EFFECTIVENESS OF THE MODIFIED APPROACH OF BIRTH PREPAREDNESS HEALTH EDUCATION THROUGH MOBILE PHONE MESSAGING REMINDERS AMONG MOTHERS ATTENDING PUBLIC ANTENATAL CARE CLINICS IN MIGORI COUNTY, KENYA

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DECLARATION

I declare that this thesis is my original work and has not been presented for a degree or diploma in this or in any other university. I declare that other people's work has been properly acknowledged.

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CERTIFICATE OF APPROVAL

This thesis was done under our supervision and guidance and the report is submitted for examination with our approval as university supervisors.

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DEDICATION

This work is dedicated to my parents Mr and Mrs Daniel Cheptum and my son Leon.

I also dedicate the work to my late sister in-law, Mrs Rose Jeruto Cheptum who passed on due to complications related to pregnancy.

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LIST OF ACRONYMS AND ABBREVIATIONS

AFIDEP - African Institute for Development Policy

AIDS – Acquired Immune Deficiency Syndrome

ANC – Antenatal Care

BP - Birth Preparedness

BP/CR - Birth Preparedness/ Complication readiness

BPP - Birth preparedness Package

CHVs - Community Health Volunteers

EDD - Expected Date of Delivery

ERC - Ethics Research Committee

FSB - Fresh stillbirth

HCP - Health Care Providers

HIV – Human Immuno-deficiency Virus

HVF - High Volume Facilities

ICAP - International Center for Acquired Immune Deficiency Syndrome Care and Treatment Programs

ICD – International Classification of disease

IEC - Information, Education and Communication

IT - Information technology

IUFD - Intra-uterine Fetal death

IMR - Infant Mortality Rate

JHPIEGO - Johns Hopkins Program for International Education in Gynecology and Obstetrics

KDHS - Kenya Demographic Health Survey

KHIS - Kenya Health Information System

KMTC - Kenya Medical Training College

KNBS – Kenya National Bureau of Statistics

KNH - Kenyatta National Hospital

MCH - Maternal Child Health

MDG – Millennium Development goal

mHealth - Mobile health

MMR – Maternal Mortality Rate

MNH - Maternal Neonatal health

MOH - Ministry of Health

MSB - Macerated stillbirth

NMR - Neonatal Mortality Rate

NND - Neonatal death

ODK - Open Data Kit

OR – Odds Ratio

PLOS - Public Library of Science

SBA - Skilled Birth Attendance

SDA – Seventh Day Adventist

SDG - Sustainable Development Goals

SMS - Short Message Service

UNFPA - United Nations Population Fund

UNICEF - United Nations Children's Fund

UON – University of Nairobi

WHO - World Health Organization

DEFINITION OF TERMS

Birth preparedness: This is a comprehensive approach for increasing coverage of skilled delivery care and reducing the three delays to care seeking during obstetric emergencies (JHPIEGO 2004).

Pregnancy: A period of nine months in which a woman carries a fertilized embryo in her womb (WHO 2015).

Antenatal care: This is the care received by a woman during pregnancy to ensure a good and healthy outcome for herself and the baby (WHO 2015b).

Health education: This is consciously constructed opportunities for learning comprising of some form of communication intended to improve health literacy, including improving knowledge, in addition to developing life skills, that are conducive to individual and community health (Health Education England 2014).

Neonatal mortality: The death of a neonate divided between early neonatal mortality (death in the first week of life) or late neonatal mortality (death after 7 to 28 days (World Health Organization, Howson, Kinney, Lawn 2012).

Maternal Mortality Ratio (MMR): This is the number maternal deaths during a given time period per 100,000 live births during the same period (World Health Organisation 2013).

Maternal Death (ICD- 10 definition): This is the death of women while pregnant or within 42 days of termination of pregnancy irrespective of the duration and the site of the pregnancy from any causes related to or made worse by pregnancy or its management but not from accidental or incidental causes (World Health Organisation 2013).

Skilled care: This is a quality of care given to the women during pregnancy, childbirth and postpartum period and her infant provided by a skilled personnel supported by an enabling

environment (necessary equipment, supplies and medicines and infrastructure) and functional referral system (WHO 2015a).

Skilled Birth Attendant (SBA): This is an accredited health professional such as midwife, doctor or nurse who has undergone education and training proficiently in the skills needed to manage normal (uncomplicated) pregnancies, childbirth and the immediate postpartum period, and in the identification, management and referral or complications in women and newborn (WHO 2009).

OPERATIONAL DEFINITIONS

Birth companion: The person who escorted the woman to the health facility during labour and delivery.

Birth preparedness kit: A bag containing baby and mother's clothes, a razor blade, sanitary pads ligatures and ANC card.

Birth preparedness: Includes: readiness for delivery; knowledge on the expected date of delivery, plan for transport arrangements, identified birth companion, planning for care of the home during her absence and ready baby clothes.

Boda boda: Mode of transport using motor cycle.

Control group: The pregnant mothers during the first and second trimester who not will be receiving the intervention - targeted birth preparedness health message and mobile phone text message reminder.

Favourable practice: Being in a position to put in place at least four of the six practices of birth preparedness (Basic knowledge of danger signs, identifying place of delivery, making transport arrangements, obtaining basic supplies for delivery; identifying a birth companion and making arrangement for a caretaker for the home while away) of birth preparedness.

Generalized teaching: Health education given to all groups of mothers during ANC visit.

Intervention: The targeted birth preparedness health message and mobile phone text message reminder given to pregnant women participating in the study.

Knowledge of birth preparedness: Information on the expected date of delivery, preparations to make for delivery and ability to tell the signs of labour and utilization of skilled birth attendance.

Matatu: Public mode of transport using motor vehicles such as vans or buses. This is a local name used in Kenya.

Modified approach of birth preparedness health education: A targeted approach of delivering health messages on birth preparedness to pregnant women during pregnancy in the ANC clinics using a mobile phone message reminder in addition to health messages provided during ANC attendance.

Mothers: Women in the first and second trimesters of pregnancy seeking antenatal care (ANC) services at the health facilities.

Partner: This is the spouse/ husband to the respondent.

Prime reproductive age: This is the age between 25 – 35 years where women are neither too young nor too old when giving birth.

Routine methods of birth preparedness health education: Methods used on a daily basis to teach antenatal mothers about birth preparedness during their ANC visits.

Rural residence: This is the geographical area located away from the town, also known as the village or countryside.

Separate –sample pre-test post-test design: In this design, the participants used for the pre-test are different from those used for the post-test.

Study group: The pregnant mothers during the first and second trimester who will be receiving the intervention - targeted birth preparedness health message and mobile phone text message reminder.

Unfavourable practice: Practicing less than four of the six practices of birth preparedness.

Urban residence: This is the place where people work and live and it is outside the villages.

ABSTRACT

Background: Various approaches have been established to address maternal mortality, which is a major problem in developing countries. Birth preparedness (BP) is one approach that has been found to effectively prevent obstetric delays that eventually contribute to lower mortalities. However, little is understood about the birth preparedness health education methods. This study aimed at assessing effectiveness of the modified approach of birth preparedness health education through mobile phone messaging reminders among mothers attending public antenatal care clinics in Migori County, Nyanza region of Kenya.

Methodology: This was an interventional study carried out in two phases. The baseline was a cross-sectional descriptive study, which utilized mixed methods. Quantitative data was collected through an interviewer-administered questionnaire while qualitative data was collected using focus group discussions (FGDs) from the mothers. The study population comprised of pregnant women in their first and second trimester attending public health facilities in Migori County. Multistage sampling method was used to select the sub-Counties and stratified sampling was used to select the health facilities. The sample size comprised of 401 participants. Four FGDs were conducted, one in each selected facility where pregnant women were randomly selected to participate. Research assistants collected data using an interviewer - administered questionnaire, while the principal investigator conducted the FGDs. Descriptive statistics were reported and regression analysis was done to test the level of significance which was $p<0.05$. Data obtained was presented in forms of figures and tables. Respondents for the second phase were recruited and followed up in the control and intervention groups. A mobile phone text message was sent to those in the intervention group of the study and the birth preparation was compared for the two groups at the end of the study.

Results: Most of the study participants (73%) were aged between 20-34 years. Majority of the respondents were married (79.2%) and most of them had primary level of education. Protestant was the predominant religion (55.2%). Housewives and businesswomen constituted 34.2% and 27% respectively. Most of the respondents (61.5%) resided in the rural areas. Only 47% of the respondents were knowledgeable on birth preparedness at baseline. The factors which affected knowledge on BP were marital status ($p=0.003$), residence, unemployment and the partner's level of education ($p=0.001$). Those who had favourable practices of birth preparedness were 56%. Health education on BP was provided to 92.6% of the respondents mostly during the first visit. Group teaching was more utilized (61.5%) in the baseline survey. Individualized teaching was utilized in the intervention group (71.2%). Documentation of the BP messages was done in 24.1% of the respondents at baseline survey. The reported challenges experienced during the teaching sessions included language barrier, unfriendly staff and poor timing of the messages. Most of the respondents (74.3%) in the intervention group had made birth preparations as compared to those in the control group (48.1%).

Conclusion: Use of mobile phone text message was effective in enhancing birth preparedness as compared to using verbal messages only.

Recommendations: Effort need to be made to enhance birth preparedness health education through use of mobile phone text message.

CHAPTER 1: INTRODUCTION

1.1 Background

Maternal and neonatal death is an issue of global public health concern. Most of these deaths occur in developing countries (WHO 2015). According to WHO, 830 women die every day due to pregnancy and child birth related causes. Most of these deaths occur in the developing countries; 550 in sub-Saharan Africa (WHO, UNICEF, UNFPA 2015) while it is 362 per 100000 in Kenya (KDHS 2014). The neonatal mortality globally is estimated at 2.7 million annually and sadly, most of these babies die within the first week of birth. Birth preparedness is one of the strategies that has been employed in reducing maternal and neonatal mortality. There is no single agreed upon definition of birth preparedness, however birth preparedness has been defined as a set of knowledge, behaviours and actions undertaken by women, families, communities, health providers and health facilities (Ayuba et al. 2012). The Family Care International (FCI) defines it as advance planning and preparation for delivery (Family Care International 2003). Birth preparedness promotes active preparation of delivery and child birth and encourages utilization of skilled birth attendance (Kaso & Addisse 2014; Markos & Bogale 2014b; Tura, Mesganaw Fantahun Afework, et al. 2014a; Moran et al. 2006).

Birth preparedness is a strategy that encompasses the mother making all plans for skilled care at birth (JHPIEGO 2004). This strategy helps pregnant women acquire skills and confidence needed to make birth a positive experience as it dissolves fears and makes pregnancy a time to remember (Kaur *et al* 2009). According to Johns Hopkins Bloomberg School of Public Health-Centre for communication programme (JHPIEGO), the preparations made for birth include basic knowledge on danger signs of pregnancy; identifying place of delivery; making transport arrangements and obtaining basic supplies for delivery such as a razor blade and baby clothes. It also includes plan

for skilled care attendance at birth; identifying a birth companion and arranging for household care support for the family while away to deliver or in case of emergencies (JHPIEGO 2004).

Birth preparedness and complication readiness (BP/CR) matrix has been developed and it points out the roles of policy makers, health providers, families and the women in facilitating skilled birth attendance thereby minimizing delays which may lead to maternal mortalities (MNH, 2004). The birth preparedness package addresses three classical obstetric delays (Thaddeus & Maine 1994). The first delay occurs when there is failure to recognize the danger signs and also delay in decision making especially in situations where a second party is responsible for making the decision to seek care when a danger sign has been identified (Thaddeus & Maine 1994). The second delay comes when the woman is unable to reach the health facility in good time owing to lack of transport and poor road networks whereas the third delay happens when the woman does not get timely assistance at the health facility (Thaddeus & Maine 1994). With the necessary information provided to pregnant women during pregnancy on birth preparedness, these obstetric delays can be avoided (Mutiso et al. 2008).

A birth preparedness tool kit developed by World Health Organization (WHO) in 2001 and revised in 2004 is aimed at assisting women, their families, communities and health workers to prepare for delivery (MNH 2004). The health care providers mainly introduce this tool kit during ANC attendance. During routine ANC visits, women are informed on birth preparedness and assisted to develop a birth plan, which include details of the planned skilled birth attendance, transport arrangements, who will accompany her and even plan for the family while she is away (MNH 2004). Health education is done using group or individual teaching and discussion. Mothers are adult learners, such that they learn best by building on their experiences and prior knowledge.

Based on the birth preparedness tool kit, it is recommended that appropriate interventions to improve information, communication and education about birth preparedness should be done (Tura, M. Afework, et al. 2014).

Knowledge of obstetric danger signs and birth preparedness are strategies aimed at enhancing the utilization of skilled care. Many women and communities lack enough knowledge on birth preparedness (Wiegers et al. 2010; Inyangala 2014). Birth preparedness is difficult to achieve especially among the relatively poor population where they are unable to identify emergency transport or set aside funds for delivery (Mbalinda et al. 2014a). One of the reasons why women are not birth prepared is due to inadequate health education methods used in delivering messages during antenatal care (Kabakyenga et al. 2011a). Birth preparedness eventually contributes to reduction in maternal and neonatal morbidity and mortality since it addresses obstetric delays which may occur during labour and delivery or in case of an emergency (D. Soubeiga et al. 2014).

Several approaches have been used to deliver health education messages. These include verbal messages, print materials such as pamphlets and posters, mass media education and mobile phone applications. A study assessing effectiveness of different methods of health education established that participants opted for a focused program in smaller groups (Saha et al. 2005). Verbal health education of patients/clients requires a multidisciplinary approach and should consider culture, literacy and clear communication methods (Marcus 2014). The changing trends and technological innovations in the world impact on health care provision. There is promising and increasing efficacy in utilization of mobile phones applications and short message service (SMS) in improving health outcomes (Rathbone & Prescott 2017; Badawy & Kuhns 2017). This study

utilized a modified approach of delivering health messages on birth preparedness to pregnant women attending antenatal care (ANC) rather than the routine approach. The routine approach is a package of ANC where all the necessary topics in pregnancy are generalized. During ANC, some of the critical topics such as labour and delivery processes are rarely covered (Magoma 2010). The modified approach adopted delivery of specific birth preparedness information through verbal messages and a mobile phone text message, short message service (SMS) reminder on key points on birth preparedness. The SMS reminder was done one month to the expected date of delivery. In addition, the verbal messages comprised other messages, which had not been included in the birth preparedness tool kit initially. These were: signs of labour and explanation about the labour as well as delivery process.

1.2 Problem Statement

Most of the times, many obstetric complications occur without warning or prediction thus they occur without prior planning (Kaur *et.al* 2009). Lack of birth preparedness has been found to be one of the factors contributing to maternal and neonatal mortality, a major global public health problem (Dieudonné Soubeiga et al. 2014). Birth preparedness in many societies is hampered by financial challenges, cultural beliefs, taboos and lack of awareness on significance of a birth plan thus hindering the preparation of childbirth and delivery (Onta et al. 2014). Most of the times, women receive pregnancy health messages in the health facilities from the health workers as part of the standardized care during ANC.

Without preparation for childbirth and delivery, it may be difficult to evade some obstetric emergencies, which could result due to lack of preparation. Even with good perception, the practice of birth preparedness was low among antenatal mothers as established in a Ugandan study (Kagali

2009). Studies carried out in Ethiopia and Burkina Faso indicated that the level of awareness of birth preparedness was low (Hiluf & Fantahun 2008a; Moran et al. 2006). The success of the birth preparedness strategy is not well known in most of sub-Saharan Africa in spite of its great possibility in reducing the maternal and newborn mortalities (Kuganab-Lem et al. 2015). According to a study done in Tharaka County, Kenya, the level of knowledge on birth preparedness was found to be low and many women did not have a birth plan (Gitonga et al. 2014).

Globally, about 289 000 women die annually because of complications of pregnancy and childbirth with 99% of the mortalities occurring in the developing countries (WHO 2014). Though there has been a drop in the maternal mortality rate (MMR) to 360/100000 (WHO, 2010), Kenya failed to achieve its Millennium Development Goal (MDG) target of reducing maternal mortality rates to 147/100000. Nyanza, one of the regions in Kenya suffers the highest maternal mortality, 660 per 100,000 higher than the national average (ICAP 2012). The region also has a high fertility rate (4.2), which is higher than the national average of 3.9 (KDHS 2014). In addition, infant mortality rate is similarly higher in the County with 50/1000 compared to the national average of 39/1000 (KDHS 2014). Out of the 47 Counties in Kenya, Nyanza region has six Counties, four of which are among the top 15 Counties in Kenya with the highest maternal mortality rate (MMR) (UNFPA 2014). These are Siaya, Migori, Kisumu and Homabay Counties. Migori, one of the Counties in Nyanza has poor maternal health indicators. The County has a MMR of 673 per 100000 with a skilled birth attendance of 47.2% (M.O.H 2015) compared to the current national average of 61% (KDHS 2014). The contraceptive prevalence in the County is 36.4% (M.O.H 2015) while the national average is 58% (KDHS 2014). These statistics indicate a need to address the maternal and neonatal health indicators.

Few studies have been done to evaluate the approaches of delivering health promotion messages to pregnant women. Studies evaluating readability and use of printed materials for health education established that written instructions posed a challenge for patients especially with limited literacy levels (Ryan et al. 2014; Grabeel et al. 2018). Use of posters in delivering health education information was found to inform the audience, however action was not taken despite the knowledge (Etter & Laszlo 2005; Nishtar et al. 2004). Despite the sharing of birth preparedness health messages in ANC clinics, birth preparedness is low and this may have contributed significantly to high maternal and neonatal mortality. It is important to evaluate the health education methods that can inform women on birth preparedness and how much of the information is retained after the health messages have been delivered. Little is known about the effective methods of birth preparedness health education among pregnant women in Migori County, Nyanza region.

1.3 Justification

Birth preparedness is a strategy that has been found effective in reducing maternal and perinatal mortalities through utilization of skilled birth attendance. The health of the mother and neonate indicates the quality of obstetric care. A randomized study established that birth preparedness interventions are significant in reduction of neonatal and maternal morbidity mortality (Dieudonné Soubeiga et al. 2014). Without preparation for childbirth, it would be difficult to prevent maternal and neonatal mortality. When pregnant mothers are aware of how to prepare for childbirth, it is possible to avert the likely complications, which can arise to the mother and the baby. In any country, maternal mortality and morbidity has a negative impact on the living children and the

family at large. This also has a negative influence on the country's socio-economic status. Neonatal mortality robs the nation of its future generation.

Kenya failed to achieve the set Millennium Development Goal (MDG) 5 target of reducing maternal mortality to 147/100000 by 2015. This is despite of the routine verbal sharing of birth preparedness health messages during ANC clinics. The focus then shifts to achievement of the sustainable development goal (SDG) 3 whose aim is to ensure healthy lives and promote health for all. One of its targets is to reduce global maternal mortality to less than 70 per 100000 live births by 2030 (GBD 2015 Maternal Mortality Collaborators 2016). Pregnant women require more education during ANC visits to enlighten and empower them pertaining aspects of pregnancy, childbirth and infant care (Al-Ateeq & Al-Rusaiess 2015). Antenatal care is an avenue that can be used to emphasize on the importance of birth preparedness (Kaso & Addisse 2014b). This study contributes significantly to obstetric care by introducing a new concept and comparing the influence of this modified and the routine approaches of birth preparedness health education to pregnant mothers. Use of mobile phone messaging can improve health status and behavior outcomes (Vodopivec-Jamsek et al. 2012).

Reduction of maternal and neonatal mortality requires combined effort by the government, individual women and the community. With the proposed modified approach of delivering birth preparedness messages, it is expected that women will retain more information about preparation for delivery and childbirth. The understanding of the importance of birth preparedness will enhance their preparedness at birth and utilization of skilled birth attendance consequently preventing maternal and perinatal mortalities (Kaso & Addisse 2014b). Nyanza province is one of the regions with the highest maternal mortalities rates (MMR) as compared to other parts of Kenya. In addition, Nyanza bears the biggest burden in infant mortality rates. Although there is a decrease

in the national average, the region still has the highest in the country with an infant mortality rate of 50 per 1000 compared to the national average of 39 per 1000 (KDHS 2014). The MMR in Nyanza's four out of six Counties is as follows: Siaya - 691/100000, Migori- 673/100000, Kisumu- 597/100000 and Homabay- 583/100000 (UNFPA 2014). In Migori County, compared to the other Counties, 45% of these maternal deaths occurred during delivery (UNFPA 2014). Migori was the County of study since the modified approach was expected to prevent obstetric delays and increase utilization of skilled care at birth thus avert mortalities occurring during delivery.

Birth preparedness intervention helps women to be ready for delivery thereby potential to decreasing deaths that can ensue during this period. An evaluation of birth preparedness health education will bring out an understanding of effective methods of delivering health messages on birth preparedness. The outcome of the study is to ensure that the intended health messages are well packaged, delivered, received and retained.

1.4 Research Questions

i. What is the level of knowledge of birth preparedness among mothers attending ANC in public health facilities in Migori County?
ii. What is the level of birth preparedness among mothers attending ANC in public health facilities in Migori County?
iii. How is the implementation of birth preparedness guidelines by health care providers in Migori County?
iv. What is the influence of modified and routine approaches in enhancing birth preparedness to mothers attending ANC in public health facilities in Migori County?

1.5 Objectives

1.5.1 Broad objectives

To assess the effectiveness of mobile phone messaging reminders over the routine strategy in enhancing birth preparedness health education among mothers attending public antenatal care clinics in Migori County, Kenya

1.5.2 Specific Objectives

i. To determine the knowledge of birth preparedness among mothers attending ANC in public health facilities in Migori County.
ii. To establish the level of birth preparedness among mothers attending ANC in public health facilities in Migori County
iii. To examine the implementation of birth preparedness guidelines by health care providers in Migori County.
iv. To compare the influence of modified and routine approaches in enhancing birth preparedness to mothers attending ANC in public health facilities in Migori County.

1.6 Hypothesis

HO: The modified approach using a mobile phone text message reminder on birth preparedness content is not effective in delivering health messages to pregnant women compared to the routine approach.

HA: The modified approach using a mobile phone text message reminder on birth preparedness content is more effective in delivering health messages to pregnant women compared to the routine approach.

1.7 Expected benefits of the study

Every pregnancy faces risk whether the threatening factors are present or not. Birth preparedness is a strategy aimed at enhancing timely utilization of skilled birth attendance therefore preventing obstetric delays. Evaluation of the birth preparedness initiative has generated inconclusive evidence about their success (Brazier et al. 2014). There has not been an evaluation on the strategy especially on the delivery of the health messages. Evaluation of the methods of delivering birth preparedness messages will help policy makers in establishing ways that can be used to reach out to women effectively. As a result, this will encourage skilled birth attendance hence reduction of maternal and newborn morbidity and mortality occurring due to preventable causes. The evaluation of health education methods on birth preparedness will aid in increasing access to maternal and neonatal health services.

The findings of this study will be useful to the government and other organizations dealing with maternal health, as it will contribute significantly to informing on planning concerning birth preparedness approaches. The findings will also identify information gaps on the health education methods of delivering health messages on birth preparedness to pregnant women. The women attending antenatal care clinics will benefit since the study will be able to establish a more reliable method of delivering health education during their visits. The families will benefit from the findings of this study since the modified approach will provide an easier and real time access to information on birth preparedness. To the community, this study provides a cost effective alternative to routine approach of delivering health messages by enabling them to keep abreast with the information on their mobile phones. As such, the findings will enhance birth preparedness through a cheap alternative. In addition, the findings will contribute theoretically to the existing body of knowledge on maternal health and in particular birth preparedness.

1.8 Theoretical framework

This section discusses the paradigm of inquiry, the philosophical approach and the theoretical perspectives that has been used in the research. These perspectives influence the choice of study methodology and also the research questions thus it is important to discuss them. In addition, it helps in understanding and interpreting the findings and the new knowledge brought forth in the study.

1.8.1 Paradigm of inquiry

The research approach depends on the problem and how it can be studied. A researcher's view of what constitutes truth and knowledge guide their beliefs and how hey frame the world around them (Kawulich 2001). This is a paradigm, which is defined as is a shared world view that epitomizes the beliefs and values in a discipline and that directs how problems are resolved (Harrits 2011). Paradigms help an individual to frame an approach to a research problem and therefore offer suggestions on how to address the issue considering the various beliefs in the world. A paradigm is informed by philosophical assumptions about the reality.

The study utilized positivism and interpretivist paradigms of inquiry sine the study adopted both quantitative and qualitative approaches. The study viewed reality as being objective and was based on verifiable measurement, thus the utilization of the positivist approach. Part of the baseline and the second phase of the study was quantitative through use of questionnaires thus the positivist approach was utilized. The study also had a qualitative aspect through the focus group discussion (FGD). An FGD was necessary to obtain the pregnant women's perception, their knowledge and practice of birth preparedness. In this situation, knowledge is subjective and the truth is dependent on the context. Therefore, the interpretivism paradigm was more suitable.

The philosophical assumption of the study was an epistemological perspective. Having a positivist paradigm of inquiry, the study was objective and independent of the researcher's view or interest. As such, it had variables which were measureable. The study aimed at a discovery that was able to predict behaviours and situations and he results would be generalizable.

1.8.2 Theoretical perspectives

Theoretical framework influences the research process since it has a relationship with the philosophical basis of the study (Wagoro 2016). Theories that explain human behavior can be used to enhance behavior change. A theory is a set of interrelated concepts, which structure a systematic view of phenomena for the purpose of explaining or predicting it (Fishbein & Cappella 2006). A theory in research enables the linking of findings from one study to another. One single theory may not be able to answer all health education problems clients come across; therefore, it is the theory that has potential benefit for a particular intervention that can be used to interpret clients' problems (Glanz et al. 2008). The aim of teaching is to influence change in human behavior, however changing habits can be very difficult.

Many theories have been identified in health education. The focus of these theories could be individual or interpersonal health behaviour or group intervention. They include health belief model (HBM), theory of planned behavior (TPB)/ Theory of reasoned action (TRA), the trans-theoretical model (TTM) or stages of change model, Precaution Adoption Process Model (PAPM) and transformative learning theory (TLT). These theories have similarities as well as differences (Glanz et al. 2008).

Rosenstock developed the health belief model (HBM) in 1966 (Stretcher & Rosenstock 1997). The main constructs of the theory are perceived seriousness, perceived susceptibility, perceived benefits, and perceived barriers (Champion & Skinner 2008). According to the theory, people will take an action if they perceive threat to their health. Although the theory is widely applied in health promotion (Jones et al. 2015), it is not suitable for this study since its main concept is that the cue to action is out of a perceived threat. Individuals tend to engage in behavior change when they perceive risk, severity of the illness and the benefits and costs of performing the behavior. In addition, the theory tends to ignore positive motivation to health (Redding et al. 2000). This study is about health promotion through health education.

The trans-theoretical model (TTM) describes behavior change as a process. Individuals do not change their behavior at once but alter gradually thereby the stages of change model. In this theory, the first stage is pre-contemplation where the person is not aware of the situation. Once informed, the person begins to contemplate taking action, therefore eventually, he/she will make a decision to take action. The action phase is marked by the person first adopting new behavior then eventually moving to the maintenance stage, which is a life-long process. The change eventually becomes a habit but this theory indicates that there might be a chance of relapse of the initial behavior. The influence of behavior change is mainly dependent on individual reasons for change, i.e. the pros and cons of behavior change. The stages of change are non-linear, meaning they do not follow a systematic flow (DeBarr 2004). This theory is useful where there is a problem and behaviour change is desired therefore making it unsuitable for this study since the aim of this research was to evaluate how effectively the mothers can learn through the various health education methods.

The TPB/TRA emphasizes that attitudes play a big role in enhancing behavior change; however, behavior change is an influence of many factors. This theory has two assumptions: behavior is under voluntary control and that people are rational beings. It explains the relationship between beliefs, attitudes, intentions and behavior. In this theory, the likelihood of changing behavior is influenced by the individual's conviction that the change will reduce their health risk and the benefits of the change. This theory is mainly applied in the context where one needs to predict behavior therefore not suitable for this study since the study is about evaluation of health education methods and not assessing risk factors (DeBarr 2004). The TPB/TRA and HBM emphasize on rational behavior and tend to ignore other factors such as the social environment, which can influence behavior. In addition, these theories are suitable for a small population where it is easy to establish behavior change. This study focuses on a large population and it considers the social environment as an influence of retention of health education messages, thus the theories are not suitable.

This study applied the integrative model of behavior prediction developed by Fishbein and Ajzen in 2010 (Fishbein & Ajzen 2010). This model was informed by the theory of reasoned action. The integrative model predicts that people act on their intentions when they have the necessary skills and when the environmental factors do not limit their behavioural actions. Behavioural intentions are signs of a person's willingness to perform an action (Fishbein & Cappella 2006). According to this model, if one has the knowledge, strong intentions and there are no environmental constraints towards performing the behavior, then there is a high probability of performing the behavior (Fishbein & Ajzen 2010). In this model, intention is perceived in three ways: attitude, perceived norm and self-efficacy (Yzer 2008). Attitude is a person's view of a behaviour whether it is

favourable or unfavourable. Perceived norm is the societal pressure one anticipates in regard to performing the behaviour. The norms include support and social networks of the performing the behaviour. Self-efficacy indicates the degree to which a person feels proficient of efficiently executing the behaviour. Attitude, perceived norm and self-efficacy represent beliefs of a particular behaviour.

In this model, behavior is defined as an action directed at a target, performed in a certain context and a certain point in time (Fishbein & Ajzen 2010). This theory has various background variables, which contribute to behavior. These are demographic variables, attitudes, personality and individual differences in how they perceive risk. These variables are flexible and can be adapted in different cultures and contexts. This theory reflects on the cultural influence as an aspect that plays a role in behavior change. It also considers the use of an intervention to change the intentions of an individual. Intentions are the immediate experiences of behavior therefore play a role towards behavior (Fishbein & Ajzen 2010). Another way of bringing change examined by this model is priming the already existing beliefs, attitudes and norms. Knowledge of the already existing assumptions will increase accessibility and acceptance of the intervention since the approach targeted on the specific beliefs, attitudes and norms. This explanation therefore indicates that changes in behavioral skills, environmental factors and behavioral intention can affect the integrative model of behavior prediction (Yzer 2008). The figure below (1.2) shows the relationship of the various variables in the integrative model for behavior prediction.

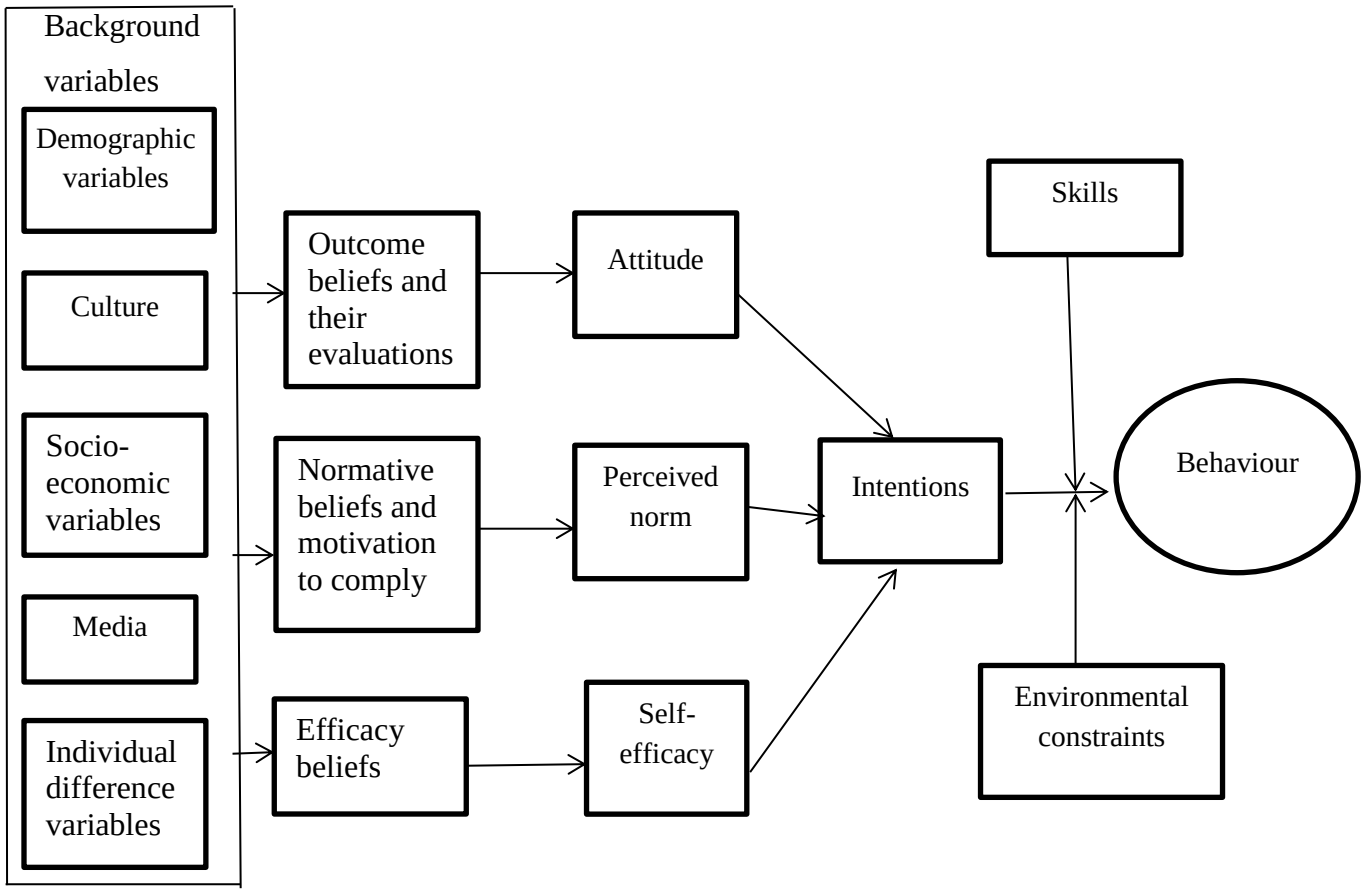


Figure 1.1: Integrative model of behavior prediction

Adapted from Yzer et.al 2007

This study was evaluating the health education approaches of delivering health messages on birth preparedness with the introduction of an intervention aimed to improve utilization of skilled birth attendance. The study involved an evaluation of an already existing behaviour on birth preparedness and aimed to bring change in beliefs about the same considering the cultural and population influences. The study relates to the integrative model of behavior prediction in that in the model, various variables, beliefs and attitude influence the intentions that in the end lead to behavior. In the study, there are variables, which influence the knowledge and practice that ultimately lead to birth preparedness.

1.9 Conceptual framework

There is an interaction between the factors contributing to birth preparedness (BP), therefore this relationship leads to the outcome. In this study, the independent variables were demographic, social cultural and obstetric factors and the means of communication. The intervening variables were implementation of the birth preparedness guidelines and the ANC environment while the dependent variable was knowledge and practice of birth preparedness. The outcome variable was reduced maternal and neonatal mortality and morbidity.

The demographic factors included age, parity, and marital status, level of education, occupation and residence. These factors contribute to knowledge and practice of birth preparedness. A knowledgeable and an informed client is likely to prepare for birth. There is an association of the level of education and birth preparedness. The preparation for birth involves use of funds for example buying baby clothes or transport arrangement, therefore a client who has resources will possibly prepare unlike one who is poor. The socio-cultural factors included religion, beliefs, taboos and norms. Cultural values in a community influence the perception and practice of birth preparedness. If it were culturally a bad omen to prepare for childbirth, the chances of a client from such a community to prepare would be minimal. The religion may also be an impeding factor such that the religious values a client believes in may not allow for the preparation until the baby is born.

The means of communication through either verbal messages, print media or electronic media will influence the knowledge and retention of the birth preparedness messages. The more effective the mode of delivery, the higher the chances of the message being understood and retained. The health education intervention is aimed at increasing awareness about birth preparedness and improving the practice on birth preparedness. The dependent variable was knowledge and practice of birth

preparedness, which will contribute to a reduction of maternal and neonatal mortality through preventing delays resulting from lack of early preparation. The outcome variable was utilization of skilled care attendance at birth. Birth preparedness was indicated through utilization of skilled birth attendance, knowledge of expected date of delivery, preparation of baby clothes, having a birth companion and having transport plan. This relationship between the factors is illustrated on figure 1.1 below.

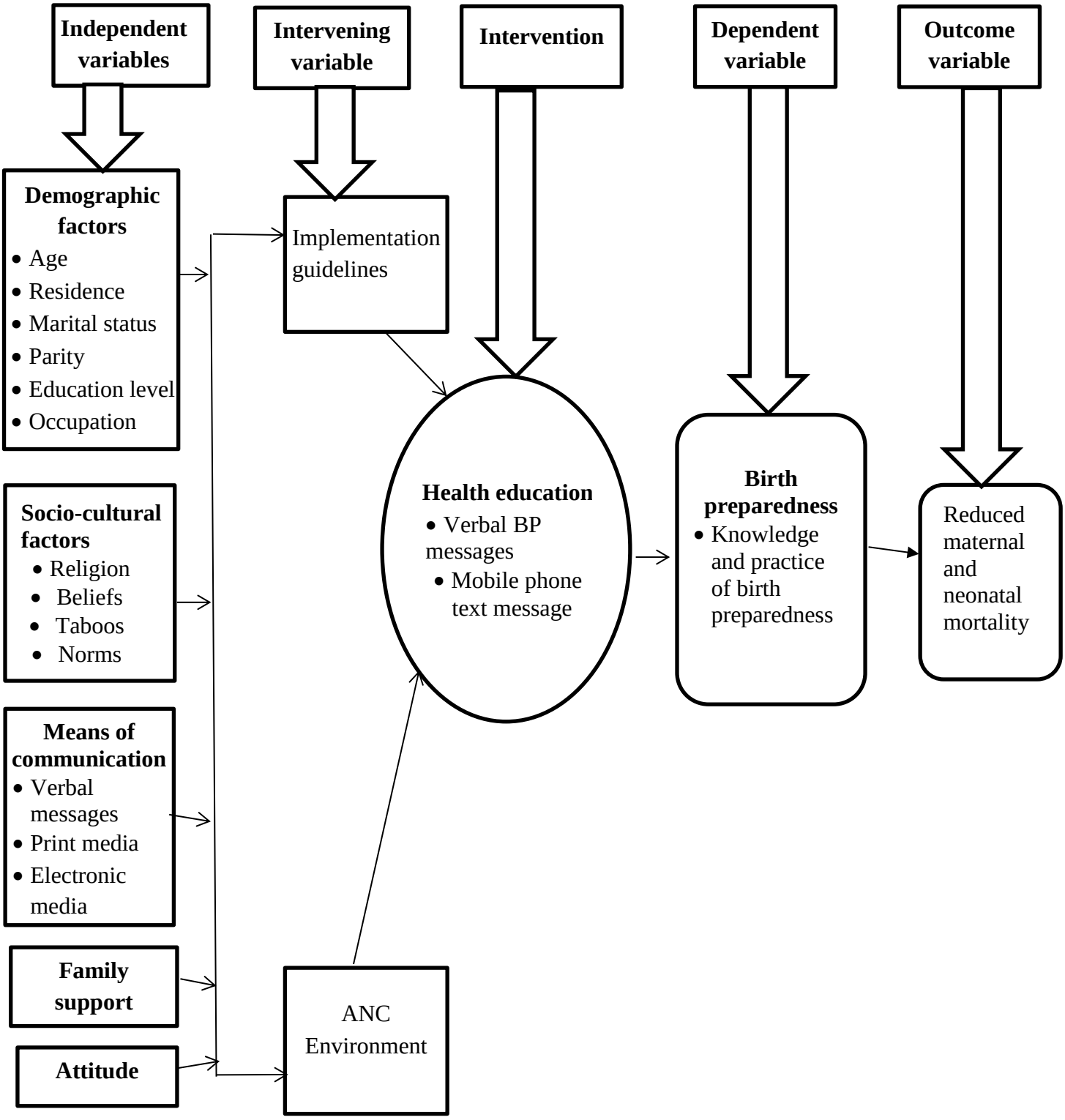


Figure 1.2: Conceptual framework

Developed from literature review

To conclude, this chapter presented the background of the study, statement of the problem, objectives, hypothesis, research and philosophical question, justification of the study, expected benefits, conceptual framework and theoretical framework. The following chapter describes the literature review.

CHAPTER 2: LITERATURE REVIEW

This chapter presents review of studies and publications in line with the objectives. The sub-themes presented are maternal mortality, description of birth preparedness, knowledge, attitude and practice of birth preparedness, factors affecting birth preparedness, information exposure to birth preparedness and use of mobile phone technology for health education.

2.1 Literature search strategy

Literature review involves looking at research work that has already been done on the research problem . Literature search was conducted through various sources. This included search of information from published scholarly articles, dissertations, ministry of health guidelines, World Health Organization (WHO) guidelines and fact sheets and any other source that was found to be credible. The electronic search was established from Google Scholar, PubMed, MedLine, Science Direct and Public Library of Science (PLOS). The key words used for literature search were birth preparedness; health education; birth preparedness knowledge, attitude and practice; mobile phone messaging and maternal mortality and neonatal mortality.

2.2 Maternal and neonatal mortality

Childbirth is a time of joy and celebration in many parts of the world. However, every pregnancy is faced with a risk of complications which may occur during pregnancy, at birth or postnatally. Globally, 289 000 women die because of complications of pregnancy and childbirth every year, an estimated 800 deaths every day (WHO 2015c) while an estimated 7000 neonates die daily (WHO 2017). Most of these deaths occur in the developing countries and mainly in the sub-Saharan Africa. In 2013, the maternal mortality ratio in developing countries was 230 per 100000

compared to 16 per 100000 in developed countries (WHO 2015c). In many cases, women die of preventable causes. The leading causes of maternal mortality include haemorrhage, sepsis, hypertensive disorders and obstructed labour (WHO 2015c).

Early identification of the symptoms and treatment can help in preventing the deaths. In Kenya, the current maternal mortality is 362/100000 (KDHS 2014). Some of the Kenya's 47 Counties are worst affected with highest maternal mortality rates, way above the national average. Four of Nyanza's six Counties (Siaya, Migori, Homa Bay and Kisumu) are among those with the highest mortality rates occurring during pregnancy, delivery and postnatally as shown on table 2.1 below (UNFPA 2014).

Table 2.1: Comparison of maternal mortality ratio in Nyanza region

County	Maternal deaths	Maternal Mortality rate (MMR)	Percent of deaths		
			During pregnancy	At birth	2 months after birth
Siaya	246	691	22	28	50
Migori	257	673	24	45	30
Kisumu	249	597	18	33	48
Homa Bay	262	583	22	34	43

Source: UNFPA, 2014

2.3 Birth preparedness strategy

Birth preparedness is a comprehensive strategy to improve utilization of skilled birth attendance (SBA) through preparation of the woman and her family, therefore reduce maternal mortality. Birth preparedness is the process of planning for a normal birth, a key strategy aimed at improving skilled birth attendance and reducing maternal mortality (Kaso & Addisse 2014a). Complications related to pregnancy and childbirth are unpredictable thus a birth preparedness plan is recommended (Markos & Bogale 2014b). Through birth preparedness health education, a birth plan is developed. This encompasses the preferred place of birth; the desired birth attendant; the location of the nearby facility for birth and in case of complications; moneys for any expenditures related to birth and in case of complications. In addition, it also includes the essential supplies to bring to the facility; an identified birth companion; an identified person to take care of the during the woman's absence; transport to a facility for birth or in the case of a complication; and identification of compatible blood donors in case of complications (WHO 2015d). As a strategy which has been found effective in averting obstetric delays, it is paramount to assess the delivery of the birth preparedness health messages to mothers attending antenatal care (ANC) since this is the forum where this information is shared.

Knowledge of preparations to be done for birth and complications readiness is increased with birth preparedness health messages (Miltenburg et al. 2015). Both the health care providers and the woman with her family play a critical role in the preparation for birth. The messages shared to the mother during ANC will empower the woman and her family to prepare for childbirth. The health messages on birth preparedness in this study were shared verbally for the control group. For the study group, in addition to the verbal messages, a mobile phone text message was sent to the clients one month before the expected date of delivery as a reminder on what to prepare.

Adequate birth preparedness could determine the health of the mother and her unborn child (Kuganab-Lem et al. 2015). Birth preparedness programmes have been found to be effective in enhancing preventive measures for decreasing maternal mortality in many regions across the world. Birth preparedness is a process that involves activities done in readiness for childbirth and delivery. These interventions aim at addressing obstetric delays, which contribute to maternal and perinatal mortalities and morbidities. The birth preparedness package includes decision-making and general preparation for delivery and childbirth. A birth preparedness package should include the following: preparation for normal delivery by selecting a skilled birth attendant (SBA) and place of delivery; preparation of necessary items for delivery and awareness of danger signs for both the mother and newborn. In addition, knowledge of where to seek help; arranging access to money and means for emergency transportation to a medical facility as well as prior identification of blood donors (JHPIEGO 2004).

Birth preparedness addresses the three obstetric delays identified by Thaddeus and Maine: delay in deciding to seek care if complication occurs; delay in reaching care; and delay in receiving care which have been found to contribute to maternal/ perinatal morbidities and mortalities (Moran et al. 2006). Saving money for childbirth and delivery has been associated with skilled birth attendance (Kumar & Singh 2013), however this may not be easy to achieve since in developing countries, many people live on less than a dollar per day (Mbalinda et al. 2014a), meaning the amount they earn may be exhausted on basic needs.

Birth preparedness has been identified as one of the ways contributing to reduction of maternal and neonatal mortalities (Dieudonné Soubeiga et al. 2014). Preparation enables increased utilization of health facility services for labour and delivery and also enables the woman and her

family to act quickly whenever an emergency occurs during pregnancy, labour and childbirth (Dimtsu & Bugssa 2014a).

2.4 Knowledge and practice on birth preparedness

Knowledge of birth preparedness is the basis for preparing for delivery and childbirth and it creates awareness of complications as well. Antenatally, pregnant women are exposed to information, which help to create awareness of danger signs during pregnancy. A study in Uganda established that understanding of danger signs was associated with knowledge on birth preparedness (Mbalinda et al. 2014b). Studies in Ethiopia recognized that women were not aware of danger signs and birth preparedness (Markos & Bogale 2014b; Kaso & Addisse 2014b). A study in Burkina Faso established that women needed to be given more information on birth preparedness (D. Soubeiga & Sia 2013). A study in Ethiopia detailed that knowledge of obstetric complications was associated with birth preparedness (Kaso & Addisse 2014b). Women who experienced obstetric emergencies in their previous pregnancies were more likely to be knowledgeable on birth preparedness (Mbalinda et al. 2014a).

A study in Burkina Faso revealed that women who had the knowledge of at least five danger signs of pregnancy and childbirth would utilize skilled birth attendance as compared to those who had little knowledge of danger signs (Moran et al. 2006). Knowledge of danger signs was significantly associated with saving money and planning for transport to the place of delivery (Ekabua et al. 2011a). Women who had given birth in a health facility previously were likely to be birth prepared (Kaso & Addisse 2014b). In a Nigerian study, only 34% of the pregnant women were birth prepared and knowledge on danger signs was low (Kuteyi et al. 2013). According to a study done

in Guinea, women's knowledge on birth preparedness was associated with increased preparation for birth; however, they were not necessarily motivated to utilize maternal health services by knowledge of complications or danger signs (Brazier et al. 2014).

Several studies have found out that women who had arrangements about their birth were more likely to utilize SBA compared to their counterparts who had not (Karkee et al. 2013; Agarwal et al. 2010). When mothers build trust in health facility services, they are likely to utilize SBA. Utilization of health facility services is also influenced by previous obstetric history. In cases where a woman has had misfortunes in the past, they are more likely to utilize skilled care as compared to those who have had uneventful experiences during pregnancy and childbirth (Ibadin et al. 2016). In Uganda, only 35% of the women who had previously given birth were birth prepared (Kyenga *et.al* 2011) and 47.8% in India (Agarwal et al. 2010). Even women who had attended ANC lacked knowledge on birth preparedness according to studies in Ethiopia (Markos & Bogale 2014b), therefore putting the question of the quality of birth preparedness information given by health professionals during the ANC visits.

Despite women attending ANC, most of them never made any preparations for birth according to a study among postpartum women in Ghana (Kuganab-Lem et al. 2015). An Ethiopian study found out that the practice of birth preparedness was low with only 17% being birth prepared (Markos & Bogale 2014b). In Burkina Faso, it was established that most women (83.1%) planned to save money for labour and delivery but few of them (46.1%) had a plan for transport to the health facility during delivery or a complication (Moran et al. 2006).

2.5 Women's perception on birth preparedness

Perception plays a very important role in utilization of ANC and skilled birth attendance, which is a function of being birth prepared. A study in Nicaragua documented that utilization of ANC and delivery services was dependent on the perception of the individual woman and the community (Lubbock & Stephenson 2008). Attitude plays a critical role in enhancing knowledge, behavior and practice in an individual. The attitude of women was associated with birth preparedness in a study carried out in Ethiopia (Debelew et al. 2014a). A Burkina Fasso study on birth preparedness for maternal health showed that women had a positive attitude towards delivering in health facilities however they encountered challenges such as transport to the health facility (Moran et al. 2006). Despite women having good perceptions about birth preparedness, birth preparedness planning was poor among antenatal clients according to a study in Uganda (Kagali 2012). Generally, women have a positive perception that health care providers are able to handle complications if they arise during pregnancy, labour and delivery since they possess equipment and skills (Lerberg et al. 2014).

2.6 Socio – demographic factors affecting birth preparedness

Socio-demographic factors can significantly be associated with birth preparedness and utilization of skilled birth attendance (Kuganab-Lem et al. 2015). Several studies have reported low level of education, occupation, distance to the health facility, services offered at the health facility and staffing as factors which affect birth preparedness eventually leading to unskilled birth attendance (Kaufmann et al. 2010; (Ekabua et al. 2011b). Knowledge of danger signs of obstetric emergencies and appreciation of the need for rapid and appropriate response when emergencies occur may reduce delay in decision making and in reaching health facilities (Mutiso et al. 2008). Planning to

save money for delivery was associated with giving birth with the assistance of a skilled provider (Moran et al. 2006). A study carried out in Edo, Nigeria established that education level and occupation were determinants of birth preparedness (Ibadin et al. 2016). Older age, maternal government employment and higher social class was significantly associated with birth preparedness (Aduloju et al. 2017).

Parity is a great determinant in BP/CR according to a study in Nigeria (Ekabua et al. 2011a) and also in Goba district, Ethiopia (Belda & Gebremariam 2016b). Elderly primigravidas have a risk of developing pregnancy and childbirth complications due to diseases such as diabetes mellitus and pre-eclamptic toxaemia thus are likely to deliver by operative delivery despite lower gestational age or baby's birth weight. A study (Al-Turki et al. 2003) suggested that women in the age group of >35 years should be informed of their pregnancy expectations and outcomes. Age at first birth and the number of live births were also associated with utilization of skilled birth attendance and birth preparedness (Belda & Gebremariam 2016b).

2.7 Socio-cultural factors affecting birth preparedness

Socio-cultural barriers have been identified to contribute to delay in seeking health care owing to various beliefs according to maternal and neonatal health (Maternal Neonatal Health Programme 2001). These factors serve as a hindrance to adoption of good practices such as health facility delivery, hygienic cord care and maternal and infant nutrition during pregnancy and post-delivery. These barriers potentially increase the risk of obstetric and newborn complications. BP/CR prevents delays in decision making especially in societies where decision-making does not entirely depend on the woman (Maternal Neonatal Health Programme 2001). A study in Nepal established

that women did not seek health care services at birth even if the health facility was near because of the cultural practice of isolating a woman during delivery and a few days after birth (Onta et al. 2014).

2.8 Obstetric factors affecting birth preparedness

Obstetric factors can influence the knowledge and practice of women on birth preparedness. A Nigerian study established that a woman's gravidity, knowledge on ANC attendance, number of ANC visits and outcome of previous deliveries were significantly associated with birth preparedness (Ibadin et al. 2016). A study in Ethiopia documented that history of a stillbirth and attendance of ANC in the preceding pregnancy were significantly associated with birth preparedness and complication readiness (Bitew et al. 2016). In addition, the study also recognized that male involvement in ANC led to birth preparedness (Bitew et al. 2016).

2.9 Delays in obstetric care

Delay in seeking skilled birth attendance has contributed to maternal and neonatal mortalities. These delays may occur in recognizing the problem due to lack of awareness of danger signs, delay in deciding to seek care owing to inability to make decision or unavailability of the decision maker (men are mostly decision makers in some communities). Lack of autonomy in decision-making has led to delays in seeking care. Women should be empowered to make decision without necessarily waiting for their partners or family members (Inyangala 2014).

Findings from a study in Burkina Faso indicated that distance to the health facilities led to lack of skilled birth attendance (Moran *et al* 2006). An Ethiopian study also established that distance to

the health facility and availability of ambulance services for transport was associated with birth preparedness (Belda & Gebremariam 2016b). Other delays may occur due to lack of transport to the health facility and delay at the health facility due to lack of equipment and staff. Lack of transport is a main challenge in developing countries as identified in a number of studies (Thaddeus & Maine 1994; Matsuoka et al. 2010; Lerberg et al. 2014). Cost of care and transport in accessing skilled care are addressed in birth preparedness (Tura, M. Afework, et al. 2014).

2.10 Utilization of health facilities

In the developing countries where most of the maternal and neonatal mortalities occur, most women deliver without skilled birth attendance. In Kenya, ANC attendance is at 95% however, utilization of skilled birth attendance is only 61% (KDHS 2014). In Nyandarua, utilization of skilled care at birth was found to be low and many women were attended to by unskilled attendants (Wanjira et al. 2011). In Burkina Faso, many women planned to give birth where there was skilled attendance for their own health safety (Moran et al. 2006). The barriers which impede women from utilizing health facilities during delivery include lack of transport and negative perception of health care providers despite the perceived benefits in the health facilities(Lerberg et al. 2014).

2.11 Approaches for health education

Exposure to information has been recognized as an effective way of changing attitudes, social norms and behavior (Asp et al. 2014). Most women in sub-Saharan Africa especially those who are unlikely to access health care have a high level of unmet need for information on pregnancy complications (Nikiema et al. 2009). According to the Birth preparedness/ Complication (BP/CR)

matrix, there are indicators that help in assessment of individual readiness for delivery (JHPIEGO 2004). Use of printed media can be used to improve antenatal care and institutional deliveries (D. Soubeiga & Sia 2013). In comparing mass media exposure through the various media channels, a study in Uganda established a significant relationship between reading newspapers and being birth prepared irrespective of the number of exposures as compared to radio which showed no association (Asp et al. 2014). According to a Nepal study which sought to assess the effectiveness of birth preparedness programmes, health education can positively influence knowledge and intermediate health outcomes (McPherson et al. 2006) however they do not positively influence household behaviours and birth planning. In addition, it also established that the source of exposure to birth preparedness messages had an influence on knowledge and behavior of the women on birth preparedness (McPherson et al. 2006). A study assessing use of posters in changing people's behavior in having their blood pressure checked was faced with limitations and its effectiveness could not be established (Nishtar et al. 2004). Use of written materials for patient education can improve health outcomes, however it is hampered by limitation of literacy and also the need to patients' understanding of the written messages (Ryan et al. 2014). Mobile phone applications have been identified as an avenue for sharing health messages however, its efficacy and effectiveness in promoting health need to be established (Badawy & Kuhns 2017).

2.12 Mobile technology in health education

Use of mobile phones is an emerging technology in sharing health messages and even for reminding clients/ patients of their hospital appointments. There is an increase in mobile phone ownership in Africa. Despite the increasing popularity of using mHealth technology in delivering health education messages, it is still in early stages of development in developing countries and

also the evidence for its efficacy is limited (Marcolino et al. 2018). Kenya is one of the most technologically advanced country in Africa with a mobile phone penetration of over 90% according to the communications authority (Kemibaro 2016). Randomized controlled trials in a review study established that mobile technology can help improve health outcomes in chronic conditions, self-management and post-hospitalization care (Sahu et al. 2014).

In health education, mobile phones can be used to deliver health messages through short messages services (SMS), learning modules or video lectures (Nahm 2013). A study in Zanzibar established that use of mobile phone technology in health education improved outcomes among women in urban areas but did not reach the rural area (Lund et al. 2013). Safaricom, the leading mobile phone technology company in Kenya has developed a number of mobile health (mHealth) applications aimed at improving health care. A systematic review on mobile text messaging for health established that there were good outcomes of its utilization, however, there was need to assess the long term intervention effects and cost-effectiveness of the technology (Hall et al. 2015).

2.13 Literature gaps

In Migori County, maternal mortality is high and most of the deaths occur during delivery. There is knowledge gap on birth preparedness as established in most of the studies. In most studies, the respondents were knowledgeable on only a few aspects of birth preparedness and mostly did not know about danger signs in pregnancy. Despite the women having a good perception on birth preparedness, its practice was low. The practice of birth preparedness in most of the studies was low especially saving finances for delivery and childbirth and planning for the family while away. Most women attended ANC, however they still did not prepare for birth. There is an information

gap among most women in sub-Saharan Africa as a result compromising on their access health care. Birth preparedness is affected by socio-demographic and socio-cultural factors which eventually lead to lack of utilization of skilled birth attendance. Mobile phone technology has been used in promotion of health, however its effectiveness in improving birth preparedness has not been established. Also, use of mobile phone technology to improve health outcomes in rural areas has not been established. Therefore, there is need to evaluate its effectiveness in enhancing birth preparedness.

The evaluation of the messages therefore pegs on the questions: How effective is health education on birth preparedness through verbal means alone? How effective is health education on birth preparedness through verbal means and a mobile phone text message reminder one month to delivery? This study also found it important to evaluate whether individual or group teaching is effective in enhancing health messages on birth preparedness.

In summary, the background of maternal mortality globally, regionally, in Kenya and in the study area was discussed. In addition, birth preparedness strategy, the factors affecting birth preparedness, its knowledge, attitude and practice across the world were also described. The benefits of birth preparedness have also been cited as explained in various studies. Health education approaches used for sharing health messages to pregnant women regarding birth preparedness was described. Finally, the benefits and use of mobile technology in delivery of health messages was discussed. The next chapter describes the materials and methods utilized in the study.

CHAPTER 3: METHODOLOGY

This chapter presents the description of methodological approach used in the process of data collection and analysis. It covers the study design, study population, study area, sample size and sampling technique, inclusion/ exclusion criteria, research instruments, research assistants, data collection methods, data management plan, data analysis and presentation, ethical considerations and study limitations.

3.1 Study design

This was a randomized control study, which utilized the separate pre-test post-test sample design. Quantitative and qualitative methods were utilized through the use of an interviewer-administered questionnaire and a focus group discussion and observation respectively. It involved the baseline and the interventional phases. The respondents who participated in the baseline survey were not followed up thereafter. Seven months after the baseline survey, recruitment was done and those recruited to the interventional phase were followed up until delivery. The health facilities for study were selected randomly from high client volume facilities in the County. There were two groups, the control and study groups. The study group received the intervention while the control group did not. Randomization was done at the level of the facilities.

3.1.1 Description of the intervention

The intervention was provision of verbal health messages on birth preparedness and a reminder through a mobile phone text message one month to the expected date of delivery (EDD). There was one session for sharing verbal messages on birth preparedness during the client's first visit to ANC and a review done on birth preparedness during the second visit. Contact details of the

participants in both groups were taken so that follow up would be done to establish their level of birth preparedness within 24 hours after delivery. The text message was short and informative, reading:

"**Remember to come and deliver in the hospital. Maternity services in the government hospitals are free. Identify transport means and set aside fare. Carry a bag with your supplies and baby clothes"**.

"Kumbuka kuja kujifungua hospitalini. Huduma za uzazi katika hospitali za serikali hailipwi. Tafuta chombo cha usafirishaji mapema na utenge fedha ya nauli. Beba mfuko ulio na mahitaji yako na nguo za mtoto". (Kiswahili)

"Par mondo idhiinyuol e hosiptal mar sirikal. Nyuol ei osiptande piny owach en nono. Chan mana kaka inyalo chupo. Ineni iting'o ofuko moromangi giki minyalo tiyogo kod lep nyathi". (Luo (local language))

3.1.2 Phase one of the study

The first phase, which was the baseline survey was a cross sectional study using quantitative and qualitative methods to assess knowledge and practice of birth preparedness among pregnant women in the selected health facilities. In addition, the pregnant women were interviewed to establish the methods used to deliver health education messages on birth preparedness to them during antenatal care (ANC). An interviewer-administered questionnaire was used to collect quantitative data. Focus Group Discussion (FGD) was used to collect qualitative data from pregnant women attending the selected facilities for ANC. One session of FGD was organized per

facility since the aim was to establish baseline data. The FGD comprised of pregnant women randomly selected to participate in the discussion irrespective of their age, parity or number of ANC visits attended. The research assistants who were trained on the process of data collection carried out the collection of quantitative data during the clients' ANC visits. Information obtained from the first phase of the study was used to design the second phase of the study.

3.1.3 Phase two of the study

The second phase involved two groups of pregnant women attending ANC clinics in the public health facilities in the study area. One group formed the control group and they received health education information about birth preparedness during their routine ANC visits through the usual approaches used in the clinics. The second group was the study group and they received the intervention which was the health education messages of birth preparedness using the modified approach that was developed from the baseline findings based on the data obtained from the first phase of the study.

To assess the level of birth preparedness, an evaluation was done on what the women put in place in terms of preparation for childbirth using an observation checklist. The preparations that were checked on the checklist included delivery at a health facility, having a bag with supplies (clothes, razorblade, ligature, gloves, sanitary pads) in readiness for delivery, having ready means of transport to the health facility, a birth companion, finances and a caretaker in the home. A comparison of the control versus the study group was done to compare the health education approaches. The diagrammatic presentation of the study design is illustrated on figure 3.1 below.

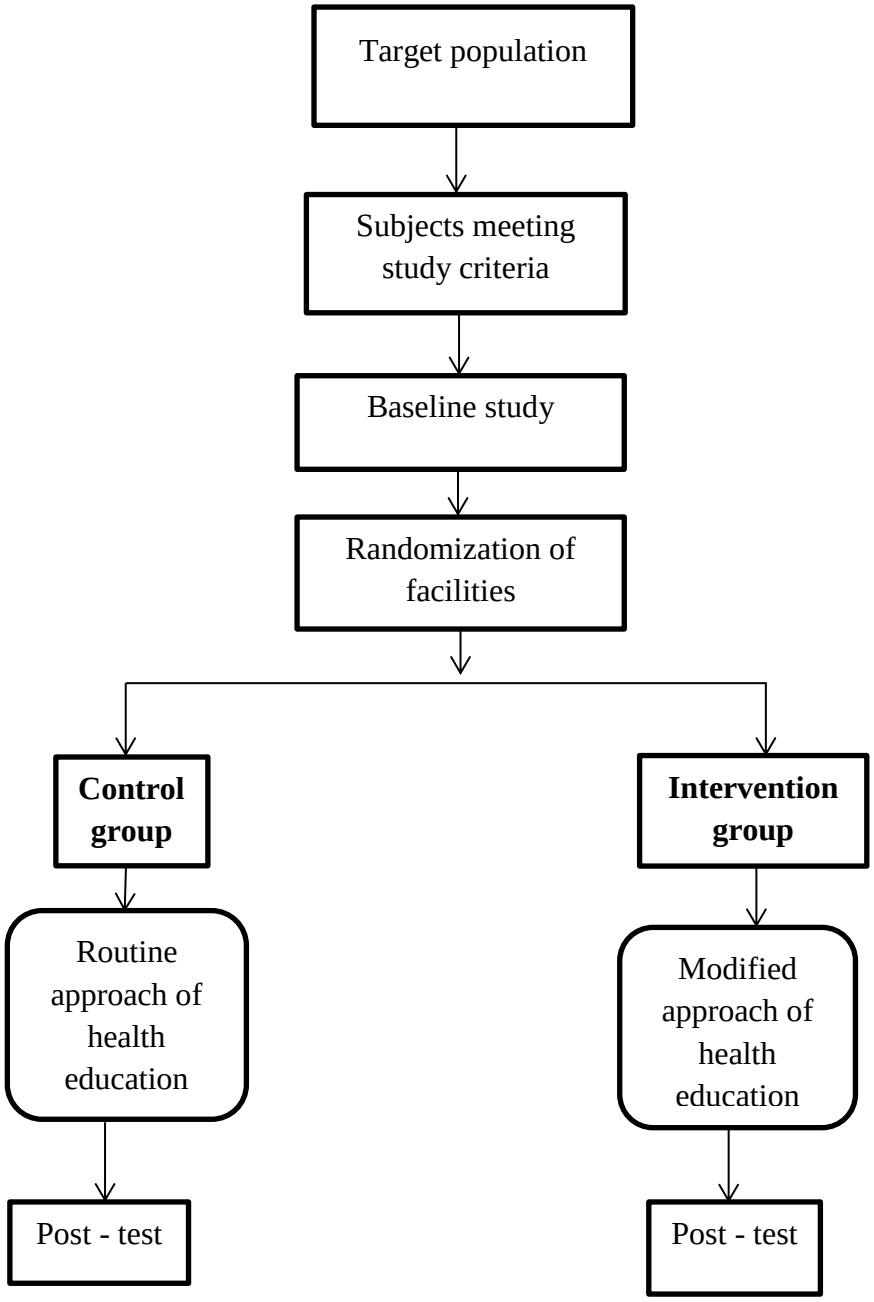


Figure 2.1: Diagrammatic representation of the study design

3.2 Study area

The study area was Migori County in Nyanza region, the fifth largest province in southwestern Kenya. Migori County borders Homa-Bay, Kisii and Narok Counties (Appendix XX, page 239). Migori covers an area of 2,597 Km^2 and is composed of four sub-counties: Rongo, Awendo, Migori and Kuria. Migori County has five constituencies namely: Rongo, Migori, Uriri, Nyatike and Kuria and its capital is Migori. Part of Lake Victoria; the largest lake in Kenya is located in this region. In 2009 census, the County had a total population of 917,170 with 48% males and 52% females (KNBS 2009). It has a population growth rate of 3.05%. Luo – speaking, Gusii and Kuria communities, mainly inhabit the County. The Luo speaking community is largely known for fishing as the major economic activity, the Gusii practice arable farming while the Kuria community is largely cattle keepers. Other economic activities in the County include manufacturing and mining.

The main agricultural products are maize, millet, sugarcane, sorghum, groundnuts, cassava, sweet potatoes, beans, Sukuma-wiki and sweet bananas. This makes the County less prone to famine. The County has 43% of its population living on less than one USD per day (M.O.H 2015).

The County has four county hospitals and six sub-county hospitals with a doctor to population ratio of 1:52,280 and 35 nurses per 100000 based on the integrated payroll and personnel database (M.O.H 2015). It has 18 health centres under the ministry of health. In governance of the health institutions, the county has eight sub-counties through which the health reports are submitted to the County head offices. The prevalent diseases in the County are Malaria, HIV/AIDS, diarrhoea and Upper respiratory Tract Infections (URTI).

On the health indicators, the total fertility rate is 5.3, adolescent birth rate is 136 per 1000 (girls aged 15-19), maternal mortality rate is 673/100000 live births. Skilled birth attendance is 53%

while contraceptive prevalence is 44% with an unmet need of 34% (AFIDEP et al. 2017). All these indicators are above the national average. In the Month of January – March 2015, the total number of deliveries that took place in the health facilities Migori County were 8424 (County Health Statistics 2014). The table below illustrates the number of deliveries per sub-county.

Table 3.1: Migori County number of health facility deliveries and neonatal deaths (Jan-March 2015)

Sub-County	**Number of health facility deliveries**	**Number of neonatal deaths**
Awendo	288	0
Kuria East	803	0
Kuria West	1338	5
Nyatike	1387	0
Rongo	820	9
Suna East	1451	28
Suna West	426	1
Uriri	975	0
Migori	936	2
Total	**8424**	**45**

Source: County Health statistics

3.3 Study population

The study population composed of pregnant women irrespective of their parity attending public antenatal care clinics in Migori County, Nyanza region of Kenya.

3.4 Inclusion criteria

- Pregnant women attending antenatal care clinics in public health facilities in Migori County.
- Pregnant women in first trimester up to 32 weeks gestation of pregnancy.

3.5 Exclusion criteria

- Pregnant women who were sick at the time of the study.
- Pregnant women seeking services other than antenatal care.
- All pregnant women who did not consent to the study.
- Pregnant women who already had attended the birth preparedness classes.

3.6 Sample size determination

The study sample was separate for phase one and phase two, thus those who participated in phase one did not participate in phase two. The sample size for the baseline study was determined using the Fisher's formula for large populations as follows:

$$n = \frac{z^2 pq}{e^2}$$

$$n = \frac{1.96^2 X\, 0.47 X\, 0.53}{0.05^2}$$

Where

- **n** is the sample size
- **z** is the confidence interval at 95% α- 1.96

- **p** is the estimated level of awareness of birth preparedness (47%) This is based on the current utilization of skilled birth attendance in Migori County (KHIS, 2012).
- **q** = 1-p
- **e** is the margin of error at 5%
- **n= 382**

An anticipated non-response rate of 5% was added; therefore the sample size was **401.**

Sample size calculation for the second phase of the study was based on the effect size of the intervention. In this study, the outcome is knowledge on birth preparedness and level of birth preparedness. The study will have a power (beta) of 80% to yield a significant effect. The significance level (alpha) was at 5%.

The required sample size per group (n_I) under individual randomization was calculated using Equation 1.

$$n_I = 2\sigma^2 \left[\frac{(z_{\alpha/2} + z_\beta)^2}{d^2} \right]$$ ..... **Equation 1 (**Donner A, Birkett N, Buck C, 1981)

Where

n_1 is the number of individuals required per group under individual randomization

$z_{\alpha/2}$ Is the standard normal deviate for a given level of significance (1.962%)

$|z_\beta$ Is the power (0.84)

d denotes the difference to be detected (10%)

σ^2 the variance in the outcome

With the power set at 80%, the required sample size per group to detect an increase in knowledge and practice of birth preparedness by ten percentages points, under individual randomization, is n_1 = **370.**

Equation 2 was utilized in computation of the corresponding number of individuals per cluster under cluster randomization:

$$m = \lceil \frac{n_1(1-\rho)}{(k-n_1\rho)} \rceil$$ …….. **Equation 2**

Where

m is the number of individuals required per cluster in a cluster randomization

n_1 is the number of individuals required per group under individual randomization (**370**)

k is the number of clusters (4 high client volume facilities (HVF))

ρ is the estimated intra-cluster correlation (0.005)

Under the assumption that ρ = 0.005, **185** individuals were required per group in the selected facilities. Therefore the study group had 185 respondents and the control group 185, totaling to 370 respondents.

3.7 Sampling technique

3.7.1 Phase one of the study

Multistage sampling was used to select the county and sub-counties of study. This entailed utilization of different sampling strategies (Chernick 2011). Nyanza region was purposively selected due to poor maternal health indicators. The County of study was selected by simple random sampling. The region has six counties therefore, six pieces of paper were written the

county names. The researcher shuffled the pieces of paper in a container and picked one piece. This was written Migori County.

Once the county had been identified, simple random sampling was done to select two sub-counties of study in Migori County. All the sub-counties were listed on a piece of paper and allocated random numbers then these papers were folded and put in a container, which had a lid. It was then covered and shaken to allow for proper mixing inside the container. Once it had been shuffled thoroughly, the reproductive health coordinator did picking of the numbers. The first two numbers that were picked were chosen as the sub-Counties of study. From the selected sub-counties, the health facilities were stratified as high and low client volume facilities. The high client volume facilities were then listed and random numbers were allocated. Using a computer, four of the facilities were selected by simple random sampling. The sampling frame was obtained from the County records office's list of public health high client volume facilities.

Each day in the health facilities, there was an average of 30 clients attending ANC. The respondents were selected using systematic random sampling. The study aimed at recruiting 370 respondents in a duration of 8 weeks. This meant that each day, a maximum of 10 respondents were to be recruited. The sampling interval was therefore 30/10, which translated to 3 indicating that every third pregnant woman who met the inclusion criteria in the selected health facilities was interviewed. Based on their order of arrival to the health facility, the first client to be interviewed was decided using the rotary technique. They were allocated random numbers which were folded and placed in a container. One nurse on duty in the first facility did hand picking of the number where data collection began. The nurse picked number 3. This then became the k^{th} number. There was a random start for first client then the k^{th} number (3^{rd}) was used based on the order of arrival to the health facility.

For the Focus Group Discussions (FGD), eight pregnant women irrespective of their age, gestation or parity were selected in every facility. Once a good quorum had formed in the ANC clinic, the pregnant women were explained to about the study. Ballot papers written 'Yes' and 'No' were put in a container, shaken and given to the women to pick before the service provision started. The women who attended ANC on the day of FGD were asked to pick random papers which were written 'Yes' and 'No'. Eight respondents participated in the FGD. They were explained to that irrespective of what they picked, whether 'Yes' or 'No', this would not have any effect on the provision of services to them. Those who picked 'Yes' participated in the FGD.

3.7.2 Phase two of the study

In the second phase of the study, the facilities selected in the first phase of the study were used. Randomization was done on the facilities that were used for the baseline information to select two facilities, which were used to obtain control group and two to obtain the study group. Pregnant women attending the selected health facilities who met the inclusion criteria were selected through systematic sampling. A study participant who met the inclusion criteria was randomly picked then every 3rd client in the order of arrival to the clinic was picked until the sample size was achieved. Once picked for the study, the client was informed so that they were not recruited again. The contacts of the respondents recruited to the study group were taken and recorded in the research book so that a reminder on birth preparedness was done one month to her expected date of delivery. For those in the control group, their contacts were also be taken to follow them up. An evaluation of the knowledge on birth preparedness and level of birth preparedness was done for both groups within 24 hours after delivery.

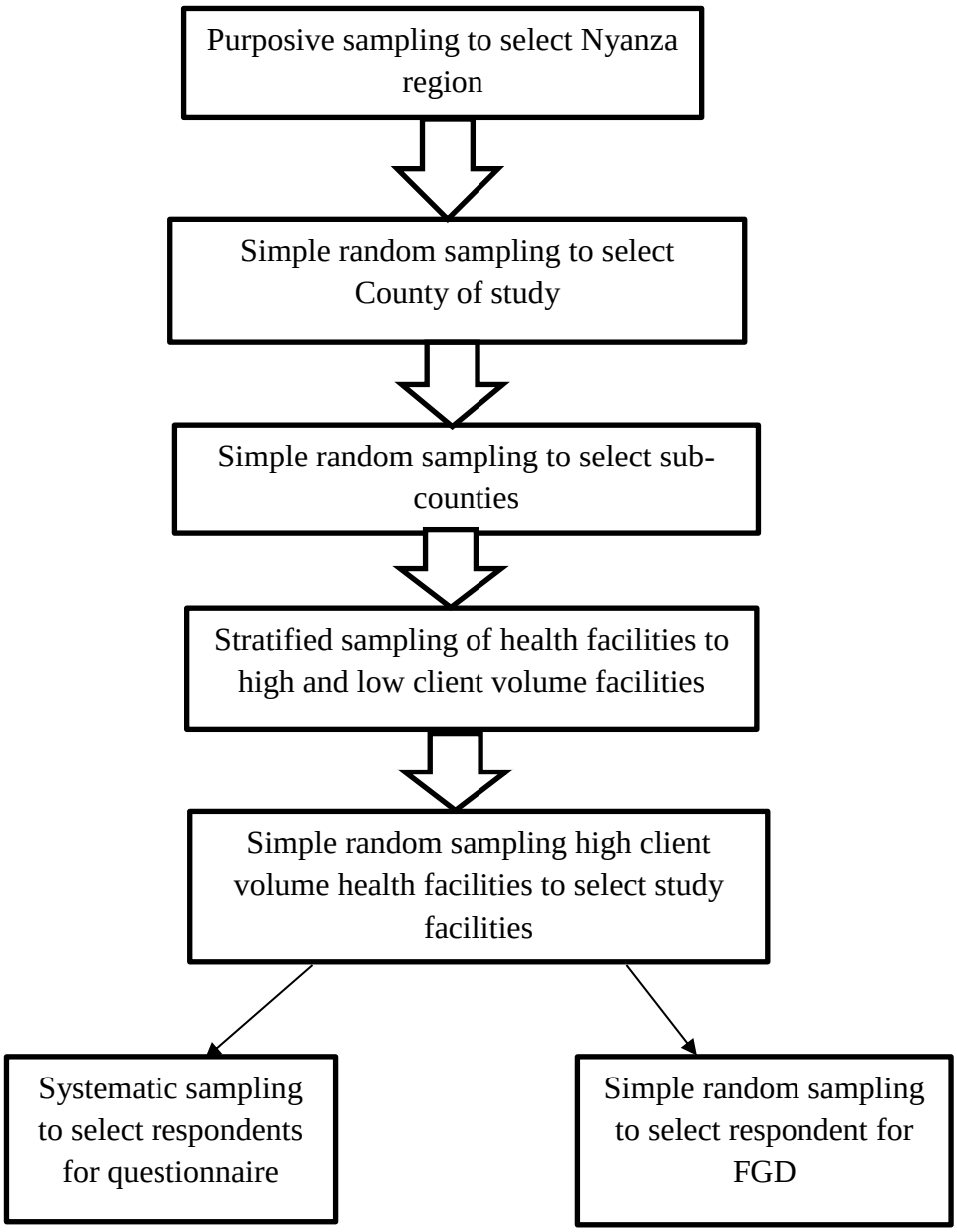


Figure 3.2: Diagrammatic representation of the sampling technique

3.8 Study variables

The dependent variable was the knowledge of birth preparedness (ability to recall what to prepare for birth, the supplies required and the arrangements made for delivery) within 24 hours after

delivery and level of birth preparedness (bought baby items, identified transport to health facility and delivered by skilled birth attendant) as observed by the research assistants. The observation was made within 24 hours after delivery since they would still be in hospital before they were discharged. The confounding factors were controlled through multivariate analysis. The independent variables were demographic, obstetric and socio-cultural factors affecting birth preparedness and the source of birth preparedness information.

3.9 Research instruments

The first phase of the study utilized quantitative and qualitative methods. For quantitative method, data was collected through use of interviewer-administered questionnaire (Appendix XVI, page 216) which was researcher-generated. It consisted of five sections: socio-demographic data, knowledge on birth preparedness, source of information on birth preparedness, obstetric history and the practice of birth preparedness. The questionnaire had forty four (44) questions and took an average of twenty minutes to interview a respondent. The questionnaires were administered to the mothers to gather data on their knowledge and practice of birth preparedness.

Qualitative data was collected from mothers attending ANC through a Focus Group Discussion (FGD) on birth preparedness. An FGD guide (Appendix XVII, page 225), which had specific key questions to guide the discussion, was used to collect information. Audiotape recorders were used during the discussion to record the information in order to aid in data analysis.

The second phase of the study employed quantitative method where an interviewer-administered questionnaire (Appendix XVIII, page 226) was used to gather data on the knowledge of birth preparedness from the control and study groups for comparative results after intervention. The

researcher, based on the information obtained from the baseline survey designed the questionnaire. It had six sections namely: socio-demographic data, obstetric history, knowledge on birth preparedness, birth preparedness health education messages, the practice of birth preparedness and the use of specific birth preparedness messages and mobile phone text message reminder. The questionnaire had fifty(50) questions and took an average of thirty minutes to interview a respondent.

Qualitative data was collected using a birth preparedness observation checklist (Appendix XV, page 215) where observation was used to collect data regarding the preparation that the mothers had done during delivery.

3.10 Training Research assistants

For baseline survey, the research assistants were community health volunteers (CHVs) and nursing students from the Kenya Medical Training College (KMTC) in their final year of study. In three of the selected health facilities located in the rural set up, CHVs from the community health units linked to the health facilities were trained to be the research assistants while the nursing students assisted in the urban facility. The CHVs were used because of their accessibility to the health facilities and ability to trace the recruited clients. The nursing students in their final year had done research as a unit in their course and were able to participate in the study. Research assistants who were be able to speak English or Kiswahili and the local dialect were selected. This was able to safeguard against language barriers since some of the respondents were not be able to communicate in either English or Kiswahili. In each facility, the nursing officer in-charge was trained to oversee the process of data collection. Training of the assistants was done using the research tools to ensure

quality of the tool was maintained. Once training was completed, the research assistants were engaged in the pre-testing of the research tools and the trained nursing officer in-charges with the principal researcher supervised the data collection process.

3.11 Pre-test study

A pre-test study was carried out to test the feasibility of the study instruments at Nyamaraga Sub-County hospital. This facility was not used for the main study. Ten percent (n=40) of the questionnaires were pre-tested in the antenatal clinic of the sub-County hospital. The eligible respondents in the facility had similar characteristics with the respondents of the main study. The pre-test gave an opportunity to assess the reliability and validity of the study, whether some questions could be added or removed.

Reliability is the ability of the research tool to consistently reproduce similar results while validity is the ability of the research instrument to measure what it is intended to measure (Creswell 2014). Validity and reliability was ensured through training of the research assistants thoroughly about the data collection procedure and use of the mobile phone software application – open data kit (ODK) for data collection. The questionnaire was well designed and pre-tested to ensure the appropriate information was collected. During the data collection process of the first phase of the study, the questionnaires were checked continuously to avoid systematic errors.

In the second phase of the study, the ODK software was used for data collection. The research assistants sent the completed questionnaire immediately they had entered information and the principal researcher rechecked to ensure completeness of the data. Reliability was also ensured

through constant communication between the research assistants and the principal researcher so that if there was any difficulty it would be solved immediately.

To ensure trustworthiness in the qualitative part of the study, the focus group discussion guide was pre-tested. In addition, the participants were clearly informed of the research and honest answers were encouraged.

Based on the pre-test, questions that were found unclear or confusing were modified. The pre-test led to the modification of the research tool where four questions which had been initially designed were modified. The average time it would take for the respondent to answer questions on the questionnaire and conducting the focus group discussion was also estimated. During the pre-test, the language appropriateness of the research tools was also tested to ensure that the respondents understood the message and the tone of the questions was appropriate. Qualitative and quantitative data was triangulated to ensure credibility of the study findings.

3.12 Data collection process

3.12.1 Phase one data collection process

Data collection was carried out using the interviewer-administered questionnaire for the quantitative data. The respondents were informed about the purpose of the study and their consent was sought before the interview. The questionnaire was used to collect data from the women about their knowledge and practice of birth preparedness. The mothers were also interviewed to collect information pertaining the methods used to deliver health messages and the information they received on birth preparedness during ANC. After the clients had received their ANC service, the selected participants who met the inclusion criteria were informed about the study detailing the

benefits and also the time the interview would take. The participants were then interviewed, one at a time, about knowledge and practice of birth preparedness and the methods used to teach the birth preparedness messages in the health facility. To avoid provider bias during data collection, the questions were made very simple for the respondents to understand. During the data collection process, the research assistants reviewed the ANC booklet for more information.

For the qualitative data, an FGD guide was used to guide the discussion and an audiotape to record the information. Beforehand, the participants were informed about the recordings and their consent was sought. The principal researcher and one of the research assistants conducted the FGD since the principal researcher could not understand the local language thus there was language barrier and required interpretation by the research assistant. The research assistant was trained on how to interpret effectively. After the clients had received their ANC services, those selected to participate in the FGD were taken to a comfortable place under a shade and were requested to sit in a circle. They were informed about the FGD, the reason for the discussion and also about voice recording of the information. Their consent to participate was sought. Once that was done, each of them was given a random number so that they would not be referred to using their names to ensure anonymity and confidentiality of their information. The researcher introduced herself again and explained to the participants what the study was about, the consent they had given, and the time the FGD was likely to take. They were also informed that they did not have to answer any question if they were not comfortable about it. They were also informed that they could leave the discussion anytime if they wanted without any repercussions on them. The participants were informed that the discussion was being recorded so that information captured would be what they themselves were saying and not that of the researcher. In addition, they were informed that the principal researcher would be taking notes during the discussion to aid memory and assist in data analysis. The principal

researcher conducted the FGDs and guided the discussion, which took approximately thirty minutes. During the discussion, field notes were written by the principal researcher. After the interview, the principal researcher confirmed on the audiotape that the information had been captured before the respondents were allowed to leave.

3.12.2 Phase two data collection process

In the second phase of the study, an interviewer-administered questionnaire was used to collect data on the knowledge on birth preparedness, the information retained and utilization of skilled attendance among the women in both the study and control groups. The questionnaire was entered in the Open Data Kit (ODK), a mobile phone software which enhances data collection and minimizes errors of missing data. Once data is collected, the research assistant sends the information to the server hosted in Google cloud platform and the principal researcher can download the information from wherever they are thus be able to check the completeness of the questionnaire. The ODK software was installed in the mobile phones that were used for data collection. It was tested and the research assistants were trained on how to use it. Each mobile phone was loaded with data bundles so that the data collected on the questionnaire could be send as soon as it was completed. The ODK is cheap as compared to printed questionnaires since data will be retrieved in an Excel sheet which minimizes the costs of printing and data entry.

Once a client had been recruited to the study, details about her place of residence and telephone contacts were taken to facilitate a reminder through a mobile phone text message, which was done one month to her expected date of delivery to remind her on birth preparedness. This was done only for those in the study group. In addition, the contacts of the principal researcher were shared to them to allow for communication when they delivered or if they had any problem that they wished to consult.

The principal researcher sent the mobile phone text messages to the respondents in the study group. Once the recruited participants (from both the study and control groups) went into labour, the principal researcher then communicated to the research assistants who went with a checklist to confirm the client's birth preparation within 24 hours after delivery since they would still be in hospital during this time following delivery. An observation checklist was used to assess the items brought by the mother to the health facility to assess the level of preparedness. For those who delivered at home, observation through the checklist was not done since home delivery was one aspect of lack of birth preparedness. In addition, an interviewer-administered questionnaire was used to collect information about her knowledge on birth preparedness.

3.13 Data quality control

Data quality was assured using a pre-tested and validated questionnaire. The research assistants were trained on the research instrument and the data collection procedure, which included the use of ODK. Pretest of the research instruments was done. The text message was translated to Kiswahili and then to Luo (the common language of the community) to enable a clear understanding by the respondents. In the second phase of the study where ODK software was used in data collection, errors were minimized by ensuring that there were no errors of commission or omission through validation of the uploaded questionnaire by an information technology (IT) expert.

Using the ODK, questions that required a single answer were designed to have a single answer option. In addition, the tool was designed to allow the research assistant review the information before submitting. It was also designed such that the research assistant could not skip any question to avoid incomplete data. Values of the data entered were checked for outliers to avoid any

potential data contamination. The principal investigator ensured that the research assistants strictly adhered to all the data collection activities.

For the qualitative data, it was ensured that the data was well transcribed from the audiotape recorders to avoid losing the original information. The principal researcher did transcription and the information was taken back to the respondents to confirm if that is what they had shared. Verbatim was used to report the findings to avoid losing the original meaning.

3.14 Data Management Plan

During the research process, both quantitative and qualitative data was generated.

3.14.1 Phase one

In the first phase of the study, quantitative data generated from 401 interviewer-administered questionnaires was entered into the Microsoft Access database. The principal researcher checked for the completeness, reliability and consistency of the information in the questionnaires. Of these, twelve (12) questionnaires were found to have inconsistent and unreliable information thus were not analyzed. All the questionnaires were kept by the principal researcher after entry into the Microsoft Access database so that incase of any further information, they would be retrieved. Qualitative data was generated from the FGDs. A field note book was used to write notes during the FGD and an audiotape recorder to record the information.

3.14.2 Phase two

In the second phase of the study, the information was recorded using the ODK software. This programme was designed such that once the form had been sent from the research assistant's phone, the information was automatically deleted. After the whole data collection process, the

software was uninstalled in the phones of the research assistants and the principal researcher changed her password in the Google cloud platform to deny access to any unauthorized person. The researcher at the end of the data collection process collected the observation checklists and the research book used to record client detail.

3.15.3 Data storage

The principal investigator of the study, her supervisors and their institution hold the intellectual property of the data generated but will grant redistribution rights for data sharing purposes. The data that was produced would useful to community members, health facility workers and policy makers. During the process of data collection, any notes or documentation containing identifying information was kept confidentially and only produced whenever the researcher required. Data was stored in specific computers with protected passwords that were changed regularly to maintain respondent's confidentiality. The computers containing the data were stored in a safe place. This will be held in place for five years. The researcher safely kept the questionnaires, observation checklists and the research book used to record client detail. The FGD information was deleted from the audiotape and stored in the computer once the information had been transcribed and analyzed to the satisfaction of the researcher.

3.16 Data analysis and presentation

3.16.1 Phase one

In the first phase of the study, completed questionnaires were entered into the Microsoft Access database. Data analysis was done using Stata version 11 software. First level analysis involved descriptive analysis to describe the study population and to establish level of knowledge on birth

preparedness among pregnant women. Percentages and Chi-square statistics were reported. To determine association between independent and dependent variables, logistic regression was done and odds ratios with 95% confidence intervals were calculated. This was presented in form of figures and tables.

Qualitative data was transcribed from the written field notes and the audiotape. Data from each participant was analyzed line by line and codes were developed. Open coding was done and a codebook created (Appendix XIX, page 237). The codes were sorted manually to enable analysis of the pattern created. During the coding process, ideas with similar meaning were put together leading to formation of categories. Labelling of the data was done to categories and further, sub-categories until there were no new themes emerging. Seven themes emerged from the data. Thematic areas were created and thematic analysis was done. Triangulation of the compiled data was done with the data from the questionnaire. Interpretation of the data was done in light of the available literature and reported in form of narration.

3.16.2 Phase two

In the second phase of the study, the completed template was downloaded from the Google cloud platform in Excel sheet form after data had been collected. The data was copied from the Excel sheet and entered into Stata Version 11 software. Data cleaning was done on the do-file by checking for outliers, duplicate IDs and missing data. The cleaned file was saved in a new name indicating the complete data. Summary statistics of the quantitative data was done. The software used for data analysis was Stata Version 11 computer packages. Regression analysis was done to test the level of significance which was $p \leq 0.05$. To determine the association of independent and dependent variables, logistic regression was performed and odds ratios reported. To compare the outcomes between the control and study groups, proportion tests were done in which percentages

and p-values reported. Data was presented in forms of figures and tables. The qualitative data from the observation checklist was compiled and triangulated with the data from the questionnaire. Data from phone conversation was entered and content analysis done. Data was presented in form of narration.

3.17 Ethical considerations

Ethical clearance was sought from Ethics and Research Committee (ERC) at University of Nairobi and Kenyatta National Hospital (UON/KNH), ethical approval number P551/07/2015 (Appendix X, page 210). A research permit was sought from the National Council for Science, Technology and Innovation (NACOSTI) (Appendix XII, page 212). In addition, permission was also sought from the County health authorities and the management teams in the health facilities (Appendix XIII, XIV, page 213, 214). A consent information form was given to the participants to carry home so that they could read and understand more about the study (Appendix IV, page 198). They were informed about the study objectives, benefits and risks. They were assured that should they agree to participate in the study, they had the right to withdraw at any point in time. If they did not wish to participate they were assured that it would have no implications for them. Once they had understood, they were given a consent form to sign that they had agreed to participate in the study. For the young mothers who were below consenting age, their guardians or parents consented on their behalf (Appendix VIII, page 205). Care was taken to ensure that respondents' confidentiality was maintained throughout the study. Names or any other forms of identification were not used on the questionnaire. All data collected was stored, analyzed and reported in formats that did not allow identification of the individual participants.

3.18 Limitations of the study

Some of the reports were based on self- reported information from the women since most of the information on birth preparedness was not documented in their ANC books. This limitation was minimized by carrying out exit interviews after antenatal care visit so that the respondent's memory could still be fresh and they could remember the information. The questions used for the focus group discussion were open – ended and this may have led to any answers from the respondents. This was delimited by ensuring that the respondents were guided and prompted during the discussion to achieve the intended responses. Another limitation was lack of ownership of the mobile phones by the participants. This was delimited by using a mobile phone of the spouse to get in touch with the participant. In addition, during the data collection using ODK, some of the phones would run out of battery and it would be difficult to continue data collection with the mobile phone. The CHVs were advised to have two batteries for the phone and incase it run out of charge, a printed questionnaire was used for back up.

During data collection and recruiting the respondents for the second phase of the study, there was a countrywide nurses' strike that affected client flow in the facilities. To ensure continuity of the recruitment process, CHVs were utilized to identify the pregnant women in the community and the recruitment was done.

To summarize, this chapter presented the materials and methods used in the study. It also discussed the research study procedures. The chapter explicitly explained the research design, study population, sample size and sampling technique, research tools, data collection methods, data analysis and data management plan. It also described the ethical considerations and the study limitations. The next chapter will discuss the baseline and interventional phase results of the study.

CHAPTER FOUR: RESULTS

This chapter presents the results from the baseline and the interventional studies. Components of this study focuses on qualitative and quantitative data. Data is presented using tables, figures and narration.

A: BASELINE STUDY RESULTS

The baseline survey results were obtained from both the Focus Group Discussions (FGDs) and interviewer-administered questionnaires. The baseline survey was done at Migori County Referral Hospital, Isibania sub-county hospital, Godkwer health centre and Arombe dispensary. The data was used to inform the second phase of the study, which was carried out in the same facilities. The number of respondents in the baseline study were a total of 389 and were distributed as follows in the study facilities: 179 (46%) in Migori, 62 (15.9%) in Arombe, 49 (12.6%) in Godkwer and 99 (25.5%) in Isibania. Four FGDs were conducted in the facilities as follows; Migori County Referral Hospital (FGD 1), Arombe dispensary (FGD 2), Godkwer health centre (FGD 3) and Isibania sub-County hospital (FGD 4).

From the qualitative data, seven themes emerged. These were: Knowledge of birth preparedness (BP), Preparing for BP, Not preparing for BP, Perception of BP, Messages taught on BP, Challenges experienced in BP health education and role of men in BP.

4.1 Response rate

The sample size for the baseline study was 401 pregnant mothers. However, the total number of questionnaires analysed were 389. Twelve questionnaires were dropped due to undependability of the information provided. The information provided was not consistent and the answers were not authentic. The response rate was therefore 97%.

The emerging themes from the qualitative data were: knowledge of birth preparedness, practice of birth preparedness, cultural beliefs and taboos regarding birth preparedness, health messages on birth preparedness and male involvement in birth preparedness.

4.2 Socio-demographic characteristics

4.2.1 Socio-demographic characteristics of the respondents

The study comprised of 389 pregnant mothers who were randomly selected as they attended antenatal care (ANC) clinics in the four health facilities situated in Migori County. The ages of the mothers were between 14 and 40 years with the median (interquartile range (IQR) age of 23.0 (20.0-28.0) years. Majority of the study participants 73% (n=284) were aged between 20-34 years and 20.6% (n=80) were aged nineteen years and below. Further, majority of the respondents were married 79.2% (n=308). Those who had primary level of education were 51.7% (n=201) and only 16.2% (n=63) had attained post-secondary education as shown in table 4.1 below. Most of the respondents were housewives 34.2% (n=133) and businesswomen 27% (n=105) while 11.8% (n=46) of them were students at the time of study. The study participants resided mostly in rural areas 61.5% (n=239). Protestant faith was the predominant religion as reported by most of the study participants 55.2% (n=213). Table 4.1 illustrates the demographic characteristics of the study participants.

Table 4.1: Characteristics of respondents interviewed using questionnaire

Characteristics	Frequency (n=389)	Percentage (%)
Residence		
Urban	150	38.6
Rural	239	61.4
Age (years)		
19 and below	80	20.6
20-24	139	35.7
25-34	145	37.3
35 and above	25	6.4
Marital status		
Married	308	79.2
Single	72	18.5
Separated	1	0.3
Widowed	8	2
Education level		
None	4	1.0
Standard 1-4	28	7.3
Standard 5-8	173	44.4
Secondary	121	31.1
College incomplete	15	3.8
University incomplete	7	1.8
College complete	23	5.9
University completed	18	4.7
Occupation		
Housewife	133	34.2
Businesswoman	105	27
Peasant farmer	48	12.3
Casual labourer	7	1.8
Employed/ salaried job	45	11.6
Student	46	11.8
Others	5	1.3
Religion		
Protestant	213	55.2
Catholic	143	37.1
Muslim	10	2.6
No affiliation	3	0.7
Others	17	4.4

Linear regression was done to test the relationship between the socio-demographic factors and birth preparedness. The respondent's religion and occupation were significantly associated with birth preparedness, p=0.013 and p=0.018 respectively.

Table 4.2: Logistic regression of birth preparedness and socio-demographic factors

Variables	**Odds ratio**	**p-value**	**95% confidence internal**	
			Lower	**Upper**
Marital status	1.222	0.226	0.883	1.692
Residence	1.071	0.646	0.797	1.44
Education level	0.957	0.561	0.827	1.108
Religion	0.849	0.013	0.746	0.965
Occupation	1.160	0.018	1.025	1.312

4.2.2 Socio-demographic characteristics of partners of the study participants

According to the respondents, most of their partners had attained primary and secondary level of education, 32.3% (n=108) and 36.2% (n=121) respectively. Most of them were businessmen. Out of 316 participants who provided the details of their partner's occupation, 38.1% (n=120) of them were businessmen while 24.4% (n=77) were in formal employment as shown on Table 4.3 below.

Table 4.3: Characteristics of partners of the study participants

Partner education level	**Frequency (n)**	**Percentage (%)**
None	20	6
Primary	108	32.3
Secondary	121	36.2
Post-Secondary	85	25.5
Partner occupation		
Fishing	6	1.9
Businessman	120	38.1
Peasant farmer	56	17.8
Casual labourer	49	15.6
Employed/ salaried job	77	24.4
Student	6	1.9
Others	1	0.3

4.3 Obstetric history

4.3.1 Parity

Overall, 34.9% (n=136) of the participants were primigravidas and were expecting their first baby. A few of them 4.9% (n=19) were grandmultiparaous since they had been pregnant for five or more times as shown on figure 4.1 below.

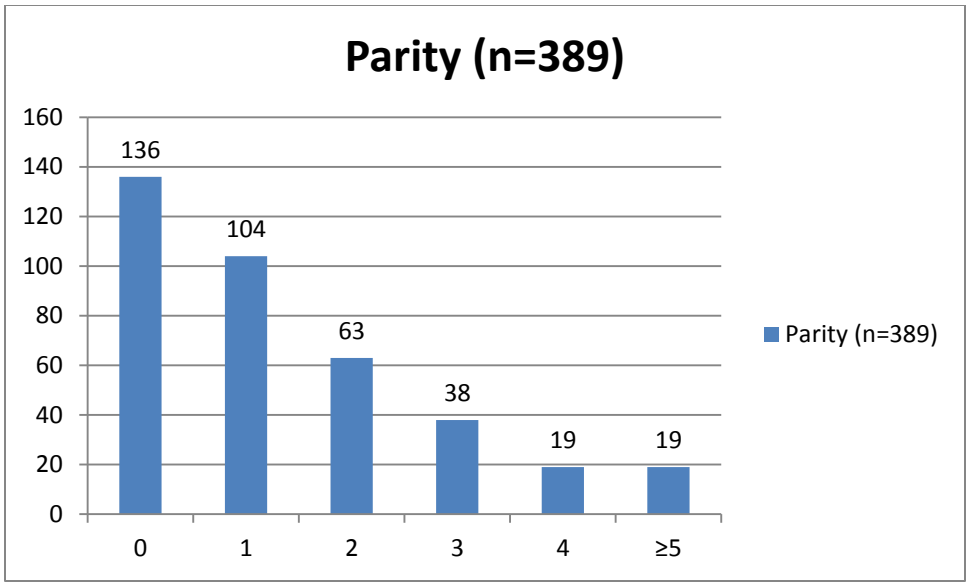


Figure 4.1: Parity of the respondents

4.3.2 Number of living and dead children

Majority of them reported having one or two children who were alive 69.3% (n=169) while 10.5% (n=41) of them had lost one, two or four children to illness or other childhood complications as shown on table 4.4.

Table 4.4: Obstetric history of the respondents

Characteristics	**Frequency (n)**	**Percentage (%)**
Respondent's children who were alive (n=244)		
1	101	41.4
2	68	27.9
3	37	15.2
4	19	7.8
≥5	19	7.8
Respondent's children who had died (n=41)		
1	30	73.2
2	10	24.4
4	1	2.4

4.3.3 Antenatal care attendance

All the mothers who were recruited to the study had attended antenatal clinic (ANC). Most of the mothers started attending ANC during the second and third trimesters, 57.3% (n=223) and 38.8% (n=151) while only 4.1% (n=16) started during the first trimester.

4.3.4 Complications experienced during pregnancy

The women who reported having been sick during pregnancy were 20.8% (n=81). Those who experienced headache were 20% (n=16) and abdominal pains 18% (n=14) among others as shown on figure below.

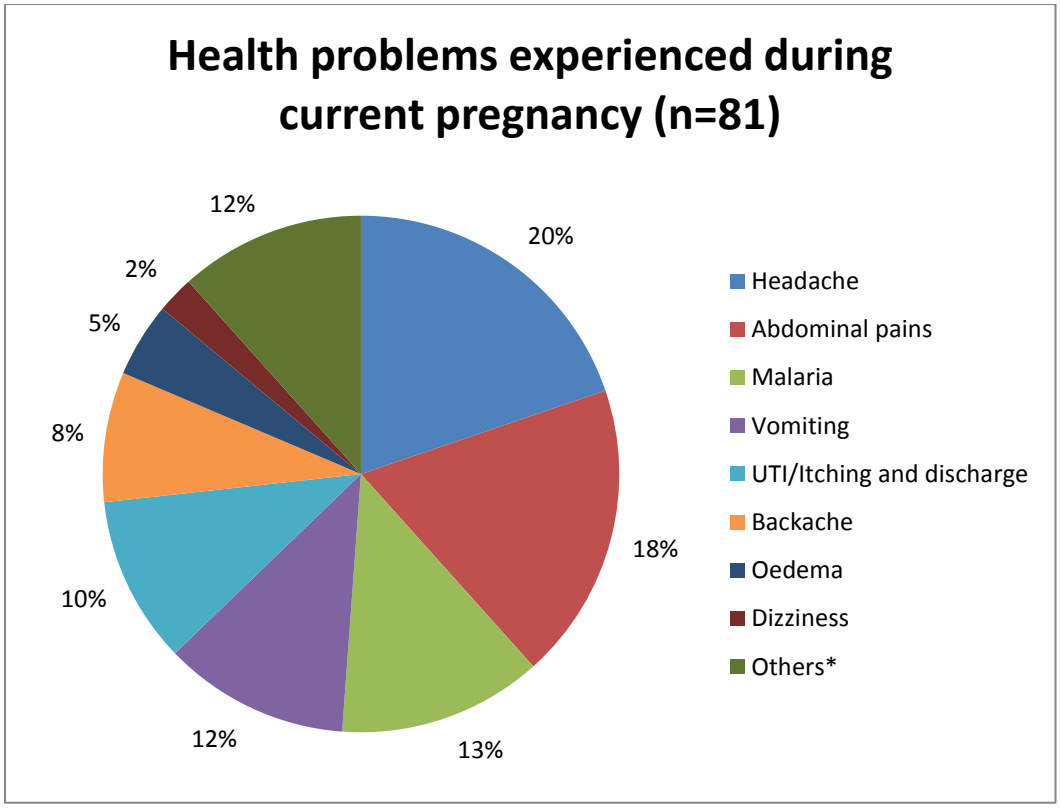


Figure 4.2: Health problems experienced during pregnancy

4.4 Knowledge of birth preparedness

The mothers were assessed about their knowledge on birth preparedness (BP). Overall, 90.5% (n=352) responded that they had heard about birth preparedness, however, they had varied understanding of its meaning. The clients were not able to clearly define the key aspects of birth preparedness for example knowledge of the expected date of delivery, preparation for normal delivery by selecting the place of delivery and awareness of danger signs for both the mother and newborn. Some of those interviewed through the FGDs reported that BP was about buying baby items, eating good food, doing exercises during pregnancy and having money for transport to hospital. A knowledge score was constructed based on a set of seven aspects of birth preparedness as follows: basic knowledge on danger signs of pregnancy; identifying place of delivery; making transport arrangements; obtaining basic supplies for delivery such as a razor blade and ready baby clothes; plan for skilled care attendance at birth; identifying a birth companion and making arrangement for household care support for the family while away to deliver or in case of obstetric emergencies. For every correct response to an aspect of birth preparedness, a score of one was awarded, however where the respondent could not answer, a score of zero was awarded. The composite score for knowledge was calculated by summing the scores for each respondent. Further, the knowledge of the respondent was dichotomized into high if they scored four or more scores and low if they scored less than 4 points based on the seven aspects of birth preparedness. The findings indicated that the aggregate knowledge score for the study participants ranged from one to seven with an average of 3.2 scores. More than half of the respondents 53.0% (n=206) were found to have low level of knowledge on BP. The respondents rated as highly knowledgeable on BP were 183 (47.0%).

The following are the responses from the FGDs about the groups' knowledge of birth preparedness.

"Birth preparedness is buying baby items which include towel, napkin, basin and also having money to go to hospital during labour". (Respondent 3, FGD 1)

"It is only about buying a leso for holding the baby when it has been born". (Respondent 2, FGD 2)

"I do not know about birth preparedness. We have not yet been taught". (Respondent 1, FGD 3)

"Birth preparedness is eating good food and doing exercises". (Respondent 6, FGD 3)

"Birth preparedness does not involve having mother's clothes ready". (Respondent 1, FGD 4)

Further assessment revealed that majority of the respondents understood that BP was about buying clothes for the baby 82.3% (n=292). The least known concept of birth preparedness was knowledge of the expected date of delivery 58.9% (n=209) as shown in table 4.5.

Table 4.5 Participant's knowledge about birth preparedness

Characteristics	Frequency (n)	Percentage (%)
Ever heard of birth preparedness (n=389)		
Yes	355	91.2
No	31	8.0
No response	3	0.8
***Birth preparedness is about: (n=355)**		
Buying clothes for the baby	292	82.3
Having a ready bag for delivery	232	65.4
Choosing the health facility for delivery	233	65.6
Knowing the expected date of delivery	209	58.9
Having a birth companion	220	62.0

***This question had multiple responses*

4.4.1 Socio-demographic factors associated with hearing of birth preparedness

The regression analysis showed the respondent's parity, gestation of pregnancy, partner's level of education and the facility attended for ANC services were significantly associated with having heard about birth preparedness (p=0.05, p=0.00, p=0.01 and 0.04) respectively as illustrated on table 4.6 below.

Table 4.6 Regression analysis of demographic data and having heard of BP

Variable	**Coef.**	**Std. Err.**	**p - value**	**[95% Conf. Interval]**	
				Lower	**Upper**
Age	-0.007	0.006	0.244	-0.020	0.005
Marital status	0.024	0.041	0.549	-0.056	0.105
Age at first birth	0.009	0.008	0.259	-0.006	0.026
Parity	0.016	0.008	0.051	-0.000	0.033
Education level	0.006	0.016	0.690	-0.025	0.037
Religion	0.010	0.021	0.613	-0.030	0.052
Gestation of pregnancy	0.008	0.003	0.002	0.003	0.014
Occupation	-0.021	0.015	0.162	-0.051	0.009
Partner's level of education	0.037	0.013	0.007	0.010	0.064
Partner's occupation	-0.015	0.014	0.271	-0.042	0.012
Facility attended	-0.027	0.014	0.044	-0.052	-0.001

4.4.2 Socio-demographic factors associated with knowledge on BP

Factors associated with disparities in the levels of knowledge on BP were assessed. Marital status had a significant influence on knowledge about BP whereby the married women were less likely to be classified as having low knowledge when evaluated against their counterparts who were not married (odds ratio (OR) 0.457 (95% CI 0.270 - 0.772, p=0.003). Women who resided in the rural areas were less knowledgeable than those from urban areas (OR 0.293 (95% CI 0.191 - 0.449, p<0.001). Additionally, maternal occupation was associated with a respondent's level of knowledge on BP. (Table 4.7).

Table 4.7: Socio-demographic factors associated with knowledge on BP

Characteristic	Knowledge				OR	95% CI		P-value
	Low		High			Lower	Upper	
	n	%	n	%				
Age (years)								
<18	26	66.7	13	33.3	1.846	0.776	4.392	0.164
18-21	64	59.3	44	40.7	0.831	0.424	1.625	0.588
22-30	90	46.9	102	53.1	0.814	0.437	1.519	0.518
>30	26	52.0	24	48.0				
Marital status								
Married	153	49.2	158	50.8	0.457	0.27	0.772	0.003
Non-married	53	67.9	25	32.1				
Residence								
Urban	52	34.7	98	65.3	0.293	0.191	0.449	<0.001
Rural	154	64.4	85	35.6				
Maternal education								
No formal education /Primary	19	59.4	13	40.6	0.585	0.211	1.617	0.299
Secondary	103	59.9	69	40.1	0.597	0.27	1.321	0.200
Post-secondary	25	71.4	10	28.6				
Religion								
Protestant	109	50.7	106	49.3	0.726	0.475	1.11	0.139
Others (Muslim, SDA, traditional)	12	41.4	17	58.6	0.498	0.222	1.12	0.088
Catholic	85	58.6	60	41.4				
Maternal occupation								
Housewife	101	54.9	83	45.1	1.661	1.074	2.569	0.022
Student/Unemployed	28	71.8	11	28.2	3.475	1.61	7.501	0.001
Self-Employed	63	42.3	86	57.7				

The partner's secondary and post-secondary level of education was associated with knowledge on BP (p=0.005 and p=0.001) respectively however, occupation was not associated with knowledge of birth preparedness (p=0.202). (Table 4.8)

Table 4.8: Relationship between knowledge of BP and partner's characteristics

Characteristic	**Knowledge**				**OR**	**95% CI**		**P-value**
	Low		**High**			**Lower**	**Upper**	
	n	%	n	%				
Partner's education								
Post-secondary	32	37.6	53	62.4	0.384	0.218	0.677	0.001
Secondary	52	43.3	68	56.7	0.487	0.293	0.809	0.005
No formal education/Primary	77	61.1	49	38.9				
Partner's occupation								
Self- employed	49	47.6	54	52.4	0.746	0.475	1.171	0.202
Others	157	54.9	129	45.1				

4.4.3 Association of the health facility with knowledge of birth preparedness

The health facility attended by the respondent was associated with knowledge of birth preparedness, p=<0.001. One out of the four facilities used for the study was not associated with knowledge of BP. (Table 4.9)

Table 4.9: Relationship between knowledge of birth preparedness and health facility

Characteristic	**Knowledge**				**OR**	**95% CI**		**P-value**
	Low		**High**			**Lower**	**Upper**	
	n	%	n	%				
Health facility								
Migori County Referral Hospital	98	54.7	81	45.3	6.276	3.408	11.559	<0.001
Arombe dispensary	62	100.0	0	0.0	6.188	3.951	9.691	<0.001
Godkwer health centre	30	61.2	19	38.8	8.191	3.735	17.962	<0.001
Isibania sub-County hospital	16	16.2	83	83.8				

4.5 Attitude about birth preparedness

Most of the participants 96.4% (n=371) believed in preparing for childbirth. However, some of them 3.6% (n=14) did not believe in preparing citing reasons such as lack of understanding 50.0% (n=7), cultural factors 35.7% (n=4), lack of family support 14.3% (n=2) and lack of money 7.1% (n=1) as the reasons for not preparing for childbirth.

4.6 Practice of birth preparedness by the mothers

4.6.1 The respondents' practice of birth preparedness

Baby's clothes was considered to be a key preparation in the birth preparedness as reported by 75.5% (n=276) of the respondents. Having a caretaker of the home while away for delivery in the facility was least considered by the respondents (46.8%). Based on the answers provided to seven

statements assessing the practices of BP: (basic knowledge on danger signs of pregnancy; identifying place of delivery, making transport arrangements, obtaining basic supplies for delivery such as a razor blade and ready baby clothes; plan for skilled care attendance at birth; identifying a birth companion and making arrangement for household care support for the family while away to deliver or in case of emergencies), a key of scoring the practice was developed. Each correct answer was scored one while a wrong answer was awarded zero mark. A total of the marks scored by the respondents was determined. The participants were then rated as having unfavourable practices if they scored less than four or favourable practices of BP if they scored four or more marks. Those who had favourable practices of BP were 56.0%.

4.6.2 The preparations done on birth preparedness

When asked the optimum time for initiating preparations for birth, majority 76.1% (n=283) reported that it should start as soon as pregnancy is confirmed. For most respondents, the person responsible for making childbirth preparations was the woman 66.7% (n=260) (Table 4.10).

Table 4.10 Participants' preparation on birth preparedness

Characteristics	Frequency (n)	Percentage (%)
Items prepared (n=372)		
Baby's clothes	281	75.5
Finances	278	74.7
Transport to health facility	230	61.8
The birth attendant	199	53.5
The care taker at home while away	174	46.8
Opinion on time to start BP (n=372)		
As soon as pregnancy is diagnosed	283	76.1
First trimester	20	5.4
Second trimester	24	6.5
Third trimester	32	8.6
No response	13	3.5
Person responsible for making preparations (n=390)		
The woman	260	66.7
The husband	84	21.5
Both partners	31	7.9
Mother in law	8	2.1

When the respondents were asked about the birth preparations they had done at the time of the study, most of them 84.4% (n=329) mentioned that they had prepared a birth bag (with razor blade, ligatures and sanitary pads). However, only 49.0% (n=191) of them had identified a caretaker of

the home for the period when away for delivery. The respondents who had not made any preparations cited lack of money 64% (n=25) as the main reason. There were also cultural beliefs, taboos and prohibitive religious doctrines that hindered the birth preparations (Table 4.11).

Table 4.11 Birth preparedness items as reported by participants

Attribute	**Frequency (n)**	**Percentage (%)**
Preparations made for birth (n=389)		
A bag with razor blade, ligatures & sanitary pads	329	84.4
Baby clothes	276	70.8
Funds for delivery	238	61.0
Transport	229	58.7
Health facility for delivery	226	57.9
Caretaker while away	191	49.0
Reasons for making no preparations (n=36)		
Lack of money	25	64
Cultural beliefs	6	15.4
Taboos	2	5.1
Prohibitive religious doctrines	2	5.1
No need	1	2.7
Others**	3	7.7

***Lack of family support, lack of information & too early*

Some respondents said they would not buy any baby items until when the baby was born. They felt that even if they had been assured from the hospital about the pregnancy, they needed to see

the baby first so that they could prepare. About preparation for the place of delivery, the respondents said that they did not plan for a specific hospital since it would be dictated by where they would be when labour began. These are the responses from the FGD about their plan for birth preparation.

"I will not buy clothes because I don't know if am carrying a baby or not. I will wait until the baby has been born then that is the time to buy" (Respondent 7, FGD 3)

"I don't know what am carrying in my uterus, so I will not prepare until when the baby is born" (Respondent 2, FGD 2)

"I will not decide on where to deliver until the day when labour begins" (Respondent 4, FGD 3)

"All I will do to prepare is to have money ready. My husband is responsible for looking for the money and then I will send him to buy the clothes when the baby is born". (Respondent 1, FGD 1)

"Within the health facility, there are shops that I can buy the clothes after birth. I can't buy the clothes now". (Respondent 8, FGD 4)

"I don't know where I will deliver because I don't know where I will be when labour begins". (Respondent 6, FGD 2)

"I don't have a ready bag for delivery. When labour begins, I will just go to the hospital with a leso for holding the baby". (Respondent 5, FGD 1)

The commonly identified mode of transport to the health facility at the onset of labour pains was *Boda boda* (motor cycle transport) 75.1% (n=260). The reasons for not planning for transport early in pregnancy included the short distance to the health facility and lack of money (Table 4.12).

Table 4.12 Transport to the place of delivery

Attribute	Frequency (n)	Percentage (%)
Planning to look for transport early in pregnancy (n=389)		
Yes	346	88.7
No	32	8.2
No response	12	3.1
Mode of transport available to the respondent (n=346)		
Boda boda	260	75.1
Matatu	68	19.7
Own vehicle	37	10.7
Walking	7	2.0
Reasons for not planning for transport early in pregnancy (n=32)		
Hospital within a walking distance	22	68.8
Lack of money	4	12.5
No need	3	9.4
Partner will decide	2	6.3
Other#	3	9.4

#Own vehicle (2), Too early (1)

4.6.3 Plan for companionship during labour and delivery

Plan for companionship to the health facility during child delivery was cited among 95.6% (n=373). The companions were mainly the spouses 34.3% (n=128) and mother in laws 32.4% (n=121) as shown on table 4.13. The reasons for not having a companion were; preference to be alone, living away from the spouse or lack of support and willingness from the spouse. Regarding the person to take care of the home while away in the hospital for delivery, they opted for their spouses, mother-in-law or the co-wife. These are the responses from the FGD groups concerning having a birth companion and plan for a caretaker.

"My husband will take me to hospital and then he comes back to take care of the children at home". (Respondent 1, FGD 2)

"My co-wife or mother-in-law will take care of the home when I go to hospital. The one who will not take me among the two is the one that will remain at home". (Respondent 4, FGD 1)

"It is the role of my husband to escort me upto hospital but he will not stay with me there. Once I deliver, he will come and take us back home". (Respondent 5, FGD 3)

Table 4.13 Birth companion

Characteristic	Frequency (n)	Percentage (%)
Will be accompanied by somebody to health facility during labour (n=389)		
Yes	373	95.6
No	5	1.3
No response	11	3.1
Companion (n=373)		
Spouse	128	34.3
Mother in law	121	32.4
Sister	60	16.1
Mother	20	5.4
Co-wife	10	2.7
Neighbour	8	2.1
Friend	6	1.6
TBA	2	0.5
Other£	3	0.8
No response	15	4.0

£CHV, Cousin, Sister

4.6.4 Plan for a caretaker while away

Nineteen respondents (7.2%) were not planning to have a caretaker of the home while they will be away for child delivery. The rest 92.8% (n=369) provided details of the caretaker which are

displayed in Figure 4.4. The caretakers included partners (31.8%) n=117 and mother-in-law (22.3%) n=82.

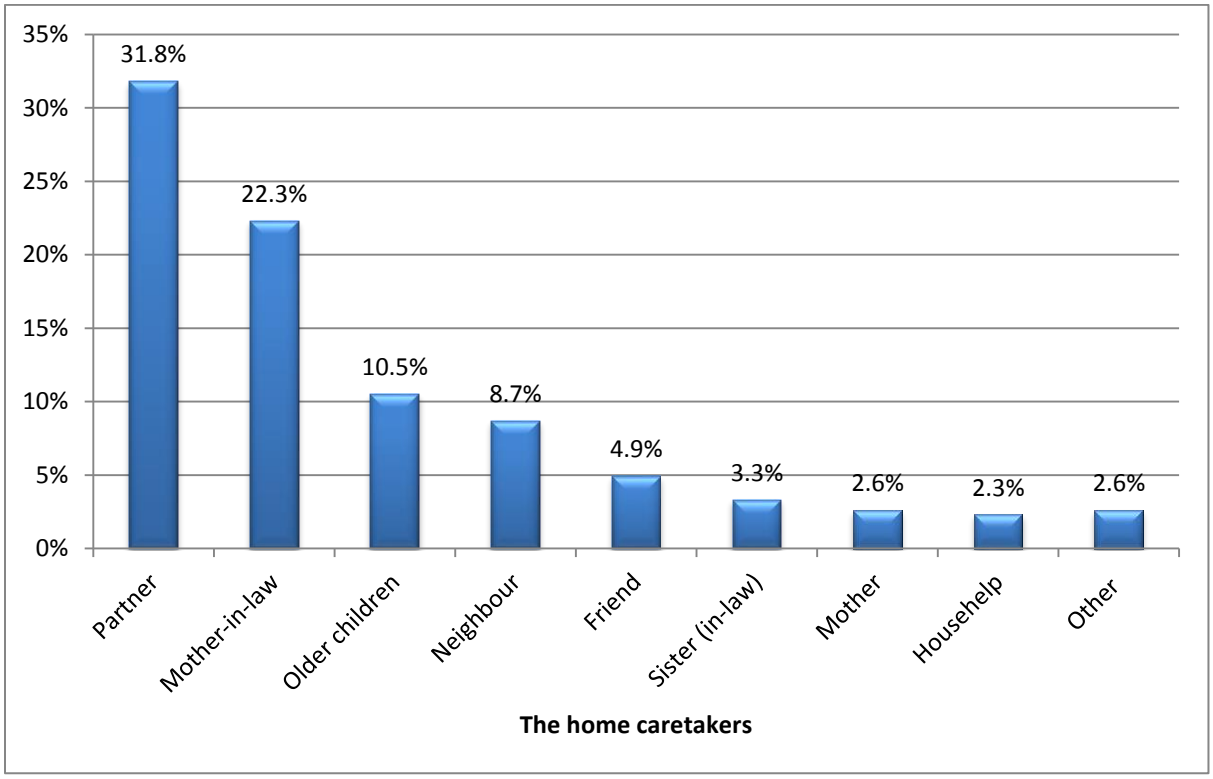


Figure 4.3 Description of the caretaker

4.6.5 Socio-demographic factors associated with the practice of birth preparedness

Regression analysis was done to assess factors associated with practices on BP. Being married was found to be associated with engaging in favourable practices of birth preparedness (OR 0.608 (95% CI 0.369 - 1.001), p=0.049). Urban residence was associated with favourable practices of birth preparedness (OR 0.285 (95% CI 0.182 - 0.444, p<0.001). Also maternal occupation, partner's education level, religion and the type of health facility were other factors significantly associated with favourable practices of birth preparedness. (Table 4.14)

Table 4.14 - Factors associated with practices on BP

Characteristic	Practice				OR	95% CI		p-value
	Unfavourable		Favourable			Lower	Upper	
Age (years)	n	%	n	%				
<18	22	56.4	17	43.6	1.294	0.558	3.002	0.548
18-21	49	45.4	59	54.6	0.831	0.424	1.625	0.588
22-30	75	39.1	117	60.9	0.641	0.343	1.198	0.162
>30	25	50.0	25	50.0				
Marital status								
Married	129	41.5	182	58.5	0.608	0.369	1.001	0.049
Un-married	42	53.8	36	46.2				
Residence								
Urban	39	26.0	111	74.0	0.285	0.182	0.444	<0.001
Rural	132	55.2	107	44.8				
Maternal education								
No formal education/ Primary	18	56.3	14	43.8	1.083	0.413	2.84	0.872
Secondary	89	51.7	83	48.3	0.903	0.436	1.872	0.784
Post-secondary	19	54.3	16	45.7				
Religion								
Protestant	92	42.8	123	57.2	0.738	0.483	1.126	0.159
Others (Muslim, Seventh Day Adventist (SDA), traditional)	6	20.7	23	79.3	0.257	0.099	0.669	0.003
Catholic	73	50.3	72	49.7				
Maternal occupation								
Housewife	86	46.7	98	53.3	1.738	1.112	2.716	0.015
Student/Unemployed	22	56.4	17	43.6	2.562	1.249	5.256	0.009
Employed/ salaried job	50	33.6	99	66.4				
Partner's education								
Post-secondary	25	29.4	60	70.6	0.333	0.186	0.598	<0.001
Secondary	41	34.2	79	65.8	0.415	0.248	0.695	0.001
No formal education/Primary	70	55.6	56	44.4				
Partner's occupation								
Self- employed	38	36.9	65	63.1	0.673	0.423	1.068	0.092
Others	133	46.5	153	53.5				
Health facility								
Migori County Hospital	72	40.2	107	59.8	8.844	3.878	20.17	<0.001
Arombe Dispensary	62	100.0	0	0.0	14.143	6.925	28.885	<0.001
Godkwer Health centre	30	61.2	19	38.8	20.752	7.949	54.174	<0.001
Isibania sub-County hospital	7	7.1	92	92.9				

4.7 Beliefs, taboos or values about birth preparedness

The respondents had various beliefs about birth preparedness. Some felt that it was wrong to prepare for childbirth since the baby might die while others felt that having ready items before the baby is born would bring a bad omen. The FGD responses about beliefs, taboos and values about birth preparedness were as follows:

"I will not prepare for the baby because the baby will die" (Respondent 7, FGD 2)

"Even if my husband will buy the baby's clothes, he will leave them in the shop until when the baby is born. The clothes can't be brought to the house because it is bad in our culture". (Respondent 1, FGD 3)

"We don't prepare for child birth because it is against our culture". (Respondent 2, FGD 3)

4.8 Perception of birth preparedness

The perception of birth preparedness varied among the respondents. Some said it was good since all that was needed would be available while others felt that it would make the baby to die if one prepared for birth as shared in the responses below.

"Preparation is good because you will have everything" (Respondent 3, FGD 4)

"Preparation can make the baby to die, therefore it is wrong to do it" (Respondent 7, FGD 2)

"It is good if you have money for bodaboda and for buying baby clothes". (Respondent 1, FGD 2)

"If I buy the baby's clothes and the baby dies, what will I do with the clothes?" (Respondent 8, FGD 1)

4.9 Implementation of birth preparedness health education guidelines

Most of the respondents 92.3% (n=359) reported that they had received information on birth preparedness during ANC. The messages were initiated predominantly during the first visit 84.6% (n=329). Out of those who had received BP health education messages, 93.6% (n=338) reported that they had a review of the messages. This was done once for most of the respondents 67.8% (n=229) (Table 4.15).

Table 4.15 Birth preparedness health education messages provided

Characteristics	Frequency (n)	Percentage (%)
Received information on birth preparedness in the facility (n=389)		
Yes	359	92.3
No	25	6.4
No response	5	1.3
Time when BP health education is initiated during ANC (n=389)		
First visit	329	84.6
Second visit	27	6.9
Third visit	7	1.8
Fourth visit	1	0.3
All visits	3	0.8
None/Don't know	3	0.8
No response	19	4.9
Review of BP health messages after initial health education (n=361)		
Yes	338	93.6
No	19	5.3
No response	4	1.1
Frequency of review (n=338)		
Every ANC visit	229	67.8
Once	45	13.3
Twice	38	11.2
Thrice	9	2.7
None	1	0.3
No response	16	4.7

There was no significant association between birth preparedness health messages shared and the readiness for birth as shown on table 4.16 below.

Table 4.16: Relationship of birth preparedness and messages shared during ANC

Variable	Coef.	Std. Err.	P-value	[95% CI]	
				Lower	Upper
Having a ready bag with items	-0.046	0.099	0.641	-0.243	0.149
Choosing health facility	-0.002	0.035	0.962	-0.070	0.067
Knowledge of EDD	0.022	0.013	0.102	-0.004	0.049
Having a birth companion	-0.025	0.024	0.302	-0.074	0.023

4.9.1 Methods used to convey BP information by health care providers

The methods used to share BP health education were group and individualized teaching as shown in figure 4.6. The messages were delivered verbally to the majority of the respondents 95.8% (n=346). Those who received the messages through the pamphlets were 2.2% (n=8) while 1.9% (n=7) of the respondents gave no response.

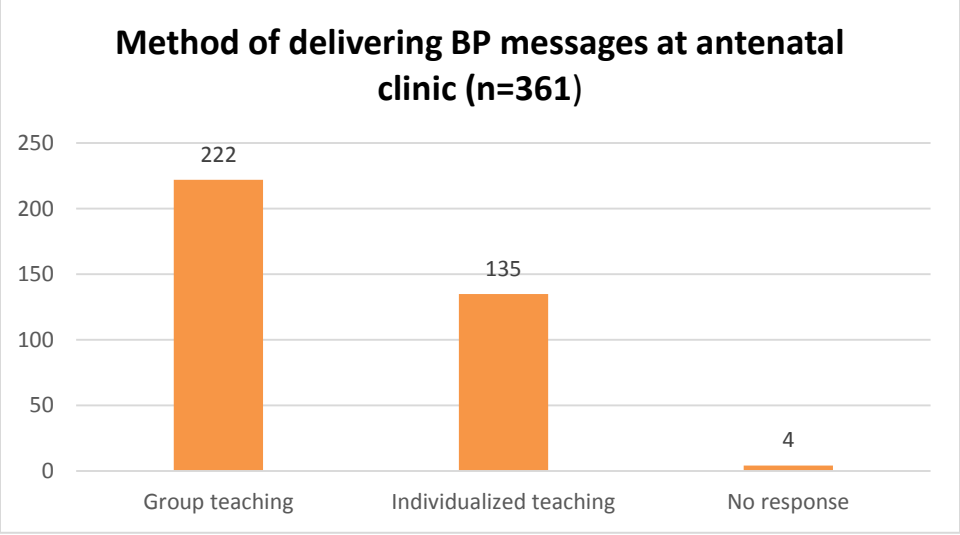


Figure 4.4 Method of sharing BP health messages

4.9.2 Satisfaction or dissatisfaction of birth preparedness messages

Most of the respondents 93.9% (n=339) were satisfied with the mode of information delivery utilized in educating them. The key reason for preference of the delivery method was that the messages were short and clear according to 57.8% (n=196) of the respondents. However, some of the respondents 5.3% (n=19) were dissatisfied with the method used to deliver BP messages signifying that it was a waste of time or the messages were too brief. (Table 4.17)

Table 4.17 Mode of sharing of birth preparedness information

Characteristics	Frequency (n)	Percentage (%)
Mode of information sharing preferred (n=361)		
Yes	339	93.9
No	19	5.3
No response	3	0.8
Reasons for liking the method (n=339)		
It was short and clear	196	57.8
It was convenient	130	38.3
It aids memory better	61	18.0
Reasons for not liking the method (n=19)		
Too complicated	1	5.3
Time wasting	5	26.3
Too brief	5	26.3
Other*	2	10.5
No response	6	31.6

** (No need for the messages, boring)*

4.9.3 Birth preparedness messages shared by the health providers

Figure 4.5 presents the health messages on birth preparedness reported by the respondents as provided in the health facility by the health care providers. The message taught most frequently by the health care providers according to the women was on having a birth plan 91.1% (n=347) while the least emphasized message was on planning for the family while away for delivery in the health facility 74.2% (n=283).

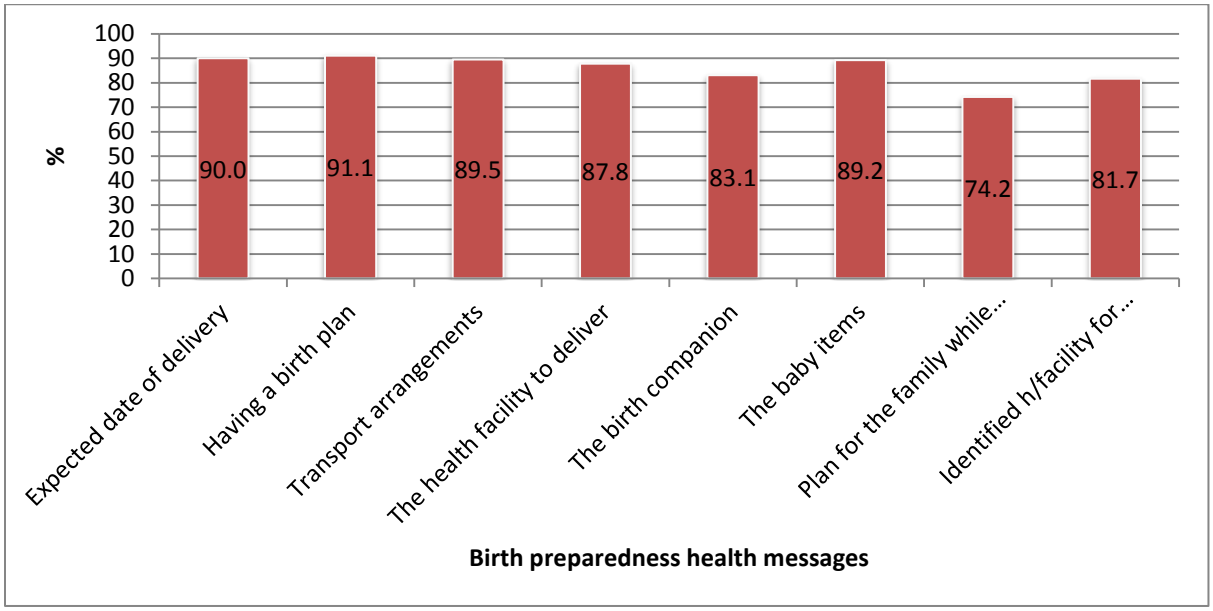


Figure 4.5 Birth preparedness health messages provided

4.9.4 Additional materials on birth preparedness information

Other than the verbal messages shared during ANC, some respondents received additional materials on BP health education. This was mainly the Mother Child Health (MCH) booklet 69.9% (n=167) which contained some additional information that the respondent could refer to. Only 29.5% (n=33) of the respondents were informed by the health care providers on reference materials on BP heath education. These findings are illustrated on table 4.18.

Table 4.18 Additional materials on birth preparedness information

Characteristics	Frequency (n)	Percentage (%)
Any additional materials to the BP health talk (n=361)		
Yes	239	66.2
No	112	31
No response	10	2.8
Additional materials(n=239)		
Videos	4	1.7
Mother- Child Health (MCH) Booklets	167	69.9
Journal	2	0.8
Pamphlets	58	24.3
No response	8	3.3
Informed about any reference materials (n=112)		
Yes	33	29.5
No	68	60.7
No response	11	9.8

**Language barrier, need written materials*

4.9.5 Sessions and time taken for provision of birth preparedness information

The number of session(s) dedicated to BP health messages delivery ranged from one to four but 5.3% (n=19) of the respondents received the messages during each ANC visit. The respondents who did not receive any messages at all on birth preparedness during ANC were 1.4% (n=5). (Figure 4.6).

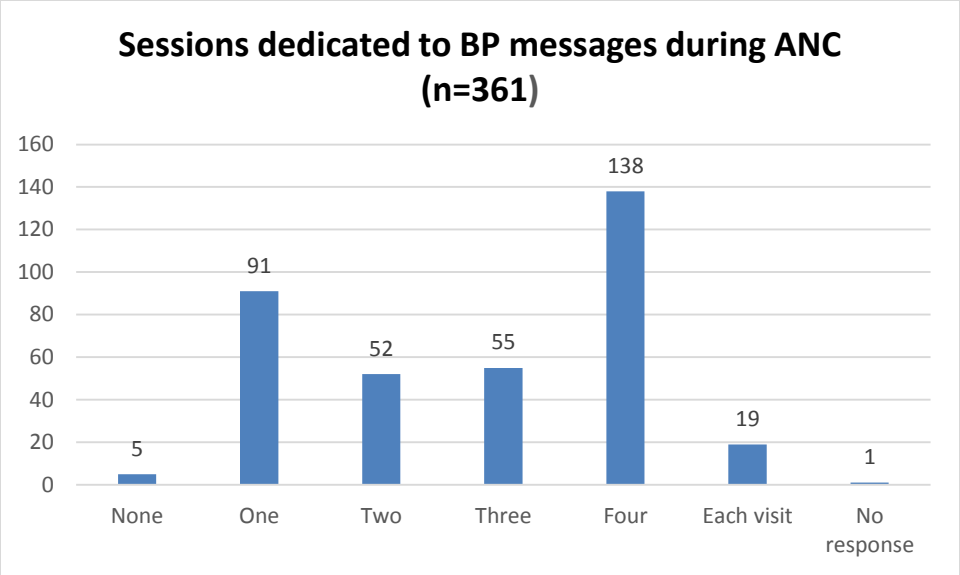


Figure 4.6 Session(s) dedicated for BP information provision

The BP health education sessions mostly lasted between 10 to 20 minutes during the ANC visits for most of the respondents 41.6% (n=150) (Figure 4.7).

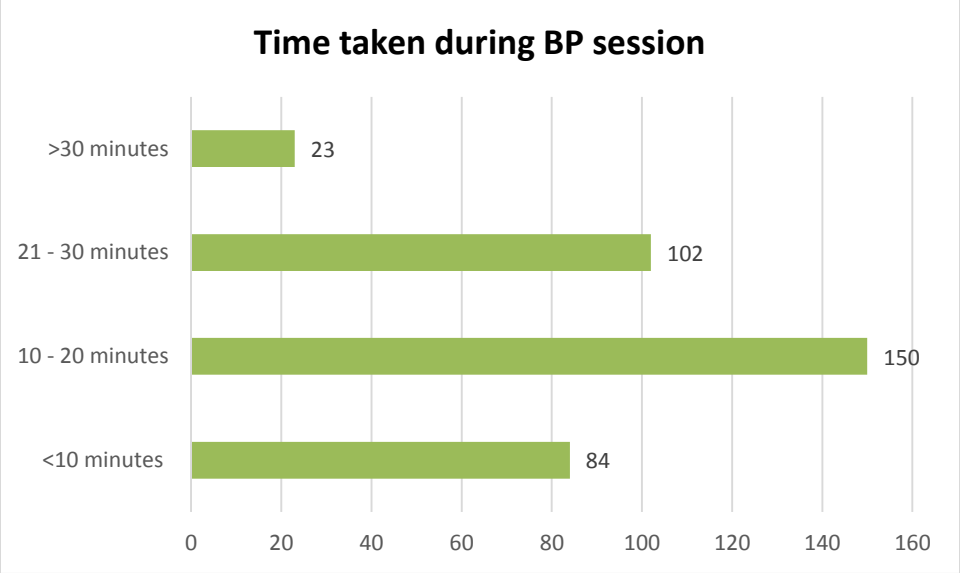
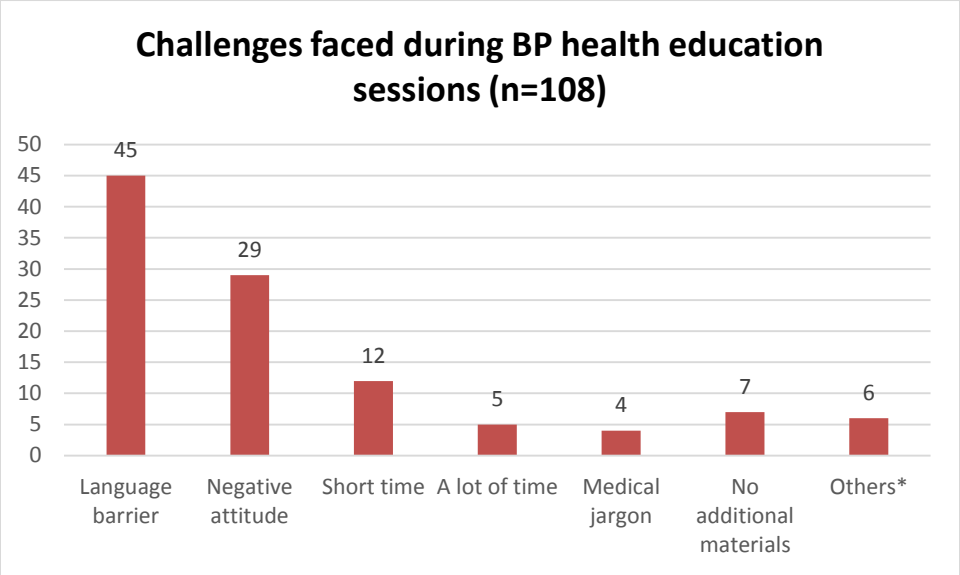


Figure 4.7 Time taken for BP information provision

4.9.6 Challenges faced by the respondents during delivery of BP information

The study also established that respondents encountered challenges when receiving BP health education from health care providers. These challenges included language barrier 41.7% (n=45) and negative attitude from health care providers 26.9% (n=29) as illustrated in figure 4.8.



**Lack of privacy, nervousness, not being audible, planning for finances, too fast, not keeping time (for each challenge, n=1)*

Figure 4.8: Challenges faced during health education

4.9.7 Documentation of BP information

Enquiries on the documentation of the delivery of BP messages from the respondents revealed that the health care providers mostly documented BP information in the mother-child health (MCH) booklets 75.1% (n=271) followed by antenatal care (ANC) registers 39.6% (n=143). No documentation on the delivery of BP messages was done as reported by 24.1% (n=87) of the respondents. Those whose information was documented on a separate piece of paper were only 0.6% (n=2). Information documented included birth plan 51.5% (n=186), details of the messages shared 34.1% (n=123) and date of the day when the BP message was discussed 23.5% (n=85).

4.9.8 Association between selected factors and delivery of BP messages

The study evaluated the association of some selected factors with the mode of delivery of BP messages. The place of residence was associated with the mode of delivery of BP messages (p=<0.001). Women from urban areas were less likely to have received the messages as a group when compared to those from rural areas (OR 0.317 (95% CI 0.203 0.496), p<0.001). Women whose partners had post-secondary education were less likely to have received group teachings during their ANC visit when evaluated against those whose partners had no formal education or primary school level of education (OR 0.153 (95% CI 0.081 - 0.290), p<0.001). No other socio-demographic factors were associated with the method of delivery of BP messages at the ANC clinic. The findings are illustrated in Table 4.19.

Table 4.19 Socio-demographic factors associated with sharing of BP messages

Characteristic	Method of sharing BP messages				OR	95% CI		p-value
	Group		Individualized			Lower	Upper	
	n	%	n	%				
Age (years)								
<18	20	60.6	13	39.4	0.498	0.188	1.319	0.158
18-21	57	59.4	39	40.6	0.473	0.214	1.045	0.061
22-30	111	60.7	72	39.3	0.499	0.238	1.047	0.063
>30	34	75.6	11	24.4				
Marital status								
Married	180	62.9	106	37.1	1.173	0.69	1.993	0.556
Un-married	42	59.2	29	40.8				
Residence								
Urban	63	45.7	75	54.3	0.317	0.203	0.496	<0.001
Rural	159	72.6	60	27.4				
Maternal education								
No formal education/ Primary	22	73.3	8	26.7	1.375	0.453	4.17	0.573
Secondary	116	76.3	36	23.7	1.611	0.691	3.755	0.266
Post-secondary	20	66.7	10	33.3				
Religion								
Protestant	121	61.7	75	38.3	1.003	0.638	1.578	0.988
Others (Muslim, SDA, traditional)	19	67.9	9	32.1	1.001	0.842	1.191	0.537
Catholic	82	61.7	51	38.3				
Maternal occupation								
Housewife	115	68.0	54	32.0	1.817	1.142	2.892	0.011
Student/Unemployed	21	61.8	13	38.2	1.378	0.64	2.971	0.412
Self-Employed	75	54.0	64	46.0				
Partner's education								
Post-secondary	28	33.7	55	66.3	0.153	0.081	0.29	<0.001
Secondary	74	65.5	39	34.5	0.572	0.316	1.033	0.063
No formal education/ Primary	83	76.9	25	23.1				
Partner's occupation								
Self- employed	61	64.2	34	35.8	1.126	0.691	1.833	0.635
Others	161	61.5	101	38.5				

4.9.9 Association between health facility and sharing of BP messages

Two health facilities visited by the respondents, Migori County referral hospital and Arombe dispensary were associated with the method of sharing BP messages (p=<0.001).

Table 4.20: Relationship of health facility with the method of sharing BP messages

Characteristics	**Method of sharing BP messages**				**OR**	**95% CI**		**p-value**
	Group		**Individualized**					
Health facility	n	%	n	%		Lower	Upper	
Migori County Referral Hospital	64	36.4	112	63.6	0.141	0.076	0.26	<0.001
Arombe dispensary	54	98.2	1	1.8	13.304	1.716	103.139	0.001
Godkwer health centre	35	87.5	5	12.5	1.725	0.588	5.063	0.317
Isibania sub-County hospital	69	80.2	17	19.8				

4.9.10 Services provided at the facility regarding birth preparedness

From the FGDs, respondents reported that they had received information about the items that they were required to buy and carry with them to the health facility when labour began. However, some of them had not been taught about the specific issues about birth preparedness. The health education sessions were often not too detailed on the specific aspects of birth preparedness. As reported by the respondents, the health facility staffs were few and had a high workload thus this impeded with their provision of services. These were the responses:

"We are told from the hospital to buy supplies like cotton wool and carry them with us when we go there. I don't like that" (Respondent 1, FGD 4)

"I have not been taught about birth preparedness. The nurses have not told me what to do" (Respondent 2, FGD 1)

"It is only the things we are supposed to buy but we are not told anything else. I don't know the expected date of delivery" (Respondent 3, FGD 3)

"The nurse wrote for me what I am supposed to buy. She did not tell me about the danger signs and I don't know. This is my first pregnancy". (Respondent 8, FGD 4)

"The nurses in this facility are few and we (the clients) are many. They will attend to you very fast so that they serve everybody". (Respondent 5, FGD 2)

"There is no specific session about birth preparedness but we are taught many things". (Respondent 3, FGD 1)

4.10 Role of men in birth preparedness

According to the respondents interviewed during the focus group discussions, the men were involved to some extent in birth preparedness through providing money needed during labour or escorting the woman during labour to hospital. However, some respondents said that the men did not do anything concerning preparation for birth, as this was the role of the woman. The men did not act as birth companions as they would not be in the labour ward until the baby is born. They also did not help in housework during pregnancy or even after childbirth because of the cultural beliefs. The women got assistance from their co-wives or mother-in-laws as it is culturally indicated according to the respondents.

These are some of the responses from the focus group discussions about the role of men in BP.

"They do not do anything about childbirth. This is the work of the woman" (Respondent 3, FGD 3)

"They look for money to be used when I come to hospital to deliver or clinic" (Respondent 7, FGD 1)

"He will bring me to hospital but he will not enter the labour room. My companion will be the nurse" (Respondent 3, FGD 2)

"The men can't help in the housework because it is culturally wrong. The person who will help me is my co-wife" (Respondent 4, FGD 4)

After the baseline survey findings were analyzed, there was need to carry out an intervention to increase the level of knowledge and practice of birth preparedness, thus the interventional phase of the study was carried out.

B: INTERVENTIONAL PHASE RESULTS

The second phase of the study was carried out seven months after the first phase of the study to avoid data contamination. This was a separate pre-test post-test design, thus the participants were different. After seven months, all those who had participated in the baseline had delivered thus the Hawthorne effect was controlled for. This was done in December 2016– January 2017. The intervention phase was carried out between September 2016 – December 2017 to recruit the participants. Follow up of the recruited participants ended in March 2017 after all those who had been recruited in the study delivered. The study was carried out in in the same facilities used for the baseline survey. These were: Migori County referral hospital, Isibania sub-County hospital, Godkwer health centre and Arombe dispensary.

A total of 379 respondents were recruited in the study. The number of respondents recruited to the study was done per facility based on the average client flow per month since the enrollment of the respondents was planned to take one month. Challenges were however experienced during recruitment following the nurses' countrywide strike which saw the recruitment process take four months. Table 4.21 illustrates the number of respondents recruited per facility.

Table 4.21: Number of respondents recruited per health facility

Facility name	**Intervention**	**Intended (N)**	**Recruited (N)**	**Percentage (%)**
Arombe	No	52	47	12.4
Godkwer	Yes	70	76	20.1
Isibania	No	133	127	33.5
Migori	Yes	115	129	34.0
Total		**370**	**379**	**100**

4.11 Success rate

The respondents who were successfully followed up were 90.5% (n=343). Those lost to follow up were 9.5% (n=36) because of providing wrong phone numbers hence they could not be reached. The respondents enrolled in the study group were 205 while those in the control group were 174. Those who were lost to follow up in the study group were 22 and those in the control group were 14, meaning data analysis was done on 183 respondents on the study group and 160 on the control group.

4.12 Socio-demographic characteristics of the respondents

Slightly more than half of the respondents 55.1% (n=209) resided in the village. The age of the respondents ranged from 15 – 44 years with the mean age being 25 years. Age at first birth ranged from 12 – 28 years old. The mean age at first birth was 18.7. The age at first birth was between 15 -19 years for most of the respondents 62.5% (n=237). There were some who had their first birth before 15 years 3.2% (n=12) and after 28 years 4.5% (n=17). Most of the respondents 86.5% (n=328) were married and the education level for the majority was primary level where some of them had completed 26.9% (n=102) while others, 35.6% (n=135) had incomplete primary education. Majority of the respondents were housewives 35.9% (n=136) and business women 29% (n=110). The pre-dominant religion was protestant 53.6% (n=203). (Table 4.22)

Age, religion and maternal occupation were significantly associated with birth preparedness, p=0.03. p=0.08 and p=0.028 respectively as shown on table 4.22.

Table 4.22: Socio-demographic characteristics of interventional phase respondents

Variable	**Control group**		**Study group**		**p-value**	**OR**
	Frequency (n)	**Percent (%)**	**Frequency (n)**	**Percent (%)**		
Age					0.03	
19 years and below	39	22.4	34	16.6		
20 - 24	69	39.7	62	30.2		
25 - 29	33	19	43	21		
30 - 34	22	12.6	41	20		
35 and above	11	6.3	25	12.2		
Total	174	45.9	205	54.1		
Marital status					0.231	
Married	156	89.7	172	83.9		
Single	17	9.8	28	13.7		
Separated	0	0	3	1.5		
Widowed	1	0.6	2	1		
Age at first birth					0.524	1.163
Under 18	69	39.7	74	36.1		
Above 18	105	60.3	131	69.7		
Total	174	45.9	205	54.1		
Residence					0.828	0.956
Town/shopping centre	77	44.3	93	45.4		
Rural	97	55.7	112	54.6		
Total	174	45.9	205	54.1		
Education level					0.56	1.133
Primary and below	112	64.4	126	61.5		
Post primary	62	35.6	79	35.5		

Table 4.22: Socio-demographic characteristics of interventional phase respondents (Cont'd)

Religion					0.008	
Protestant	109	62.6	98	47.8		
Catholic	34	19.5	37	18		
SDA	24	13.8	56	27.3		
Others (Legio/ Roho/ Muslim)	7	4.1	14	6.9		
Total	174	45.9	205	54.1		
Occupation					0.028	
Student	12	6.9	13	6.3		
Peasant farmer	37	21.3	27	13.2		
Casual labourer	6	3.4	8	3.9		
Housewife	51	29.3	85	41.5		
Business woman	55	31.6	55	26.8		
Employed (salaried)	10	5.7	14	6.8		
Others	3	1.7	3	1.5		
Total	**174**	**45.9**	**205**	**54.1**		

Multivariate regression analysis was done to test association of the socio-demographic factors and birth preparedness. The respondent's religion and occupation were significantly associated with being birth prepared (p=0.012) and (p=0.020) respectively.

Table 4.23: Multivariate analysis for socio-demographic factors and birth preparedness

Variable	**Odds ratio (OR)**	**p-value**	**95% CI**	
			Lower	**Upper**
Age (years)	0.99	0.796	0.957	1.034
Marital status	1.21	0.277	0.859	1.695
Residence	1.07	0.629	0.799	1.449
Education level	0.95	0.549	0.826	1.107
Religion	0.85	0.012	0.745	0.965
Occupation	1.16	0.020	1.024	1.312

4.13 Socio-demographic characteristics of the respondents' partners

Regarding the respondent's partner's socio-demographics, most of the partners 39% (n=128) had complete primary level education while only 12.3% (n=40) had completed college/ university education. Most of them were businessmen 30.2% (n=99) while 0.6% (n=2) were students at the time of the study. (Figure 4.9)

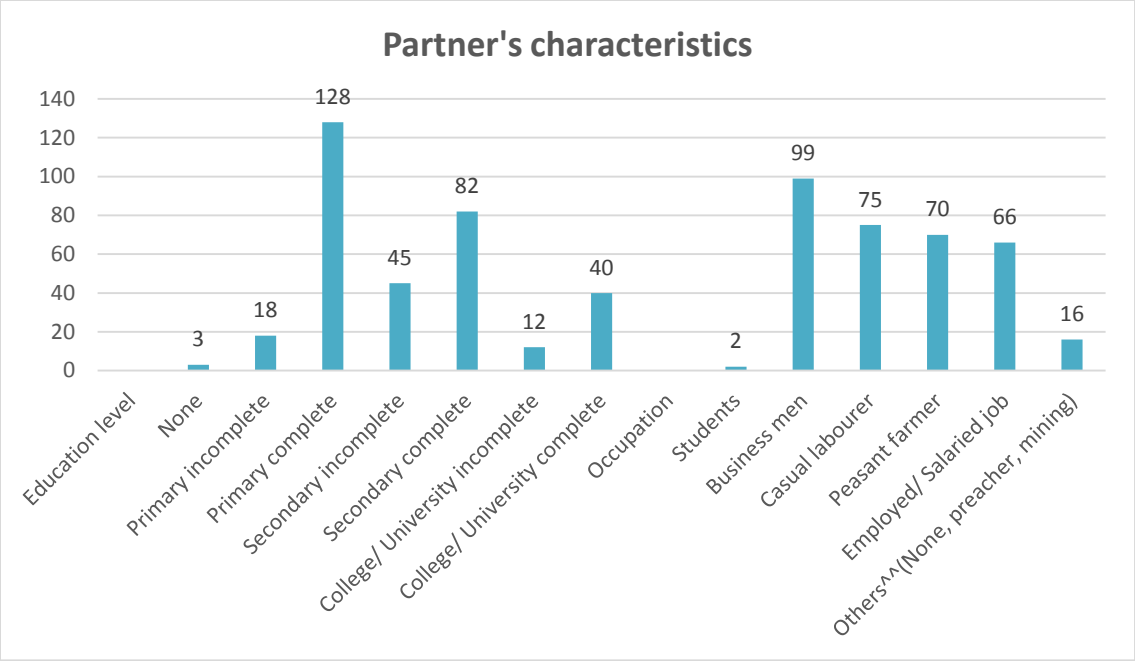


Figure 4.9: Partner socio-demographic characteristics

On regression analysis, there was no association between the partner characteristics and birth preparedness as shown on table 4.24.

Table 4.24: Multivariate analysis for partner socio-demographic factors and BP

Variable	**Odds ratio (OR)**	**p-value**	**95% CI**	
			Lower	**Upper**
Partner's education level	1.004	0.949	0.880	1.145
Partner's occupation	0.947	0.509	0.804	1.114

4.14 Obstetric characteristics

Majority of the respondents 72.5% (n=275) were para 1, 2, 3 and 4 as illustrated on figure 4.10. The respondent with the highest parity was para 10. The respondents who had experienced miscarriages in their previous pregnancies were 9.8% (n=37) with four of them having experienced

three miscarriages each. On regression analysis, there was no association between birth preparedness and the parity of the respondents (OR = 0.988, p=0.84, 95% CI (0.879 1.111))

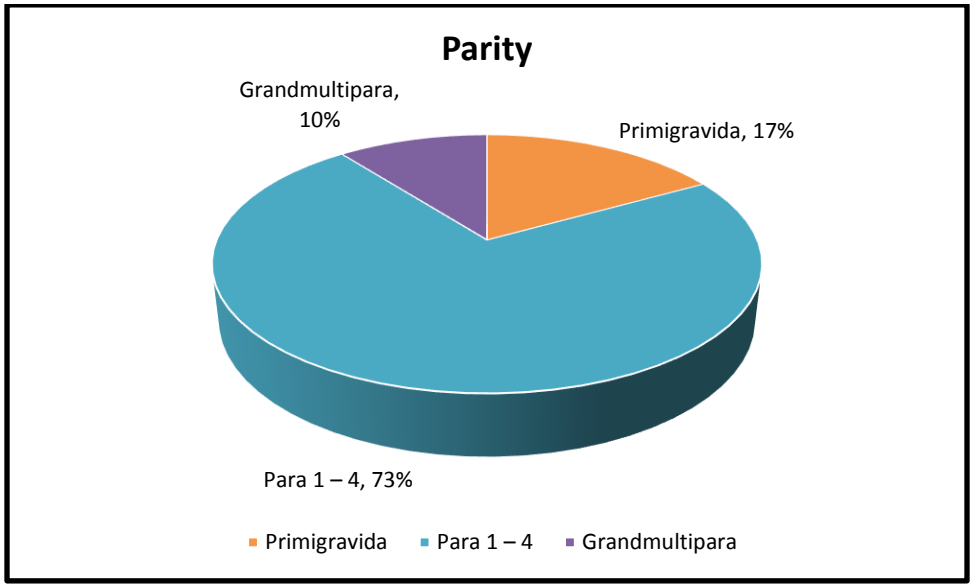


Figure 4.10: Parity of the respondents

4.15 Antenatal care

4.15.1 Antenatal care attendance

Most of the respondents had attended ANC once or twice, 36.9% (n=140) and 32.9% (n=125) respectively. One of the respondents had made six visits to the ANC clinic. The clients who had made four or more visits to ANC in the control and study groups were 7.5% (n=13) and 12.7% (n=26) respectively. Those who made less than four visits were 92.5% (n=161) and 87.3% (n=179) in the control and study groups respectively. There was no significant association of ANC attendance in the control and study groups (p=0.096, OR=0.556) with birth preparedness. Most of the respondents 66% (n=250) attended ANC for the first time during the second trimester of pregnancy. Few of them 18% (n=66) booked during the first trimester (Figure 4.11). There was no

association between the control and study groups on gestation for booking ANC and birth preparedness (p=0.088).

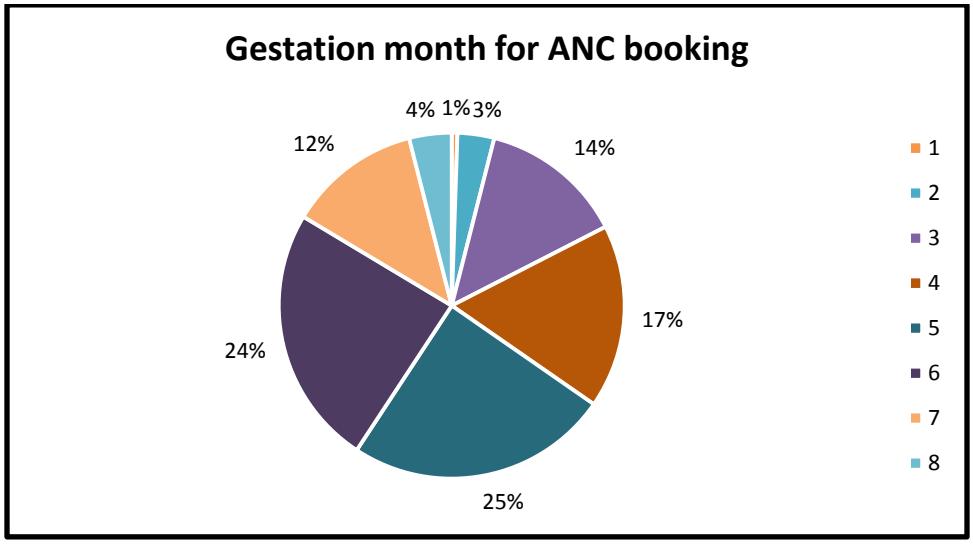


Figure 4.11: Gestation month for booking ANC

4.15.2 Complications experienced during pregnancy

The respondents who had experienced complications during pregnancy before recruitment to the study were 29% (n=110). The complication that was commonly experienced during pregnancy as reported by the respondents was lower abdominal pains 35.5% (n=39). Other respondents 23.6% (n=26) experienced more than one complication as shown on table 4.25. There was a significant association (p=0.0001) of pregnancy complications between the control and study groups. There was also significant association for the specific complications experienced; vaginal bleeding (p=0.023) and lower abdominal pain (p=0.001), OR=5.695, 95% CI (1.901, 17.069)). On multivariate analysis, there was no association between birth preparedness and the pregnancy complications (OR = 1.046, p=0.136, 95% CI (0.986 1.111)). (Table 4.25)

Table 4.25: Complications experienced during pregnancy

Variable	**Control group**		**Study group**		**p-value**	**Odds ratio**
	Frequency (n)	**Percent (%)**	**Frequency (n)**	**Percent (%)**		
Pregnancy complications					0.0001	0.204
Experienced	18	10.3	74	36.1		
Not experienced	156	89.7	131	63.9		
Total	174	45.9	205	54.1		
Complications experienced						
Lower abdominal pain	11	12	16	17.4	0.001	5.696
Vaginal bleeding	8	44.4	14	18.9	0.023	
Convulsions	2	11.1	6	8.1		
Severe headache	6	6.5	22	23.9	0.089	0.846
Others	4	11.1	9	6.8	0.417	

4.16 Knowledge of birth preparedness

Most of the respondents 83.1% (n=315) had heard about birth preparedness (BP) at the time of recruitment to the study. Knowledge of the respondents on BP was assessed during recruitment to the study based on the knowledge score constructed as per the seven aspects of birth preparedness. These aspects are: basic knowledge on danger signs of pregnancy; identifying place of delivery, making transport arrangements, obtaining basic supplies for delivery such as a razor blade and

ready baby clothes; plan for skilled care attendance at birth; identifying a birth companion and making arrangement for household care support for the family while away to deliver or in case of obstetric emergencies. For every correct response to an aspect of birth preparedness, a score of one was awarded, however where the respondent could not answer, a score of zero was awarded. The composite score for knowledge was calculated by summing the scores for each respondent. Further, the knowledge of the respondent was dichotomized into high if they scored four or more scores and low if they scored less than 4 scores based on the seven aspects of birth preparedness. The findings indicated that the respondents' knowledge in the study group was 58% (=106) while in the control group was 52% (n=83).

Most of the respondents 35.9% (n=113) said that it was both the partner and woman's responsibility to prepare for childbirth. Only 19.4% thought it was the partner's responsibility to prepare (Table 4.26).

Having a ready bag for delivery, choosing a facility for delivery and having a birth companion were significantly associated with birth preparedness, p=0.001, p=0.001 and p=0.000 respectively as illustrated on table 4.26.

Table 4.26: Preparation for birth preparedness

Variable	**Control group**		**Study group**		**p-value**	**Odds ratio**
	Frequency (n)	**Percent (%)**	**Frequency (n)**	**Percent (%)**		
Heard about BP					0.512	1.199
Yes	147	84.5	168	82		
No	27	15.5	37	18		
What to prepare						
Baby clothes	141	95.9	162	96.4	0.813	1.149
Ready delivery bag	113	76.9	100	59.5	0.001	0.442
Knowledge of EDD	94	63.9	112	66.7	0.613	1.128
Choose facility	110	74.8	97	57.7	0.001	0.46
Birth companion	91	61.9	55	32.7	0.000	0.3
Who is responsible for preparation					0.563	
Woman	43	29.3	62	37.1		
Partner	31	21.1	31	18.6		
Mother and Mother-in-law	58	39.5	59	35.3		
Others	15	10.2	15	9		

Less than half of the respondents 39% (n=123) believed in beginning preparation for childbirth as soon as they realized that they were pregnant. Some of them never prepared while others said preparation for birth begins after delivery (figure 4.12). The respondents who believed that the third trimester was the best time to prepare were 26.9% (n=85). Those who prepared during the first trimester were only 10% (n=32). There was a significant association of the control and study groups on when to start birth preparation (p=0.000).

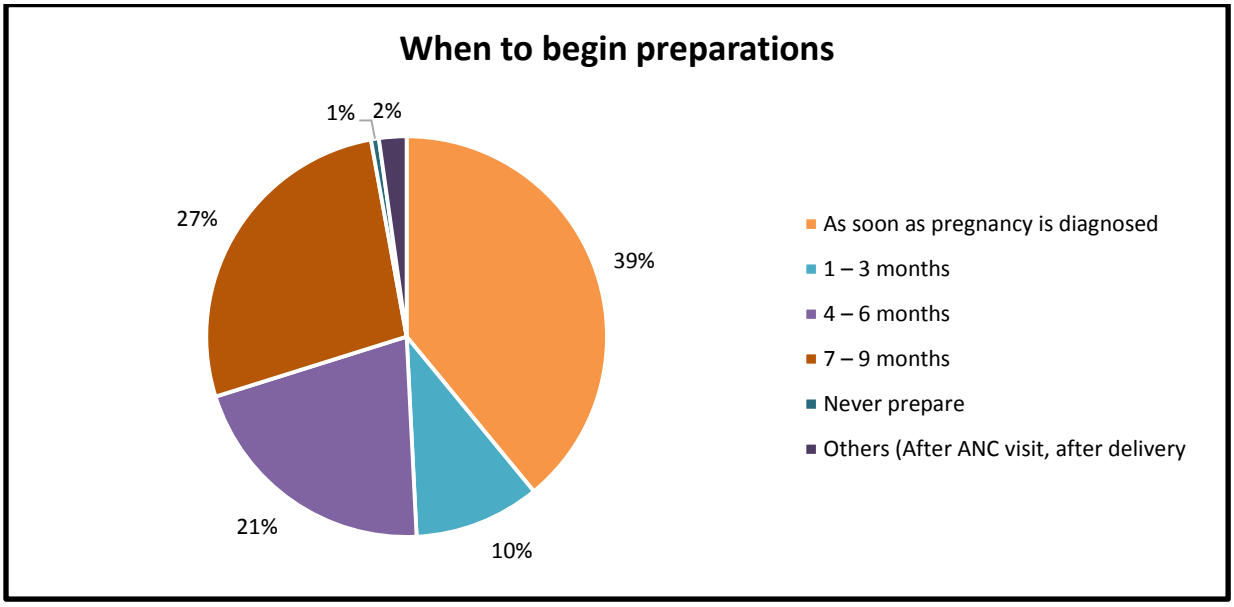


Figure 4.12: Time for beginning preparation for childbirth

Most of the respondents 80.5% (n=305) had heard of at least one serious complications which could occur during pregnancy. According to the study, the respondents who were considered knowledgeable were those who knew more than four serious complications which could occur during pregnancy. The study established that only 39.6% (n=121) of the respondents were knowledgeable on the serious complications. The commonest complication identified by most of the respondents was per vaginal bleeding and severe abdominal pain as illustrated on table 4.27.

Knowledge of complications such as severe headache (p=0.000), drainage of liquor (p=0.000) and blurred vision, (p=0.000) were significantly associated with birth preparedness.

Table 4.27: Knowledge of serious pregnancy complications and association to BP

Variable	**Control group**		**Study group**		**p-value**	**Odds ratio**
	Frequency (n)	**Percent (%)**	**Frequency (n)**	**Percent (%)**		
Knowledge of serious complications					0.091	0.617
Yes	147	84.5	158	77.1		
No	27	15.5	47	22.9		
Specific complication known						
Vaginal bleeding	138	93.6	146	92.4	0.612	0.793
Convulsions	55	37.4	51	32.3	0.347	0.797
No fetal movement	86	58.5	68	43	0.007	0.563
Abdominal pain	107	72.8	116	73.4	0.902	1.032
Breathlessness	46	31.3	31	19.6	0.019	0.536
Severe headache	98	66.7	66	41.8	0.000	0.359
Drainage of liqour	55	34.7	17	10.9	0.000	0.225
Blurred vision	55	37.4	28	17.7	0.000	0.36

Majority of the respondents 86% (n=326) believed in preparing for childbirth. Most of them 97.4% (n=369) planned to deliver in the health facility while 2.6% (n=10) planned to deliver at home. Those who intended to deliver at home planned to be assisted during delivery by the TBAs, their mother, grandmother, mother in law or by themselves.

The practices significantly associated with birth preparedness were finance preparation, transport preparation, identification of health facility for delivery, identification of a caretaker and having a ready bag for delivery were significantly associated with birth preparedness. (Table 4.28)

Table 4.28: Regression analysis for the practices of birth preparedness

Variable	**Control group**		**Study group**		**p-value**	**Odds ratio**
	Frequency (n)	**Percent (%)**	**Frequency (n)**	**Percent (%)**		
Preparing baby clothes	139	92.7	163	93.7	0.718	1.173
Finance preparation	112	74.7	149	85.5	0.013	2.022
Identified health facility	18	27.3	12	13.2	0.027	0.405
Transport preparation	105	70	78	44.8	0.000	0.348
Identified care taker	75	50	54	34	0.001	0.450
Ready delivery bag	5	3.3	18	10.3	0.014	3.346

The commonest mode of transport chosen by most respondents 68.6% (n=253) to reach the health facility was the motorcycle transport (*bodaboda*).

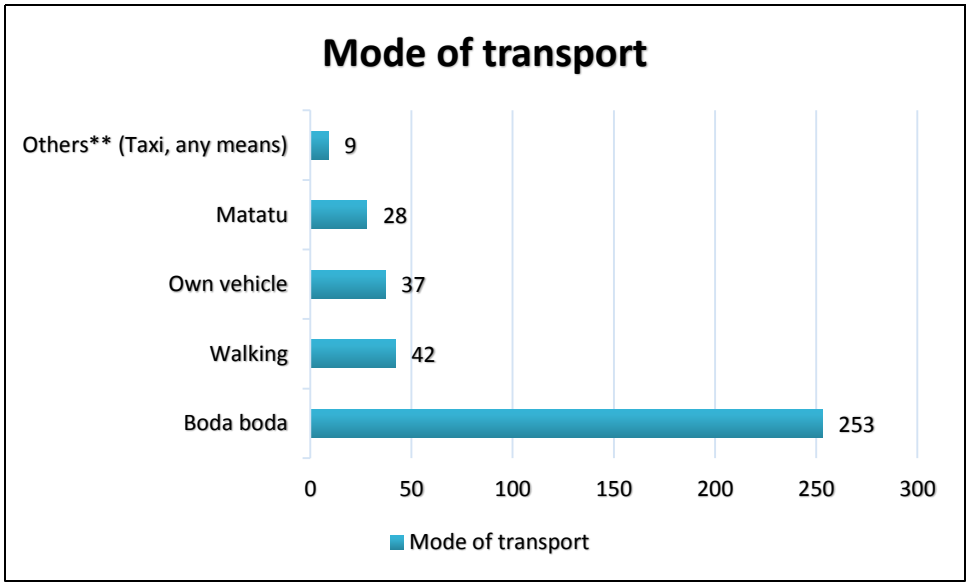


Figure 4.13: Mode of transport to the health facility

4.17 Companionship during labour and delivery

Most of the respondents 94.3% (n=348) planned to have a companion during labour and delivery. The companion who was identified by most of them was the mother in law and the partner in some cases. Some of the respondents opted not to have a companion in labour because of cultural reasons 23.8% (n=5) or preference to be alone 42.9% (n=9). Other respondents 33.3% (n=7) did not see the need of having a companion among other reasons given. Table 4.29 illustrates the birth companions chosen by the respondents.

Table 4.29: Birth companion

Characteristics	Frequency (n)	Percentage (%)
Have a companion		
Yes	348	94.3
No	21	5.7
Total	369	100
Companion chosen		
Partner	126	36.2
Mother in law	106	30.5
Mother	38	10.9
Friend	15	4.3
Sister	36	10.3
Traditional Birth Attendant (TBA)	8	2.3
Others (aunt, co-wife, neighbor, sister in law)	19	5.5

4.18 Care taker while away

About the caretaker of the home while away for delivery in hospital, the person chosen was mainly the partner 27.6% (n=102) and the mother in-law 17.6% (n=65). Older children were also left to be caretakers of the home while the mother was away among 13.4% (n=49) of the respondents. Some of them 10.8% (n=40) did not have anyone to take care of their homes during their absence.

Table 4.30: Caretaker for the respondent while away

Characteristics	**Frequency (n)**	**Percentage (%)**
Partner	102	27.6
Mother in law	65	17.6
No one	40	10.8
Sister	35	9.5
Older children	49	13.4
Neighbour	27	7.3
Others**(Aunt, house-help, siblings, cowife, parents)	38	10.3
Friend	13	3.5
Total	**369**	**100**

The practice of BP was evaluated during recruitment of the participants to the study. The evaluation was based on the practices of BP: (basic knowledge on danger signs of pregnancy; identifying place of delivery, making transport arrangements, obtaining basic supplies for delivery such as a razor blade and ready baby clothes; plan for skilled care attendance at birth; identifying a birth companion and making arrangement for household care support for the family while away to deliver or in case of emergencies). A key of scoring the practice was developed whereby each correct answer was scored one while a wrong answer was awarded a zero mark. A total of the marks scored by the respondents was determined. The participants were then rated as having unfavourable practices if they scored less than four or favourable practices of BP if they scored four or more marks. Those who had favourable practices of BP in the study group were 59% (=108) while in the control group were 54.4% (n=87).

4.19 Implementation of birth preparedness health education guidelines

Most of the respondents 82.8% (n=314) received health education in the health facilities during ANC visit. For the majority 83.4% (n=262), the BP health education was initiated during the first visit, however for others it was initiated during the subsequent visits (figure 4.14).

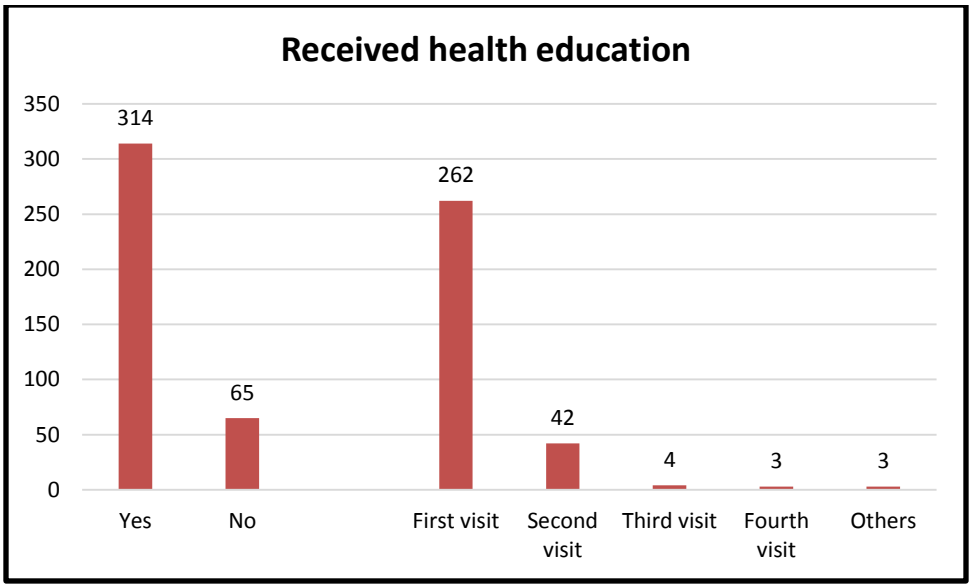


Figure 4.14: Health education received in ANC

There was a significant association between the time of initiation of health education during ANC and birth preparedness (p= 0.01). (Table 4.31)

Table 4.31: Regression analysis for initiation time for health education and BP

Variable	**Control group**		**Study group**		**p-value**	**Odds ratio**
	Frequency (n)	**Percent (%)**	**Frequency (n)**	**Percent (%)**		
Initiation time					**0.011**	**0.450**
1st visit	126	72.4%	136	66.3%		
Other visits	35	27.1	17	11.1		

Regarding birth preparedness information, most of the respondents were taught about the expected date of delivery (EDD), having a birth plan, transport arrangements, choosing the health facility for delivery, having a birth companion during labour and delivery, preparing baby items and having a plan for the family while away during delivery.

The method used for delivery of health messages was mostly individualized teaching in the intervention group 71.2% (n=109) whereby the respondent was taught while alone with the health provider. Verbal means was used as the mode of communication for all the respondents during health education. Those in the intervention group received an additional mobile phone text message reminder on what to prepare one month prior to delivery.

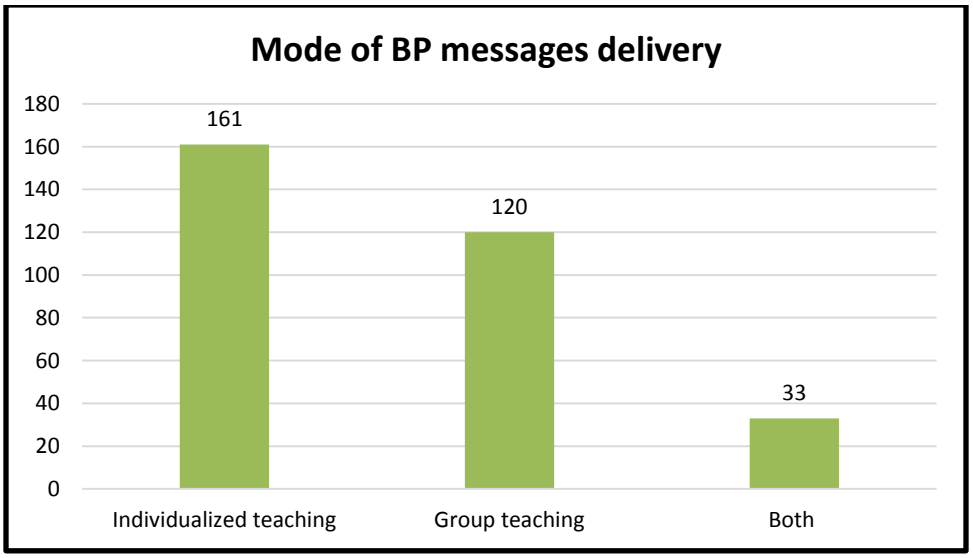


Figure 4.15: Mode of teaching BP health education

There was a significant association between the mode of teaching and birth preparedness (p=0.000) as shown on table 4.32.

Table 4.32: Regression analysis for mode of teaching birth preparedness

Variable	**Control group**		**Study group**		**p-value**	**Odds ratio**
	Frequency (n)	**Percent (%)**	**Frequency (n)**	**Percent (%)**		
Mode of teaching					0.000	
Individual	52	32.3	109	71.2		
Group	79	49.1	41	26.3		
Both	30	18.6	3	2.5		

Most of the respondents preferred the method that was used to deliver birth preparedness messages to them. According to the respondents, they preferred the method of teaching since the messages were short and clear 38.5% (n=115) or because of the convenience of the method 20.7% (n=62). Some disliked the mode of delivery of the health massages because they found it too brief, time wasting or too complicated. Some of the respondents 34.7% (n=109) were provided with Information, Education and Communication (IEC) materials in addition to the health messages received in the health facility. This included the mother-child health (MCH) booklet and pamphlets with information on birth preparedness. (Table 4.33)

Table 4.33: Delivery of health messages on birth preparedness

Variable	**Control group**		**Study group**		**p-value**	**Odds ratio**
	Frequency (n)	**Percent (%)**	**Frequency (n)**	**Percent (%)**		
Mode of teaching preferred					0.08	2.732
Yes	150	93.2	149	97.2		
No	11	6.8	4	2.6		
Total	161	51.3	153	48.7		
Reasons for liking the method						
Short and clear	67	44.7	103	69.1	0.000	2.774
Convenient	50	33.3	67	45	0.039	1.634
Memorable	38	25.3	56	37.6	0.023	1.775
IEC materials provided					0.000	0.419
Yes	71	44.1	38	24.8		
No	90	55.9	115	75.2		
Review of health message					0.410	1.213
Yes	98	60.9	100	65.4		
No	63	39.1	53	34.6		

Review of birth preparedness health messages was done to 63.1% (n=198) of the respondents. The rest did not have the messages on birth preparedness reviewed once it had been initiated. The frequency of review of the messages was once, twice or during every visit. (Figure 4.16)

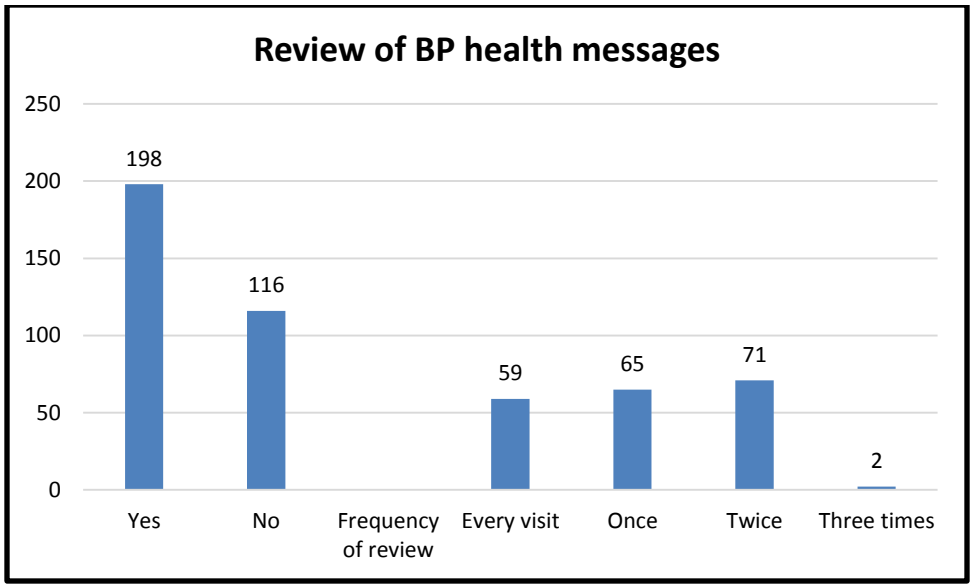


Figure 4.16: Review of health messages on birth preparedness

Most of the respondents 41.4% (n=157) felt that the best way to retain birth preparedness health messages was to have the teaching sessions repeated severally. Others felt that use of community health volunteers (CHVs), mobile phone reminders and pamphlets were other ways of helping them retain the messages. A combination of these methods was also suggested whereby the health messages could be repeated severally in addition to using mobile phone reminders 15.3% (n=58). (Table 4.34)

Table 4.34: Best way to retain health messages

Best way to retain health messages		
Characteristics	**Frequency (n) (379)**	**Percentage (%)**
Repeat severally	157	41.4
Health education with pamphlets	57	15.0
Mobile phone reminder	20	5.3
Mobile phone reminder, health education with pamphlets	1	0.3
Repeat severally, health education with pamphlet	4	1.1
Repeat severally, health education with mobile phone reminder	58	15.3
Others (Feedback, demonstration, CHVs, phone calls, Videos, not necessary)	82	21.6
Total	**379**	**100**

#Multiple responses

During the health sessions, some clients reported experiencing challenges while receiving health education on BP. The respondents who experienced challenges during health education on birth preparedness were 21.4% (n=81). The main challenge experienced was language barrier 33.3% (n=27) and use of medical jargon 22.2% (n=18) during health education as illustrated on figure 4.17.

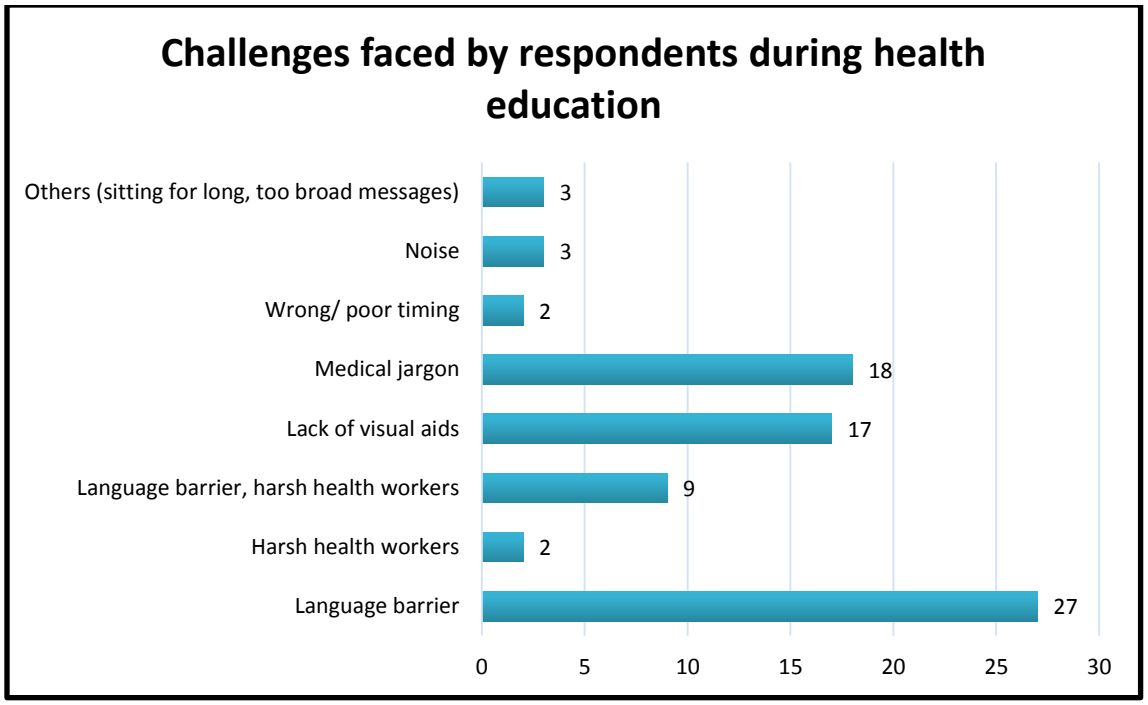


Figure 4.17: Challenges faced by respondents during health education

4.20 Documentation of BP information

The information documented mostly in the respondent's Mother – Child Health (MCH) booklets was a birth plan and the items to buy 31.1% (n=118) and carry to the health facility during delivery. Some had a single information about birth preparedness documented while others had more than one information documented. (Table 4.35)

Table 4.35: Documentation of birth preparedness information

Information documented	**Frequency (n)**	**Percentage (%)**
Birth plan	48	12.7
Items to buy	13	3.4
Items to buy and birth plan	118	31.1
Items to buy, birth plan and messages shared	79	19.5
Birth plan and messages shared	21	5.5
Messages shared	19	5.1
None	84	22.2
Others (EDD)	2	0.5

**Multiple responses*

4.21 Mode of delivery and outcome

Most of the respondents 80.7% (n=306) delivered in the health facility. Majority of them delivered via vaginal delivery 94.8% (n=325) as illustrated on table 4.36.

Table 4.36: Place, mode and outcome of delivery

Variable	**Control group**		**Study group**		**p-value**	**Odds ratio**
	Frequency (n)	**Percent (%)**	**Frequency (n)**	**Percent (%)**		
Place of delivery					0.019	0.433
Hospital	136	85	170	92.9		
Home	24	15	13	7.1		
Mode of delivery						
Spontaneous vaginal delivery (SVD)	156	97.5	159	92.3	0.033	3.231
Caesarean section (C/S) / Vacuum	4		14			
Delivery outcome						
Live birth	155	96.9	176	96.2	0.725	0.811
Perinatal death	5	3.1	7	3.8		

The outcome of pregnancy for the majority was a live birth 96.5% (n=331), however, 3.5% (n=12) of the respondents had poor outcomes such as miscarriages, fresh stillbirths (FSB), macerated stillbirths (MSB) and neonatal deaths as shown on figure 4.18.

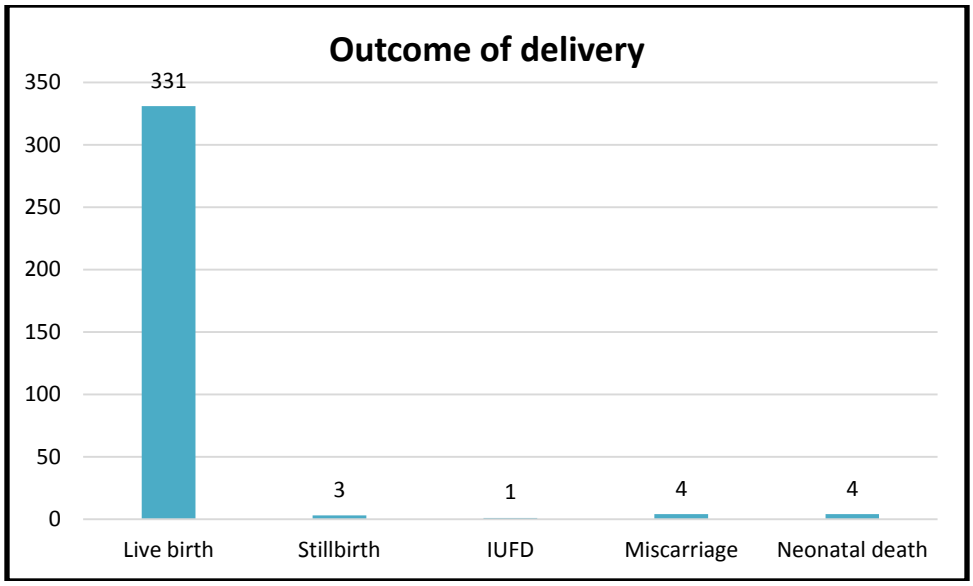


Figure 4.18: Outcome of delivery

The data per facility indicated that women who attended the County referral hospital and the sub-County hospital experienced most of the poor outcomes. In the County hospital, there were two fresh stillbirths (FSBs), two miscarriages, one intra-uterine fetal death (IUFD), one macerated stillbirth (MSB) and one neonatal death (NND). In the sub-County hospital, there were two miscarriages and two NND. In the dispensary, there was one miscarriage. There were no poor outcomes experienced by the respondents who attended the health centre for delivery services.

4.22 Comparative results of study and control groups on birth preparedness

Knowledge of the respondents on birth preparedness was assessed in the study and control groups after the intervention. Using the knowledge score developed based on the components of BP, a score of four or more was regarded as knowledgeable while less than four was considered as low level of knowledge on BP. The findings indicated that the level of knowledge among the respondents in the study group was 85.8% (n=157) while in the control group was 63.1% (n=101).

Regarding birth preparedness, 62.4% (n=214) of the respondents were birth prepared. The variables that indicated preparation were hospital delivery, having a ready bag with baby clothes, having transport means and setting aside fare to pay for transport. For those respondents who delivered in hospitals other than the government facilities where delivery services were free, readiness included having money to pay hospital delivery fees. The clients in the intervention group who were birth prepared were 74.3% (n=136) while those in the control group were 48.1% (n=77). (Table 4.37).

Table 4.37: Birth preparedness per facility

Birth Preparedness	**Facility name**									
	Arombe		**Godkwer**		**Isibania**		**Migori**		**Total**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	n	%
Prepared	8	19	41	63.1	69	58.5	96	81.4	214	62.4
Not prepared	34	81	24	36.9	49	41.5	22	18.6	129	37.6
Total	**42**	**100**	**65**	**100**	**118**	**100**	**118**	**100**	**343**	**100**

4.23 Effectiveness of the mobile phone technology

The respondents in the intervention group of the study appreciated the use of the mobile phone text message to remind them about birth preparation. The message was simple and clear and it enabled them to remember what they needed to prepare especially those who had received health education only once during their ANC attendance.

Access of the researcher's mobile phone contacts enabled the respondents to inquire any further information pertaining pregnancy and childbirth. Some raised concerns after delivery about having

difficulty in breastfeeding, minor complications of puerperium or any other problem they experienced. The mobile phone provided a forum for sharing information and reassurance to the respondents. These are some of the mobile phone conversations with the respondents.

'I received the SMS before I had started preparing and it helped to remember what I needed'.

'The SMS reminded me what I was supposed to do so that I could not be caught unaware during delivery'

'This (SMS) is a good thing. You know sometimes we are very busy and we forget but this reminded me what I was to prepare'.

'Thank you for sending the SMS. You see now I am able to call when I have a problem'.

'I started bleeding after I received the SMS and the telephone contact enabled me to ask what to do'.

'I am happy because you sent the SMS which helped me to prepare. In addition, I was able to ask what to do when I went into labour since I didn't know. This is my first child'.

4.24 Hypothesis testing

Calculation of the Mann-Whitney U:

$$U_1 = n_1 n_2 + \frac{n_1(n_1+1)}{2} - R_1$$

Where:

U=Mann-Whitney U test

N_1 = sample size one

N2= Sample size two

R_i = Rank of the sample size

Two-sample Wilcoxon rank-sum (Mann-Whitney) test

	Observation	**Rank sum**	**Expected**
Prepared	130	8515	22630
Not prepared	213	50481	36636
Combined	343	58996	58996

Unadjusted variance 793780.00

Adjustment for ties -233300.39

Adjusted variance 560479.61

Ho: birth~d2(birth~d2==prepared) = birth~d2(birth~d2==not prepared)

z = -18.493

Prob > |z| = 0.0000

P{birth~d2(birth~d2==prepared) > birth~d2(birth~d2==not prepared)} = 0.000

The p-value = 0.000

The null hypothesis stating that the modified approach using a mobile phone text message reminder on birth preparedness content is not effective in delivering health messages to pregnant women compared to the routine approach is therefore rejected.

4.25 Birth Preparedness Health education Model

This study led to development of the birth preparedness health education model. (Appendix I, page 179). This model indicates the success of birth preparedness health education is a function of interrelationships between the client, health care provider, the environment and mode of delivery of the messages. The health care provider need to be prepared to deliver the message. The preparation include being knowledgeable, planning for adequate time and having visual aids. He/she must also choose the appropriate language to use when communicating the health message. The client need to be ready to participate in the health education session, plan for adequate time and avoid distractors that may hinder. The environment should be conducive for the message to be delivered. The messages can be shared orally or in written form. Once the information has been shared, the clients need to be reminded about the key messages shared through a mobile phone text message. This will enable follow up of the clients and will also allow them to consult whenever there is need.

CHAPTER FIVE: DISCUSSION

Birth preparedness is a strategy that enables the pregnant woman and her family to have a birth plan, which enables them to be ready for labour, delivery and childbirth. Health education on birth preparedness enables the woman to be ready for any eventualities during pregnancy, labour, delivery and during the immediate postnatal period (World Health Organization 2006). Johns Hopkins Program for International Education in Gynecology and Obstetrics (JHPIEGO) conceptualized the birth preparedness strategy in 2004 with the aim of promoting utilization of skilled birth attendance thus addressing maternal and perinatal mortalities (JHPIEGO 2004). Evaluation of birth preparedness, particularly on the delivery of health education messages is essential to determine its effectiveness among the clients receiving the services.

5.1 Socio-demographic characteristics and birth preparedness

Age is a critical variable in reproductive health since women who are too young or too old when giving birth stand a higher risk of complications as compared to those who are within the prime reproductive age bracket. This is the age where most women are physically and emotionally mature and ready to settle down in marriage. Most of the respondents were within the prime reproductive age bracket. These study findings are supported by results from an Ethiopian study assessing the practices and factors associated with birth preparedness (Bitew et al. 2016) which established that most of the respondents were in the same age range. However, in this study, there were a number of teenage mothers. This could be attributed to the low socio-economic status and education levels which make the girls to engage in unprotected sexual intercourse for monetary gains and may eventually get pregnant. Comparing the baseline and intervention phase findings, there was a slight drop of teenage pregnancies in the intervention phase. This may be attributed to the strategies

which have been implemented by the County health management to address adolescent pregnancy. Teenage pregnancy increases the risk of pregnancy and childbirth-related complications owing to physical immaturity coupled with other social factors such as poverty. Based on this, the woman may not receive the appropriate support she needs through the pregnancy. At this age, most of the girls are not yet socially and economically independent, still schooling and are still reliant on their parents and guardians. The study findings agree with the results of the Kenya demographic health survey which established that almost a quarter of all the pregnancies happened among the teenagers (KDHS 2014).

Education level has been associated with birth preparedness (Bintabara, Mohamed A. Mohamed, et al. 2015). The women who had higher level of formal education were more likely to be prepared as compared to those who had lower level of formal education. The findings of this study are in agreement with other studies which established a relationship of birth preparedness and education level (Ekabua et al. 2011b; Kuganab-Lem et al. 2015; Markos & Bogale 2014a; Tilahun & Sinaga 2016). In the study, most of the respondents had only completed primary level of education while others did not complete primary level of education. This could be attributed to early age at childbirth which makes the girls to drop out of school thus unable to continue with their education. The findings of this study are in agreement with an Ethiopian study (Bitew et al. 2016).

The results of this study indicate that there is a high possibility of school dropout since most of the respondents had only attained primary level of education and this may affect the literacy levels. Education empowers women to obtain information that can help them to make decisions independently (Sundaram 2014; Mann 2016). Despite the return –to- school policy by the ministry of education in Kenya, which allows the girls to go back to school after childbirth, some of them may not manage owing to lack of social and financial support for them and their children. Higher

level of education has been associated with birth preparedness. In the study, the women who had higher level of education were more birth prepared as compared to those who had lower level of education. These findings are in agreement with an Ethiopian study which indicated that women with secondary level and above showed more preparedness (Bitew et al. 2016). Low level of education has been associated with low socio-economic status indicating that poverty levels are likely to increase (Maiyo 2015). High poverty level is likely to affect birth preparation since part of the preparation includes setting aside finances in case of emergency. This may be difficult in a situation where meeting the basic needs such as food is at stake.

Occupation is another factor that affects birth preparedness. In the study, majority of the respondents were housewives, peasant farmers or casual labourers. These occupations are associated with low income, which is likely to affect their economic independence. When women are economically empowered, they are likely to be more birth prepared since they may not need economic provision by their partners. When preparing for birth, having finances for transport and other utilities is vital to ensure prompt arrival in the health facility in case of labour or an emergency. One of the reasons why delay occurs in seeking care is lack of finances for transport or other services (Thaddeus & Maine 1994) which make it difficult for the woman to access the health facility. Most of the partners of the respondents had complete primary level of education and most of them worked as businessmen, casual labourers or peasant farmers indicating that they were likely to have low wages. In the County, the people living on less than one dollar per day are 43.1% (KHIS 2014).

Low wages are associated to high poverty levels and economic instability since these people will be struggling to meet the basic needs and may not be able to meet other demands such as preparing for birth (Maiyo 2015). In this study, the partner's occupation was not associated with the partner's

awareness of birth preparedness. The findings contrast with those established by a study in Jimma zone, South west of Ethiopia which showed that the husband's occupation was significantly associated with knowledge of birth preparedness (Debelew et al. 2014a). Involvement of a male partner during antenatal care follow up leads to better birth preparedness (Bitew et al. 2016).

Marriage has been associated with positive pregnancy and child outcomes (Ryan 2012) while unmarried status is associated with social disadvantage and poor obstetric outcomes (Raatikainen et al. 2005). Being married enhances social and economic support during pregnancy and childbirth through preparation and decision-making. Most of the respondents in this study were married. Marital status was not significantly associated with knowledge of birth preparedness in this study. These findings contrast those of a study conducted in Edo estate, Nigeria which found significance of marital status in birth preparedness (Tobin et al. 2014). Marriage enables individuals to share decisions thus are able to offer support to each other.

Pregnancies that occur during teenage are categorized as adolescent pregnancies. These pregnancies face a lot of risk both to the mother and her unborn child (Magadi 2006; McPherson et al. 2013; Ago et al. 2012). Most of the respondents in this study had their first birth during the teenage period. The early age at birth could be attributed to low level of education and low socio-economic status as established in the study. Several studies have linked teenage pregnancies to lack of knowledge, peer pressure, lack of utilization of contraceptives and cultural practices such as forced marriages (Were 2007; Mushwana et al. 2015; Mchunu et al. 2012).

Religious practices have been shown to affect birth preparedness due to different religious practices prohibiting or enhancing birth preparation. Most of the respondents were Protestants. Religions other than protestant and Catholic were significantly associated with birth preparedness.

These findings are in agreement with an Ethiopian study which established that Muslim religion was associated with birth preparedness (Belda & Gebremariam 2016a). However, studies assessing the factors affecting birth preparedness in Ethiopia and West Bengal revealed no association of religion and birth preparedness (Debelew et al. 2014a; Mukhopadhyay et al. 2015). Practices carried out in some religions are likely to affect birth preparedness positively or negatively. Some religions believe in not seeking formal health care or disapprove some health care services such as blood transfusion thus this will jeopardize health of the individual. Other religions encourage their clients to utilize health care services thus this offers promotion of the services.

Majority of the Kenyan population reside in the rural areas. In this study, most of the respondents resided in the rural areas. The urban residence was associated with birth preparedness. These findings are in agreement with other studies in Ethiopia (Bishaw & Worku 2014; Musa & Amano 2016). As compared to those residing in the urban setting, those in the rural area may not freely access some amenities because of their unavailability thus, they may be required to seek the services in the urban areas.

5.2 Obstetric characteristics and birth preparedness

Parity is a predictor of birth preparedness and this may be due to previous experience for those who have given birth before or the anticipation for childbirth for the first time mothers. The respondent's parity was significantly associated with having heard about birth preparedness. These findings are in agreement with findings of an Ethiopian and Indian studies which established that parity was a predictor of birth preparedness (Debelew et al. 2014b; Acharya & Ghimire 2013; Rajesh et al. 2016). In the intervention phase of the study, most of the respondents did not have a

high parity (five or more pregnancies). This could be attributed to the age of the respondents since most of them were young and were still in the process of giving birth to their children. The findings of this study are supported by those of several studies which showed that an increase in parity has been associated with birth preparedness (Ekabua et al. 2011b; Acharya et al. 2015; Markos & Bogale 2014b). When a woman gives birth once, they tend to gain experience in the subsequent pregnancies thus are more likely to be ready. A study to assess the impact of mother-in-law's parity on birth preparedness had contrary findings where it established that there was no significant association (Acharya & Ghimire 2013).

Gestation of pregnancy was significantly associated with birth preparedness in this study. This could be attributed to the fact that most women tend to start preparations for delivery late in pregnancy. The findings are in agreement with those of a study conducted in Western Kenya which established that women tend to book antenatal care (ANC) late thus may not have adequate time for preparations for childbirth (Inyangala et al. 2016). In most cases, women have a tendency of beginning ANC during the second or third trimester thus may not achieve the four-world health organization (WHO) recommended ANC visits. This implies that they may not receive adequate health education messages which will enable them to be ready for labour and delivery.

5.3 Antenatal care attendance and birth preparedness

Antenatal care (ANC) is a critical component on promoting health and preventing complications during pregnancy and immediate postnatally. During ANC, women are provided with information on preparations for childbirth (Urassa et al. 2012). Currently, WHO is recommending to have the ANC visits increased from the previous four to eight quality visits (WHO 2016). These visits

should happen at week 12, 20, 26, 30, 34, 36, 38 and 40 weeks' gestation. When clients book late for ANC, they are unlikely to receive some of the services or if they had a complication, it may be detected late. ANC attendance is associated with birth preparedness (Inyangala et al. 2016).

Most women in this study made their first ANC visit during the second and third trimesters. This means a majority attended ANC at least once out of the four WHO recommended visits. Most of those respondents who booked ANC during the first trimester had a complication that made them seek health care. The findings are in agreement with several studies which have established that women book ANC late (Parameshwaran & Kean 2013; Pradhan et al. 2013; Ouma et al. 2010; Magoma et al. 2013). Findings of this study concur with those of a study in Western Kenya which recorded that ANC attendance was associated with birth preparedness (Inyangala et al. 2016). With the late attendance, they are not able to attend the four visits recommended by WHO, therefore the possibility of not acquiring all services provided during the various visits (World Health Organization 2012). Antenatal care (ANC) is able to prevent some complications that may arise during labour and childbirth since it is possible to detect and treat them early. In addition, health promotion services such as deworming are provided. During ANC, women are taught about birth plans and this helps in birth preparedness and increased utilization of skilled care at birth (Magoma et al. 2013). Some women only value the ANC card which according to them is the ticket to health facility delivery without a clear understanding of the need of attending ANC (Kawungezi et al. 2015).

5.4 Knowledge of birth preparedness

The knowledge of birth preparedness enables the woman and her family to make adequate plans for childbirth. Without the knowledge, emergencies that could arise may not be handled in good time. Birth preparedness is part of the ANC package and health messages are shared with all women attending ANC clinics. Among the respondents, birth preparedness was not a new concept since most of them had heard about it. These findings are in agreement to findings from a study in Nigeria which established that the knowledge of the birth preparedness concept was surprisingly high (Ekabua et al. 2011b). However, less than half of them had knowledge on details of birth preparedness. The actual understanding of the components of birth preparedness was lacking among most of the clients in this study. Similar findings were established in a study in Ethiopia where the women knew birth preparedness as saving money and preparing essential baby items but did not know about the other aspects of birth preparedness (Kaso & Addisse 2014b).

The most understood concept of birth preparedness in the study was buying of baby clothes and the least known of the components was knowledge of the expected date of delivery (EDD). This could mean that the women could go into labour pains without having prepared enough. Awareness of EDD helps the women to anticipate the date of delivery knowing that it could be around that period. Qualitative data of this study indicated that there was variation on the understanding of birth preparedness. The various responses from the study such as it is about eating good food or exercising or basically not having an idea about it indicated that there was need to emphasize on the actual birth preparedness messages. Women who are knowledgeable about birth preparedness are more birth prepared (Mutreja & Kumar 2015).

Marital status was associated with knowledge of birth preparedness. These findings are in agreement with studies which sought to establish the factors affecting the knowledge and practice

of birth preparedness (Gitonga et al. 2014; Kabakyenga et al. 2011a; Hiluf & Fantahun 2008a).. The study area being in a patriarchal society, men are usually decision makers and breadwinners in their families. This can affect positively or negatively the preparation for pregnancy and childbirth. When one is married, they receive support from their partners and are more likely to be prepared compared to the unmarried women (Raatikainen et al. 2005). However, contrary findings were established in other studies which did not find any significant association between marital status and knowledge of birth preparedness (Markos & Bogale 2014a; Belda & Gebremariam 2016b; Debelew et al. 2014a).

Early preparation enables the women to be more prepared and are likely to utilize skilled birth attendance (Lakew et al. 2016). In the intervention phase of the study, most of the respondents had heard about birth preparedness. This could be attributed to their experience in the previous pregnancies since most of them were not having children for the first time. Most of the respondents knew that birth preparation should begin as soon as a woman finds out that she is pregnant.

Knowledge of obstetric complications helps in early identification and treatment. During pregnancy, complications often occur unpredicted and without warning. A woman's knowledge on the danger signs will enable her to identify them and seek help early from the skilled birth attendants. Knowledge of danger signs promotes birth preparedness (Kabakyenga et al. 2011a). Most of the respondents knew at least one serious complication that could occur during pregnancy. Less than half of the respondents in the study knew more than four danger signs during pregnancy. These findings are in agreement with other studies which sought to establish the knowledge of danger signs among women and their findings showed that most of the respondents were not knowledgeable on the danger signs (Maseresha et al. 2016; Mbalinda et al. 2014a). The findings of this study are however contrary to a Ugandan study which did not establish any significance

between knowledge of birth preparedness and danger signs (Kabakyenga et al. 2011b). Women's lack of knowledge on most of the danger signs could be attributed their low level of education or inadequate health education during ANC. The most reported complication among the respondents in this study was vaginal bleeding. The findings are in agreement with Ethiopian and Ugandan studies which sought to assess knowledge of danger signs (Hiluf & Fantahun 2008b; Kabakyenga et al. 2011b). It is easier for women to have knowledge on vaginal bleeding as a complication since it is much more common than other pregnancy complications.

5.5 Practice of birth preparedness

The practice of birth preparedness enables the women to prepare, plan for delivery and be ready at the time of childbirth. The study established that most of the respondents believed in birth preparedness. Slightly more than half the respondents had favourable practices on birth preparedness, which included having basic knowledge of danger signs, identifying place of delivery, making transport arrangements, obtaining basic supplies for delivery; identifying a birth companion and making arrangements for a caretaker for the home while away for delivery. These findings are in agreement with a Ugandan study which established low practice of birth preparedness (Kabakyenga et al. 2011b). In addition, the respondents in this study had prepared for childbirth in various ways. Most of the respondents had a ready maternity bag (with razor blade, baby clothes and sanitary pads) in addition to buying baby clothes. During ANC, having these items is emphasized therefore it is likely that women will prepare and have the items ready. The Kenya government currently offers free maternity services in public health facilities, thus women and their families may not consider setting aside finances for delivery as a priority. In the study, some of the respondents had set aside funds for transport and other requirements during

childbirth. Similar findings have been established in various studies (Ekabua et al. 2011b; Dimtsu & Bugssa 2014b; Debelew et al. 2014a) which showed that some women had set aside finances for delivery bills and other requirements. Contrary findings were established in a Ugandan study where most of the women had set aside finances for hospital bills during delivery (Kabakyenga et al. 2011b). In another study in India, preparations for birth included ensuring that food would be available in the home during the period of puerperium (Aimol 2014). Most of the respondents were planning to deliver in the health facilities in this study contrary to a study in Wolatya zone, Ethiopia which established that more than half of the women planned to have home deliveries (Gebre et al. 2015a). Hospital delivery is encouraged during ANC so that the women can utilize skilled birth attendance and obviate complications, which may arise during unskilled attendance.

Marital status was associated with the practice of birth preparedness in this study. This could be attributed to the support that the respondents reported to have received from the partners. Similar findings were established by a study in western Kenya (Inyangala et al. 2016). On the contrary, other studies have found no association between birth preparedness and marital status in Ethiopia (Ekabua et al. 2011a; Markos & Bogale 2014c; Belda & Gebremariam 2016b; Debelew et al. 2014a).

The mother's level of education was not associated with the practice of birth preparedness in this study. These findings are not in agreement with other studies which established that there was an association of the mother's level of education and the practice of birth preparedness (Affipunguh & Laar 2016; Gebre et al. 2015a). Higher education level enables a woman to understand better the importance of birth preparedness practice as compared to those of a lower level of education who their understanding might be complicated by their cultural beliefs.

Urban residency was associated with birth preparedness practice in this study. This could be attributed to accessibility of the health facilities in the urban settings as compared to the rural areas where the facilities could be inequitably distributed and limit access due to distance. In addition, if a mother needs to make purchases of any baby items, accessibility of such in the urban areas is better owing to availability of many shopping places compared to the rural areas. Similar findings were found in an Ethiopian study which established that the adjusted Odds ratio of living in an urban residence and being birth prepared was 2.38 (Tura, M. Afework, et al. 2014). A study in Nigeria established that urban residence was a predictor of health facility delivery, a component of birth preparedness (Ekabua et al. 2011a). However, rural residence was associated with birth preparedness in a cross-sectional study in Ghana (Affipunguh & Laar 2016).

Religion can affect the practice of birth preparedness since various doctrines have different ways of carrying out their religious practices. Religions other than protestant were associated with birth preparedness. This could be attributed to the various religious beliefs regarding health practice in these denominations. Similar findings have been established by other studies (Belda & Gebremariam 2016b; Affipunguh & Laar 2016). However, contrary findings were documented by a Nigerian study which indicated that women who practiced Christianity were more likely to be birth prepared as compared to those who were Muslims (Ajibola et al. 2015). The findings also disagree with a Ghanaian study which found no association between religion and birth preparedness (Kuganab-Lem et al. 2015). A religion that is supportive of health care practices will encourage its believers to utilize the health facility services. Conversely, those of contrary belief will discourage their followers from the same.

In this study, cultural taboos and beliefs hindered birth preparation whereby the society believed that the baby must be born first so that preparation such as clothes could be bought. These findings

relate to those of a study in Lurambi, Kakamega in western Kenya (Inyangala et al. 2016). This could be ascribed to the fact that the region where this study was done bordered the western region thus there was a possibility that these communities had some cultural taboos and beliefs in common. One of the beliefs for not making childbirth preparations in this study was that the child could die at birth if preparations were made prior. No woman would wish to lose her child at birth; instead, they would prefer to adhere to the cultural beliefs and taboos. In a Tanzanian community, there is stigmatization of young girls who get pregnant before marriage (August, Pembe, Kayombo, et al. 2015).

Cultural and traditional practices such as use of herbs during labour hinder health facility delivery (Yanagisawa et al. 2013). In Nepal, owing to the cultural practices and traditional beliefs, many women delivered outside the health institutions (Chand 2016). One of the key components of birth preparedness is delivery assisted by a skilled birth attendant. When women opt to deliver outside the health facilities where unskilled attendants assist them, it could mean they are inadequately prepared for birth.

Birth preparedness is a responsibility of the woman, her family, community and the health care providers. Most of the respondents believed that it was the responsibility of the woman to prepare for birth. These included aspects such as buying baby clothes and any other requirements. In many African societies, pregnancy and childbirth is mostly an issue of women (Abbyad & Robertson 2011). In most societies, the place of delivery is a decision mostly made by the family members and not the woman (JHPIEGO 2004). In the community of study, men are mainly the decision makers in the home since it is a patriarchal society. Consultation between the woman and her partner regarding birth preparation significantly affects seeking of skilled birth attendance (Kabakyenga et al. 2012).

Booking means of transport during pregnancy is of utmost importance since labour or any complication arising cannot be predicted. Most of the respondents were planning to identify means of transport early before labour began to ensure readiness. Identification of early transport helps in preventing delays occurring because of lack of transport means thus reduce complications, which could lead to maternal or perinatal mortalities. These findings are in agreement with studies done in Delhi, India, Nigeria and Ethiopia established that the women were planning to look for early transport (Acharya et al. 2015; Onayade et al. 2010; Hailu et al. 2011).

Despite the plan, there was a variation in the studies on the proportion of women identifying transport early. This could be attributed to the cost of transport, its availability and distance to the health facility. The most available means of transport means in the study was *bodaboda* (motorcycle transport). Motorcycle transport is easily accessible and affordable. In areas with poor road networks like the study area, the motorcycle is very effective since it can reach to where the client is despite the poor terrain. This type of transport was reported in a study in India (Acharya et al. 2015). Other means of transport available for the respondents included use of *Matatu* (public transport). This means may not be as fast or offer the privacy a woman can receive while on a personal vehicle or hired transport. Different settings have different transportation challenges however the most important is the comfort of the mother (PATH 2012).

A birth companion during labour and delivery plays a great role in supporting a woman psychologically and emotionally during the labour and delivery process (World Health Organization 2014; Kabakian-Khasholian et al. 2015). Having a birth companion has been found to be a strategy in ensuring effective non-pharmacological pain management during labour (Kungwimba et al. 2013). Most of the respondents in this study had identified a person who escorted them to the health facility during labour or in case of a complication. The persons

identified by the respondents to accompany them were mainly the spouse and mother-in-law. These were the family members and they would accompany the woman to hospital when labour began. The study findings are in agreement with a review study, which established that birth companions were mostly family members (Bohren et al. 2017). In this study, a birth companion rarely stayed with the mother throughout the labour process, however, they would visit them during visiting hours. This could be attributed to overcrowding in the labour room since most of the health facilities had a small labour ward thus having birth companions present could infringe on the clients' privacy.

Having a birth companion continuously has been established to lead to better labour and newborn outcomes (Umoiyoho et al. 2011; World Health Organization 2014). The community of study viewed childbirth mainly as a women's affair since the spouses would take them to the hospital, leave and pick them after delivery (Cheptum et al. 2014). It is recommended that a mother has continuous companionship during labour and childbirth (WHO 2015d). In this study, the person who stayed with the woman throughout the labour and delivery process was the midwife; however, they did not manage to be with one client throughout because of the huge workload and poor staffing. Similar findings were established in a study in Norway, which showed that the midwives offered continuous support to mothers during labour (Aune et al. 2014). A review of literature established that quality of care during labour and childbirth could be hindered by low staffing levels (Lavender 2016).

5.6 Male involvement in birth preparedness

Men play a critical role in offering support to the woman and the entire family. One way of ensuring a reduction in maternal mortality is through male involvement during pregnancy, labour and delivery and in the postnatal period (Obi et al. 2013). Male involvement has been associated with improved maternal outcomes (Yargawa & Leonardi-Bee 2015). In African societies, men are usually decision makers regarding issues affecting the family including reproductive health issues (Nwokocha 2007). When a couple makes a collaborative decision regarding labour and childbirth issues health care will be enhanced by minimizing the delays resulting from decision-making (Ibrahim et al. 2014). In this study, the role of men in birth preparedness was mostly during financial provision as most of the women were housewives thus they would be economically incapable to provide for finances required during the entire process of childbirth and child rearing. Similarly, in studies conducted in Uganda and Tanzania, men played a key role in provision of finances (Kalisa & Malande 2016; August, Pembe, Mpembeni, et al. 2015).

Men rarely participated in other activities such escorting the woman to the hospital during labour or taking care of the home while the woman is away in hospital for labour and delivery. In this study, less than half of the women had their partners as their birth companions. This could be attributed to cultural beliefs and practices where men rarely engage in childbirth issues. Similar findings were established in a study conducted in Nepal to assess the involvement of men in birth preparedness established that only 39.3% of the women were accompanied by their partners to the hospital during labour (Bhatta 2013). Also, a Nigerian study showed that men were rarely involved as companions during labour (Obi et al. 2013).

The partner's level of education (secondary and post-secondary) in this study was significantly associated with the knowledge and practice of birth preparedness. This could be attributed to the

esteem held by the community on the male child. When men have the knowledge, they are more likely to influence their spouses to practice birth preparedness. Similar findings were established in Uganda which showed that men lacked knowledge on birth preparedness (Kakaire et al. 2011). In Ethiopia, male involvement in birth preparedness was low, however, the same study revealed that they would be more involved if they had the knowledge on what to be done during preparation (Gebrehiwot et.al, 2015).

5.7 Implementation of birth preparedness health education guidelines

The aim of health education during pregnancy is to improve the outcome of both the mother and her baby (Wright et al. 2014). The health workers provided birth preparedness health education to a majority of the respondents. The findings are in contrast to those of a study assessing delivery of health education to patients with chronic illnesses which showed that only a few of the patients received the health messages (Ritsema et al. 2014). In the study, the respondents could mention different aspects of birth preparedness that had been taught by the health care providers but could not describe the whole package.

There are various techniques of communicating health education. Verbal communication is the commonest and easiest means, though the message can also be delivered through visual aids and even computer or mobile phone technology. In the study, verbal communication was frequently used during delivery of birth preparedness health messages to the pregnant women. This could be attributed to the convenience of verbal communication and the unavailability of other methods of teaching such as written pamphlets or videos which could be expensive in the resource-limited health facilities.

Verbal communication can be affected by barriers such as medical jargon or non-verbal communication which can hamper the receiver from receiving the message. Without adequate skills, verbal communication may be marred with barriers which could lead to miscommunication (Marcus 2014). Verbal communication sometimes fails, the women may misunderstand or forget the information (Wright et al. 2014). Many a times in health education, the focus is usually not on the quality of education provided (Nolan 2009). This is likely to compromise on the message delivered to the receiver. The use of written material such as pamphlets in promoting health education can be used successfully (D. Soubeiga & Sia 2013) however, the health care workers may not have adequate time to explain to the women about them (Nolan 2009). A systematic review assessing the effective teaching strategies for patient education delivery established that the most effective strategies included computer technology, written materials, demonstrations and videos (Friedman et al. 2011).

Health promotion messages provided to pregnant women during ANC has been found to contribute to utilization of skilled birth attendance (Dieudonne Soubeiga et al. 2014). The methods used to deliver the birth preparedness messages to the pregnant women during ANC were group or individualized teachings. The choice of method to be used during the teaching session could be because of the number of clients, staffing or identified individual needs. In this study, individualized teaching was used more as compared to group teaching, however in some cases both modes of teaching were utilized. Having an individualized teaching enables the woman to get individualized attention thus can be able to have specific concerns addressed. A study in Tanzania showed that the use of individualized teaching can allow for development of individual birth plan since the woman will have own time with the provider (Magoma et al. 2013).

Group teaching on the other hand may be beneficial since the teaching will be done to a larger group within a short time. In spite of that, group teaching may not allow the respondents to have their specific concerns addressed and some may be shy to ask about any personal concerns. A Cochrane review involving four studies concluded that group antenatal care was acceptable to the pregnant women and was not associated with adverse pregnancy outcomes (Catling et al. 2015). A study comparing group and individual methods of teaching established that both modes resulted into an improvement of patient outcomes (Wilson 1997). Contrary findings were documented by a study comparing effectiveness of an intervention in management of type II diabetes where the study established that group teaching was more effective as compared to the individual teaching method (Merakou et al. 2015). A systematic review on clinical trials which compared the effect of group versus individual pregnancy care was inconclusive owing to the small numbers of the studies (Catling et al. 2015). Based on this, a combination of both, group and individualized methods of delivering health messages could be beneficial to the clients.

In the study, some of the clients received additional information through the maternal – child health (MCH) booklets, pamphlets and videos. Use of these teaching aids has been found to reinforce the verbal teaching (Oliveira et al. 2014). The respondents in the intervention group of the study received additional information through mobile phone text messages which served as a reminder to the verbal information they had received during their ANC sessions. The ANC sessions may not offer adequate time for the clients to conceive the information regarding pregnancy, labour and delivery. Additional reference material is helpful so that the woman can refer to it during her free time. Very few of the respondents in the study were informed of any other reference materials that they could refer to in order to gain more knowledge on their journey of pregnancy. This could be because there are no other available references in the health institution. Similar findings are shared

by a study assessing quality and suitability of patients' written educational materials (Demir et al. 2008). A study conducted in Nakuru, Kenya revealed that among the mothers who were given the MCH booklet, about half of them of them were explained to about the content, however, only a few of them read the content (Gathoni et al. 2015). The MCH booklets play a very important role in enhancing retention of information since the mother can access it at her convenience.

Documentation regarding birth preparedness was done in the booklets for the majority of the respondents; however, no documentation was done for some of the respondents. This could be attributed to staff workload which made them unable to document. Similar findings were obtained in a descriptive study among surgical patients (Demir et al. 2008). Documentation serves as a way of ensuring continuity of care this whenever information is not documented, it creates a gap in the quality of care. Documentation of birth plans during ANC can increase the utilization of skilled care at birth and postnatal services (Magoma et al. 2013).

The infrastructure, resources, service quality and delivery affect utilization of health facility services (Odiwuor & Macharia 2014). Two health facilities in the study, the County hospital and the dispensary were associated with delivery of birth preparedness messages. The dispensary is more close to the people in the community therefore; it is much more likely to be utilized while the County hospital is more equipped to handle complicated cases in case of referrals. Similar findings were established in a study assessing utilization of health facilities in rural Kenya (Ngugi et al. 2017). A study in western Kenya assessing the impact of birth preparedness on pregnancy outcome established that the type of facility attended for ANC was a predictor for birth outcome (Inyangala et al. 2016).

In the intervention phase of the study, most of the respondents received health education which was initiated during the first visit. For some however, the messages were initiated during the second, third or fourth visits. This could be attributed to late arrival of the client to the facility if group teaching is being done since this is usually done in the morning before the services are provided. It could also be ascribed to the inability of the provider to be keen in ensuring all the clients receive health messages during the first visit. The WHO recommendation is that the birth preparedness messages should be initiated during the first visit and the woman is encouraged to develop a birth plan which will be reviewed during the subsequent visits (WHO 2006). This gives time for the woman and her family to make preparation.

5.8 Challenges faced during birth preparedness health education sessions

Health education sessions need to be well organized and any factors which may hinder delivery of the messages be addressed. Whenever clients experience challenges during health education sessions, they may not understand the message which is meant to promote their health. Some of the respondents in the study experienced challenges during health education sessions. These were mainly the language barrier, use of medical jargon, lack of visual aids and harsh health workers. Language is the medium of communication. When there is a barrier in language, the message cannot be delivered as intended. The health providers routinely use medical jargon when communicating among themselves and this may have an influence as they communicate to clients. Communication barriers can have adverse effects on the patient especially when they do not understand the message (Graham & Brookey 2008). Care should be taken to ensure the clients receive information that is clear and unambiguous (Marcus 2014).

Lack of visual aids was reported as a barrier to communication of the birth preparedness health messages. This could be attributed to the fact that most of the public health facilities are economically independent and rely on government budgetary allocation which may not prioritize the visual aids. Visual aids enhance communication and it enhances memory better as compared to verbal communication (Garcia-Retamero et al. 2012). Three types of learners exist; the auditory, visual and kinetic. Visual learners prefer visual aids, auditory learners appreciate verbal communication while kinetic learners prefer use of touch for them to learn effectively (Friedman 2013).

Some of the respondents in the study reported harshness of health providers during health education. This could be attributed to the poor staffing and high workload among the staff that make them tired when attending to the clients. The findings of this study are in agreement with those of a review study which showed that long working hours, staff shortage, poor infrastructure and workload affected delivery of services among health providers (Manyisa & van Aswegen 2017). Some of the clients opt not to utilize health facility services due to the unfriendly health provider attitudes (Cheptum et al. 2014). The health care providers' unfriendly attitude can have inextricable effects on the health messages (Inyang, MP and Doubrapade 2016). The discourteousness of the health care providers infringes on the patient's dignity and violates the patients' rights of free expression, autonomy and information (Ojwang et al. 2010).

5.9 Delivery outcome and health facility attended

Every mother wishes to have a positive delivery outcome, however, sometimes negative outcomes occur. In this study, 3.5% of the respondents experienced poor outcomes which included

miscarriages, fresh and macerated stillbirths and neonatal mortalities. Most of the respondents who experienced these outcomes attended the County and sub-County hospital for delivery services. This could be attributed to the referrals done from the lower level facilities to the higher level hospitals. It could also be attributed to the fact that when women have complications they seek care from higher level facilities or possibly have presented themselves late in the health facility. Several studies have indicated a relationship of poor pregnancy outcomes and home deliveries (Chinkhumba et al. 2014; Lazić & Takač 2011). However, confounding factors such as delay in seeking care make it difficult to link a poor outcome directly to a health facility (Chinkhumba et al. 2014).

5.10 Use of the mobile phone text message technology

Manual follow up and tracking of clients receiving health care services can be difficult owing to the massive numbers. Mobile phone is a technology that has been used and found effective in providing health education owing to its convenience and accessibility and ease of use. Use of mobile phones in improving health care has been found to be cost effective (Kumar et al. 2013). Verbal messages can easily be forgotten or sometimes if the message is not clear it can be misunderstood. A mobile phone text message serves as a constant reminder and can simply be understood. The mobile phone, being a hand-held device that one always has it within their vicinity enables information access as compared to the ANC booklet that one may only refer to it when attending ANC visit.

In the study group, the respondents received a mobile phone text message as a reminder on birth preparedness in addition to the verbal messages and those in the control group only received verbal

messages during antenatal care sessions. Most of the respondents in the intervention group of the study were more birth prepared as compared to their counterparts in the control group. This could be attributed to the use of mobile text message reminder for respondents in the intervention group. Having information on the mobile phone enables easy access and allows one to refer whenever there is need. It is also a cheap alternative to a situation where one would be forced to travel to a health facility to receive information. Findings of this study are similar to the findings of studies on mobile phone messaging reminders for attendance at healthcare appointments which established that use of mobile reminders improved attendance to health care as compared to where there were no reminders (Gurol-Urganci et al. 2013; Guy et al. 2012). The findings of this study are also in agreement with a study examining use of mobile phone text message in Zanzibar which established that its use led to increased antenatal care attendance and utilization of skilled birth attendance (Lund et al. 2013).

The use of the mobile phone text message in this study contributed to the birth preparation by helping the clients to be reminded of what to prepare a month to their expected date of delivery. A systematic review to assess the role of mobile technology established that use of mobile phones can be used to improve health (Sahu et al. 2014). A systematic review of 60 studies where short message service (SMS) reminders were used to remind patients about medication and reduce treatment interruption showed improved outcomes in 46 of the 60 studies (Kannisto & Koivunen 2014).

CHAPTER SIX: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the summary, conclusion and recommendations of the baseline and intervention phases of the study.

6.1 Summary

6.1.1 Socio-demographic characteristics

The study population represented a rural population with more than half of the respondents living in rural areas. Most of the respondents were aged between 20- 34 years. Majority of them were married and the education level for the majority was primary level where some were still students at the time of study. On occupation, majority were housewives and business women. For the married respondents, their spouses' education level was mostly secondary and primary level. Most of them were businessmen. Most of the respondents were Protestants or Catholics.

In the intervention phase of the study, similar findings were established regarding the age of the respondents where most of them (71.2%) were aged between 20 -34 years. The age at first birth ranged from 12 – 28 years. Most of the respondents were married with primary level of education. The occupation for the majority was housewives and business. Similar to the baseline findings, most of the partners of the married women were businessmen. Those who had a salaried job were 21%. Most of them had complete primary level of education.

6.1.2 Knowledge of birth preparedness

Majority of the respondents had heard about birth preparedness however, the knowledge on key aspects of birth preparedness was low. Birth preparedness was mostly understood as buying baby clothes. Those who were knowledgeable, being able to mention at least four components of birth

preparedness were 46%. These variables included knowledge on danger signs of pregnancy; identifying place of delivery, making transport arrangements, obtaining basic supplies for delivery such as a razor blade and ready baby clothes; plan for skilled care attendance at birth; identifying a birth companion and making arrangement for household care support for the family while away to deliver or in case of emergencies.

6.1.3 Practice of birth preparedness

Most of the respondents had started preparing for labour and childbirth. Those who had no preparations mainly cited lack of knowledge, lack of money and cultural beliefs and taboos prohibiting preparation. In the intervention phase of the study, most of the respondents who were birth prepared were those in the intervention group of the study. They had prepared the baby's clothes, finances had been set aside, had identified means of transport to the health facility and had a skilled birth attendance during birth.

6.1.4 Implementation of birth preparedness health education guidelines

Birth preparedness heath messages were delivered mostly verbally to mothers during ANC either individually or as a group. Mostly, the additional information was the maternal booklet (69.9%) and pamphlets. The health messages started during the first visit for the majority and a review was done during every visit. A larger section of the respondents preferred the mode of delivery of the teaching, however others felt it was time wasting or too brief. Averagely, a teaching session took 10 – 20 minutes. There were challenges experienced by the mothers during health education sessions.

In the intervention phase, birth preparedness health education was delivered to most of the respondents verbally and mobile text message reminder for those in the intervention group of the study. For majority of the respondents, birth preparedness health education was initiated during the first visit. The mode of teaching used mostly was individualized teaching. Most of the respondents liked the mode of teaching. Some respondents were provided more information through MCH booklets or pamphlets.

6.1.5 Effectiveness of the mobile phone text message

The mobile phone text message was used among the clients in the intervention group of the study. A reminder was sent to them one month prior to their EDD. Most of the respondents (74.3%) in the intervention group were birth prepared as compared to their counterparts in the control group of the study (48.1%). The use of mobile phone text message reminder enables the clients to be more prepared unlike where they rely on ANC visits.

6.2 Conclusion

1. The study population was knowledgeable on some concepts of birth preparedness.
2. There were factors associated with the practice of preparation for childbirth.
3. The mothers received health education on birth preparedness as provided by the health care providers, however there were challenges that affected delivery of the messages.
4. Documentation of health messages provided to the clients was not done effectively to all the clients.
5. Use of mobile phone text messages in combination to verbal message in delivery of health education messages is more effective as compared to use of verbal messages only.

6.3 Recommendations

Individual

1. There is need to increase the level of knowledge on birth preparedness concepts among pregnant mothers through antenatal care sessions and use of mobile technology to serve as reminder.
2. Women and their families need to prepare on all aspects of birth preparedness to ensure adequate preparedness.

Community

1. There is need to discard harmful cultural practices and adopt those that are beneficial regarding birth preparedness.

Health care providers

1. The language used by the health care providers during a teaching session needs to be simple, clear and well understood by the clients to ensure the intended message is delivered.
2. There is need for the health care providers to improve on documentation of birth preparedness information on the maternal-child health (MCH) booklets.

Policy Makers

1. Introduction of the use of mobile phone text message reminders in addition to the verbal messages in the health facilities is vital to facilitate and enhance more birth preparation among the clients.
2. There is need to strengthen delivery of birth preparedness health messages as per the available guidelines.

6.4 Further Research

a) There is need to establish the opinion of the health care providers pertaining delivery of birth preparedness message since this study interviewed the pregnant mothers.

b) There is also need to compare the delivery of birth preparedness messages in the public and private or mission hospitals. This study focused on the public hospitals.

c) Further research can also seek to interview men on their involvement in birth preparedness.

d) There is also need to carry out a study assessing challenges of using mobile phone text messages in provision of health education messages.

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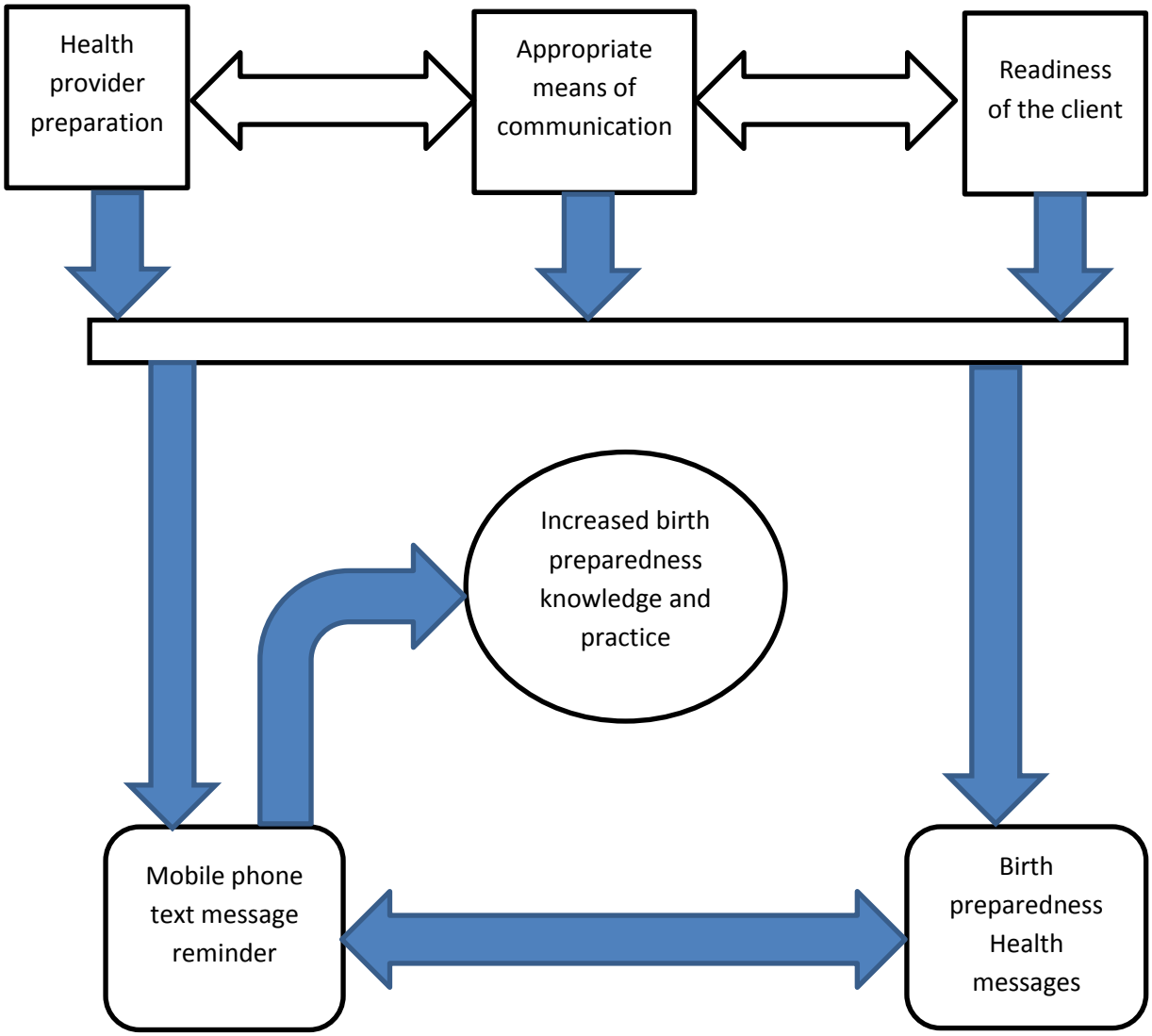
APPENDIX I: BIRTH PREPAREDNESS HEALTH EDUCATION MODEL

The study results led to the development of a birth preparedness education model. The study findings indicate that there is evidence of enhanced knowledge and practice on birth preparedness with provision of tailored health message and mobile phone text message reminder on birth preparedness. The health care provider should be well prepared and the client should be ready to receive information which should be communicated through the appropriate channel of communication. This is illustrated on the figure below.



APPENDIX II: LIST OF PUBLICATIONS AND CONFERENCE PAPERS

Publications

1. **Cheptum JJ**, Omoni G and Mirie W, Health Education on birth preparedness: What is happening? A study among women of reproductive age in Migori County. International Journal of Nursing Sciences, Vol. 5, No. 2 July - December 2017. ISSN 2320-8643 (Print) ISSN – 2320-8651 (Electronic)
2. **Cheptum JJ**, Omoni G and Mirie W, Knowledge and practice of birth preparedness among women of childbearing age in Migori County, Kenya African Journal of Midwifery and Women's Health, Vol. 4, Issue 11, October – December 2017, pp 190-195. https://www.magonlinelibrary.com/doi: 10.12968/ajmw.2017.11.4.190
3. **Cheptum JJ**, Omoni G and Mirie W, Effectiveness of Mobile Phone Text Message Reminder on Birth Preparedness in a Rural Community in Kenya. Obstetrics and Gynaecology International Journal. ***(Under review)***
4. **Cheptum JJ**, Omoni G and Mirie W, Do men have a role in birth preparedness? A study among women attending antenatal clinics in Migori County, Kenya. Journal of Midwifery and Reproductive Health ***(Under review)***
5. **Cheptum JJ**, Omoni G and Mirie W, Factors affecting Birth Preparedness among Pregnant Women attending Public Antenatal Clinics in Migori County, Kenya, Biomedical Journal of Scientific and Technical Research ***(Under review)***

Conference papers

1. **Cheptum J.J**, Omoni G and Mirie W, The practice of birth preparedness: Where are we? A study among women of childbearing age in Migori County. 4th KNH/UoN International Scientific conference 14th – 16th June 2017, KNH – Nairobi.

2. **Cheptum J.J**, Omoni G and Mirie W, Health education on birth preparedness: What is happening? A study among women of reproductive age in Migori County, Midwives conference 12th – 14th August 2016, Boma Inn – Eldoret.

PAPER I: KNOWLEDGE AND PRACTICE OF BIRTH PREPAREDNESS AMONG WOMEN OF CHILD BEARING AGE IN MIGORI COUNTY, KENYA

AFRICAN JOURNAL OF MIDWIFERY AND WOMEN'S HEALTH, OCTOBER–DECEMBER 2017, VOL 11, NO 4

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Abstract

Background: Birth preparedness (BP) is a strategy that has been established and found effective in ensuring readiness for birth thus preventing obstetric delays. It is hindered by lack of knowledge, cultural taboos and lack of finances.

Methods: This was a descriptive cross-sectional aimed to establish the knowledge and practice of birth preparedness among antenatal mothers attending public health facilities in Migori County. The study utilized both quantitative and qualitative methods. Data was collected through interviewer-administered questionnaires and Focus Group Discussions (FGD). A total of 389 women were interviewed in four randomly selected facilities. Data analysis was done and p-values reported. Content analysis was done for qualitative data and reported in form of narration.

Results: The knowledge on BP was low (53%) and the respondents were unaware of its key concepts. Marital status (p=0.003), residence (p=<0.001), unemployment (p=0.001) and the partner's level of education (p=0.001) affected knowledge on BP. Those who had favourable practices of birth preparedness were 56%. Marital status (p=0.05), residence (p=<0.001), partner's level of education and health facility (p=<0.001) affected the practice of BP.

Conclusion: More emphasis should be made on key concepts of birth preparedness during health education. Effort should also be made to improve its practice.

Key points

- This was a rural population with a low level of education.
- Teenage pregnancy was proportionately high.
- Most of the respondents lacked knowledge of the key concepts of birth preparedness.
- The practice of birth preparedness was affected by marital status, residence, partner's level of education and the health facility attended.

Birth preparedness has been established as a strategy that is effective in preventing obstetric delays therefore able to contribute to reduction of maternal mortality. This is a strategy that involves planning for childbirth (KDHS 2014). Childbirth and pregnancy are normal physiological processes which sometimes much attention is not paid on them. However, if action is not taken the life of both the mother and her baby is put at risk owing to complications which may occur and are often unpredictable. Through birth preparedness, skilled birth attendance can be scaled up. Currently, the skilled birth attendance in Kenya is 61% while the antenatal care coverage is 95% (JHPIEGO 2004) meaning some of the women deliver under unskilled care including those who deliver alone. The preparations to be made for birth include basic knowledge on danger signs of pregnancy; identifying place of delivery, making transport arrangements, obtaining basic supplies for delivery such as a razor blade and ready baby clothes; plan for skilled care attendance at birth; identifying a birth companion and making arrangement for household care support for the family while away to deliver or in case of emergencies (Kabakyenga et al. 2012).

Knowledge of danger signs and practice of birth preparedness has been found to be low (Karkee et al. 2013). Several studies have found out that women who had arrangements about their birth were more likely to utilize skilled birth attendance (SBA) compared to their counterparts who had not (Agarwal et al. 2010)(Markos & Bogale 2014c).

Methods

This was a descriptive cross-sectional study which involved both qualitative and quantitative methods. Quantitative data was collected through the use of an interviewer-administered questionnaire to 389 pregnant women attending antenatal care (ANC) at the public health facilities in Migori County. Qualitative data was collected using a Focus Group Discussion (FGD) among the pregnant women in the selected facilities. A group of eight clients were randomly chosen in the selected facilities. The health facilities used for the study were Migori County referral hospital, Isbania sub-county hospital, Arombe and Godkwer health centre. The clients included in the study were women in their first or second trimester of pregnancy. Quantitative data was analyzed using Stata software and descriptive statistics were reported. Regression analysis was done to establish relationship between the variables and birth preparedness. The level of significance was 0.05 with 95% confidence interval. Data was presented in form of figures and tables. Qualitative data was coded into themes and thematic analysis was done. Data was reported in form of narration.

Ethical approval was obtained from the University of Nairobi (UON)/ Kenyatta National Hospital (KNH) ethics review committee (ERC). Anonymity and confidentiality of information of the respondents was maintained throughout the process.

Results

The themes which emerged form qualitative data were knowledge on birth preparedness, perception and the preparations to be made and role of men in birth preparedness.

Socio-demographic factors of the study participants

Most of the study participants (73%) were aged between 20-34 years, 20.6% aged nineteen years and below and 6.4% were above 35 years old. Further, majority of the respondents were married (79.2%). Analysis of the highest level of education attained by the study participants revealed that those who had standard 1-4, standard 5-8, secondary and post-secondary education were 7.5%, 44.2%, 31.1% and 16.2% respectively. Protestant Christianity was the predominant religion among the study participants (55.2%). Housewives, businesswomen and peasant farmers constituted 34.2%, 27% and 12.3% respectively. In addition 11.8% of the participants were students. About their area of residence, 38.5% hailed from urban and 61.5% from rural areas. On education level of the partners of the married women, 6% of them did not have any formal education, 32.3% had primary level, 36.2% secondary and 25.5% post-secondary level of education.

Knowledge of birth preparedness

Overall, 91.0% of the study participants responded on the affirmative on inquiring whether they had ever heard of birth preparedness. The composite score for knowledge was calculated by summing the scores for each respondent. Further, the knowledge of the respondent was dichotomized into high (≥ 4 scores) and low (<4 scores). The findings indicated that the aggregate knowledge score for the study participants ranged from one to six with an average of 3.2 scores. Most of the respondents were found to have low level of knowledge on BP (206, 53.0%). A total of 183 respondents (47.0%) were rated as highly knowledgeable on BP.

From qualitative data on the knowledge of birth preparedness, the respondents had varied understanding. For some, it was about buying baby items, eating good food, doing exercises during pregnancy and having money for transport to hospital. The clients were not able to clearly define the key concepts of birth preparedness such as knowledge of the expected date of delivery, preparation for normal delivery by selecting the place of delivery and awareness of danger signs for both the mother and newborn. The responses from the FGDs were as follows:

"Birth preparedness is buying baby items which include towel, napkin, basin and also having money to go to hospital during labour". (FGD 1)

"It is only buying a leso for holding the baby when it has been born". (FGD 2)

"We do not know about birth preparedness. We have not yet been taught". (FGD 3)

"Birth preparedness is eating good food and doing exercises". (FGD 3)

"Birth preparedness does not involve having mother's clothes ready". (FGD 4)

Socio-demographic factors associated with knowledge on BP

Factors associated with variations in the levels of knowledge on BP were assessed. Marital status had a significant influence on knowledge with married women being less likely to be classified as having low knowledge when evaluated against their counterparts who were not married (odds ratio (OR) 0.457 (95% CI 0.270 - 0.772, p=0.003). Women from rural areas were less knowledgeable than those from urban areas (OR 0.293 (95% CI 0.191 - 0.449, p<0.001). Additionally, maternal occupation was associated with level of knowledge of a respondent.

Table 1: Socio-demographic factors associated with knowledge on BP

Characteristic	Knowledge				OR	95% CI		P-value
	Low		High			Lower	Upper	
	n(206)	%	n(183)	%				
Age (years)								
<18	26	12.6	13	7.1	1.846	0.776	4.392	0.164
18-21	64	31.1	44	24.1	0.831	0.424	1.625	0.588
22-30	90	43.7	102	55.7	0.814	0.437	1.519	0.518
>30	26	12.6	24	13.1				
Marital status	n(206)	%	n(183)	%				
Married	153	74.3	158	86.3	0.457	0.27	0.772	0.003
Un-married	53	25.7	25	13.7				
Residence	n(206)	%	n(183)	%				
Urban	52	25.2	98	53.6	0.293	0.191	0.449	<0.001
Rural	154	74.8	85	46.4				

Maternal occupation	n(192)	%	n(180)	%				
Housewife	101	52.6	83	46.1	1.661	1.074	2.569	0.022
Student/Unemployed	28	14.6	11	6.1	3.475	1.61	7.501	0.001
(Self-)Employed	63	32.8	86	47.8				

Most of the participants believed in preparing for child birth (95.4%). The persons/items mentioned to be key in the birth preparedness were baby's clothes (75.5%), finances (74.7%), transport to health facility (61.8%), the birth attendant 53.5%) and the care taker of the home while away (46.8%). For the fourteen participants who reported that they did not believe in BP, they cited lack of knowledge (50.0%), cultural factors (35.7%), lack of family support (14.3%) and lack of money (7.1%) as the reasons for not preparing for child birth. The participants were also asked about the optimum time for initiating preparations for birth. Most of them (76.1%) said that preparations should start as soon as pregnancy is diagnosed while the rest reported first (5.4%), second (6.5%) and third trimester (8.6%) as the best time to start preparations. The woman, the husband, both partners and mother in law were mentioned as the person(s) responsible for making preparations for child birth by 66.7%, 21.5%, 7.9% and 2.1% of the participants respectively.

Practice of birth preparedness

Asked about the birth preparations they had done at the time of the survey, 84.4%, 70.8%, 61.0% and 58.7% of the respondents mentioned that they had a birth bag (with razor blade, ligatures and sanitary pads), bought baby's clothes, set aside funds for delivery and identified a means of transport to the venue of delivery respectively. Moreover, 57.9% and 49.0% of the respondents had identified, respectively, a health facility for delivery and a caretaker of the home for the period when the respondent will be away. The respondents who had not done any preparations cited, among others, lack of money (69.4%), cultural beliefs (16.7%), taboos and prohibitive religious doctrines (5.6%) as the reasons for not engaging in birth preparations. Some respondents said they would not buy any baby items until the baby was born. They felt that even if they had been assured from the hospital about the pregnancy, they needed to see the baby first so that they could prepare. About preparation for the place of delivery, the respondents said the hospital they will deliver in will be dictated by where they will be when labour begins. They did not have a specific hospital and even a specific health provider. About the person who took care of the home while they would be away, they opted for their spouses, mother-in-law or the co-wife.

"I will not buy clothes because I don't know if am carrying a baby or not. I will wait until the baby has been born then that is the time to buy" (FGD 3)

"I don't know what am carrying so I will not prepare until when the baby is born" (FGD 2)

"I will not decide on where to deliver until the day when labour begins" (FGD 3)

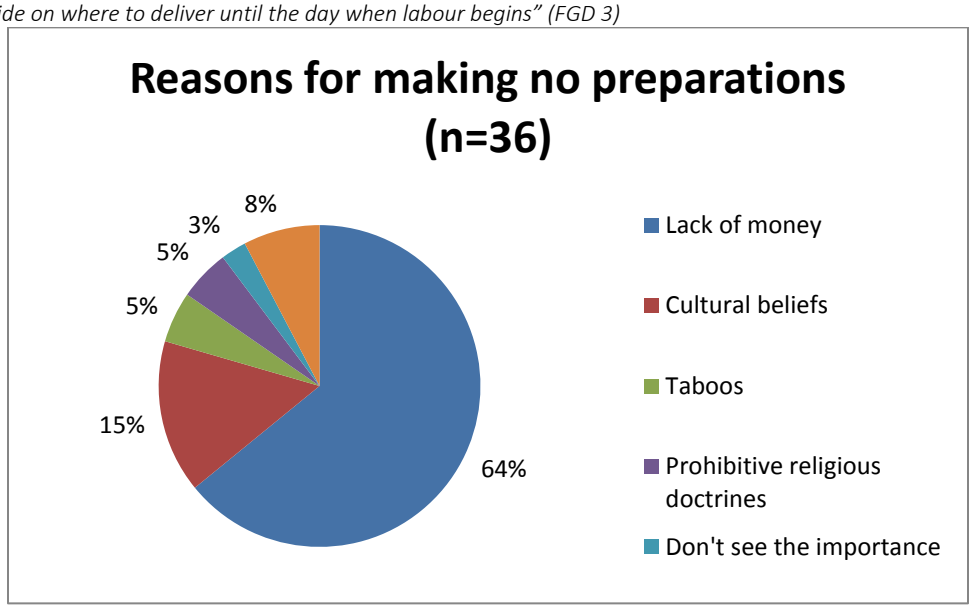

Figure 1: Reasons for not preparing for birth

Boda boda, walking, *Matatu* and own vehicle were the most common means of getting to the health facility when labour pains set in. Most of the respondents (88.9%) were planning to identify transport means to the health facility at the early stages of the pregnancy. The reasons for not planning for transport early in pregnancy included distance to the health facility and waiting for the partner's decision (Table 2).

Table 2: Transport to the place of delivery

Attribute	Frequency	%
Planning to look for transport early in pregnancy (n=389)		
Yes	346	88.9
No	32	8.3
No response	11	2.8
Mode of transport available to the respondent (n=372)		
Boda boda	260	69.9
Matatu	68	18.3
Own vehicle	37	9.9
Walking	7	1.9
Reasons for not planning for transport early in pregnancy (n=34)		
Hospital within a walking distance	22	64.7
Lack of money	4	11.8
No need	3	8.8
Partner will decide	2	5.9
Other#	3	8.8

#Own vehicle (2), Too early (1)

Respondents who were making plans for a companion during child delivery were 95.6%. The companions included spouses (34.3%), mother in laws (32.4%), sisters (16.1%), mothers (5.4%), co-wives (2.7%) among others. Five respondents (1.3%) were not planning for a companion during delivery.

Nineteen respondents (7.2%) were not planning to have a caretaker of the home while they will be away for child delivery. The rest (92.8%) provided details of the caretakers who included partners (31.8%), mother-in-law (22.3%), older children (10.5%), neighbor (8.7%), friend (4.9%), Sister (in-law), (3.3%), mothers (2.6%) among others.

Regression analysis was done to assess factors associated with practices on BP. The practice was classified as favourable or unfavourable. Favourable practice was being in a position to put in place at least four of the six practices (Basic knowledge of danger signs, identifying place of delivery, making transport arrangements, obtaining basic supplies for delivery; identifying a birth companion and making arrangement for a caretaker for the home while away) of birth preparedness. Unfavourable practice is practicing less than four of the six practices of birth preparedness mentioned.

Being married was found to be associated with reduced likelihood of engaging in unfavourable practices (OR 0.608 (95% CI 0.369 - 1.001), p=0.049). Women who resided in urban areas were less likely to engage in unfavourable practices (OR 0.285 (95% CI 0.182 - 0.444, p<0.001). In addition, religions other than protestant Christianity and Catholic were significantly associated with the practice of BP. Also maternal occupation, partner's education, health facility were other factors significantly associated with variations in practices as shown on table 3 below.

Table 3: Factors associated with practices on BP

Characteristic	Practice				OR	95% CI		P-value
	Unfavourable		Favourable			Lower	Upper	
	N(171)	%	N(218)	%				
Marital status								
Married	129	41.5	182	58.5	0.608	0.369	1.001	0.049
Un-married	42	53.8	36	46.2				
Residence								
Urban	39	26.0	111	74.0	0.285	0.182	0.444	<0.001
Rural	132	55.2	107	44.8				
Religion								
Protestant	92	42.8	123	57.2	0.738	0.483	1.126	0.159

Others (Muslim, SDA, traditional)	6	20.7	23	79.3	0.257	0.099	0.669	0.003
Catholic	73	50.3	72	49.7				
Maternal occupation								
Housewife	86	46.7	98	53.3	1.738	1.112	2.716	0.015
Student/Unemployed	22	56.4	17	43.6	2.562	1.249	5.256	0.009
Employed/ salaried job	50	33.6	99	66.4				
Partner's education	n(136)		n(195)					
Post-secondary	25	29.4	60	70.6	0.333	0.186	0.598	<0.001
Secondary	41	34.2	79	65.8	0.415	0.248	0.695	0.001
No formal education/Primary	70	55.6	56	44.4				
Health facility								
Migori C/Hospital	72	40.2	107	59.8	8.844	3.878	20.17	<0.001
Arombe	62	100.0	0	0.0	14.143	6.925	28.885	<0.001
God Kwer Dispensary	30	61.2	19	38.8	20.752	7.949	54.174	<0.001
Isibania	7	7.1	92	92.9				

Discussion

The study established that most of the respondents were aged between 20 -34. This is the age in which most girls are out of school and ready to start a family. There were 20.6% of the respondents who were aged below 20 years. These are teenagers and most likely they were students at the time of interview or had dropped out. This indicates that there was high proportion of teenagers. These findings tally with results from KDHS (2014) which indicated that Nyanza region has the highest number of teenage pregnancies in the country (22.2%). The KDHS (2014) report indicated that in Migori County, among those aged below 20 years, 20.9% had had a live birth while 24.3% had begun child bearing in the same age bracket.

Most of the respondents were married. This indicates that the respondents were likely to get support during their preparation for childbirth and delivery.

On the education level, 44.1% of the respondents had attained only primary level of education and 7.5% had no formal education. This could be attributed to early pregnancies which make girls drop out of school. This could also explain the fact that only 16.7% of the respondents had attained post-secondary education. The mother's education level has been found to be a predictor for birth preparedness (Ekabua et al. 2011b; Acharya et al. 2015). With regression analysis, the respondent's parity, gestation of pregnancy, partner's level of education and the facility attended for ANC services were significantly associated with having heard about birth preparedness (p=0.05, p=0.001, p=0.01 and 0.04) respectively. Education level and parity was found to be a predictor of birth preparedness (Bintabara, Mohamed A Mohamed, et al. 2015). When women are educated, they get empowered and can be able to get information which can help them to make decisions independently.

Birth preparedness was not a new concept to the participants as 91% of them indicated having heard about it. This could be attributed to the frequent health talks happening during ANC. What most women understood as birth preparedness was mainly having baby clothes, however other aspects of preparation such as knowledge of expected date of delivery (EDD), having a birth companion or planning for the family while away for delivery were lacking. Women who were educated were more likely to be birth prepared compared to those who were not. These findings are similar to findings from a study in Tanzania.

The study established that most of the respondents (91%) had heard about birth preparedness. These findings are similar to findings from a study in Nigeria which established that the knowledge of the birth preparedness concept was surprisingly high (Ekabua et al. 2011b). Only 47% of them had knowledge on details of birth preparedness. A study in Ethiopia established that women knew birth preparedness as saving money and preparing essential baby items (Kaso & Addisse 2014b). Birth preparedness is part of the ANC package and health messages are shared to all women attending ANC clinics. The actual understanding of the components of birth preparedness was lacking among most of the clients. What was mostly understood as birth preparedness was buying of baby clothes (82.3%). The least known of the components was knowledge of the expected date of delivery (EDD) (58.9%). This could mean that the women could enter into labour pains without having prepared enough. Awareness of EDD helps the women to anticipate the date of delivery knowing that it could be around that period. Qualitative data indicated that there was variation on the understanding of birth preparedness. The various responses such as it is about eating good food or exercising or basically not having an idea about it indicated that there was need to emphasize on the actual birth preparedness messages.

Marital status was associated with knowledge of birth preparedness (p=0.003).When one is married, they receive support from their partners and are more likely to be prepared compared to their counterparts.

The study established that most of the respondents (95.4%) believed in birth preparedness. Those found to have favourable practices regarding birth preparedness were 56%. In addition, the respondents had made various preparations in regard to childbirth. Most of the respondents had a ready maternity bag (with razor blade, baby clothes and sanitary pads) (84.4%) and also bought baby clothes (70.8%). This could be because in ANC, having these items is emphasized. Those who had set aside funds for use during childbirth were 61%. With the current free maternity services in public health facilities in Kenya, women may not consider setting aside finances for delivery as a priority especially those who do not need transport to the health facility. Similar findings have been established in various studies. In another study in India, preparations for birth included ensuring that food would be available in the home during the period of puerperium (Aimol 2014). Most of the respondents were planning to deliver in the health facilities contrary to a study in Wolatya zone, Ethiopia that established more than half of the women planned to have home deliveries (Gebre et al. 2015b).

Marital status was associated with the practice of birth preparedness (p=0.049). This could be attributed to the support received from the partners. Similar findings were established by a study in western Kenya (Inyangala et al. 2016). On the contrary other studies have found no association between birth preparedness and marital status in Ethiopia(Affipunguh & Laar 2016).

The mother's level of education was not associated with the practice of birth preparedness in this study. However, other studies established that there was an association (Ekabua et al. 2011b; Markos & Bogale 2014b; Belda & Gebremariam 2016b; Debelew et al. 2014a).

The health facility attended was significantly associated with the knowledge and practice of birth preparedness. These health facilities were different levels; the referral hospital, sub-County hospital, health centre and dispensary. These facilities are equipped differently in terms of staffing and other resources. This could explain the reason for the significant association. Similar findings were established in an Ethiopian study regarding the health education provided during ANC to the pregnant women (Hiluf & Fantahun 2008a).

Conclusion

This was a rural community who majority had heard about birth preparedness yet they did not understand the actual concepts in it. There was a high proportion of teenage pregnancies. The practices done on birth preparedness were mostly having a birth bag containing a razor blade, ligatures and sanitary pads in addition to buying baby's clothes. The reasons for not preparing for birth included lack of money and cultural beliefs negating preparations. The factors which affected knowledge and practice of birth preparedness included the marital status, religion, maternal occupation, partners' education level and also the health facility attended.

Recommendation

The community should be provided with health education on the actual concepts of birth preparedness. They should also be educated against harmful cultural beliefs that interfere with birth preparation. The teenagers should be educated on the risks of teenage pregnancies.

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Health Education on Birth Preparedness: What is Happening? A Study Among Mothers Attending Antenatal Clinics in Migori County, Kenya

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ABSTRACT

Background: Health education is the avenue to deliver health messages. Among pregnant women, birth preparedness education is critical in equipping them with knowledge on readiness of birth and prevention of complications. Although this is the case, there are challenges in delivery of health messages in health facilities. The aim of the study was to establish how birth preparedness health messages are delivered to pregnant women by health care workers during antenatal care (ANC) visits.

Method: This was a cross-sectional descriptive study carried out among 389 pregnant women attending public ANC clinics in Migori County. Data was collected using a structured questionnaire and analysed using Stata version 11software.

Results: Birth preparedness health education was delivered to 92.6% mothers attending antenatal clinic and it was mostly initiated during the first visit. The mode of delivery used was group teaching (61.5%). The verbal method used for delivery of the messages by health providers was preferred by 38.3% of the respondents because of its convenience; however some respondents found it time wasting or too brief (52.6%). Residence, level of education and type of health facility visited were associated with delivery of health education messages ($p<0.001$). Challenges faced by clients during health education were language barrier, harshness of health workers and poor timing of delivery of the messages.

Conclusion: Birth preparedness health education is provided to women attending ANC, however there are challenges facing the delivery of the messages. Effort should be made to improve delivery of these messages to the mothers.

Keywords: *Birth Preparedness, Health Education, Antenatal Care, Mode of Delivery, Challenges*

INTRODUCTION

The trend of maternal mortality has been reducing, however, the maternal deaths still occur from preventable causes. Sub-Saharan Africa among other developing countries contribute to 99% of the maternal mortalities across the world[1]. In Kenya, the maternal mortality rate is 362/100000 live births[2]. Birth preparedness is a strategy that has enabled a decrease in maternal mortality through preventing obstetric delays. Birth preparedness involves the actions done by the woman, her family, the community, health workers and health facilities in preparation for childbirth. These actions include basic knowledge on danger signs of pregnancy; identifying place of delivery, making transport arrangements, obtaining basic supplies for delivery such as a razor blade and ready baby clothes; plan for skilled care attendance at birth; identifying a birth companion and making arrangement for household care support for the family while away to deliver or in case of emergencies[3]. Exposure to information has been recognized as an effective way of changing attitudes, social norms and behavior[4]. Most women in sub-Saharan Africa especially those who are unlikely to access health care have a high level of unmet need for information on pregnancy complications [5]. According to the Birth preparedness/ Complication (BP/CR) matrix, there are indicators which help in assessment of individual readiness for delivery[3]. Use of printed media can be used to improve antenatal care and institutional deliveries[6]. In comparing mass media exposure through the various media channels, a study in Uganda established a significant relationship between reading newspapers and being birth prepared irrespective of the number of exposures as compared to radio which showed no association[7]. According to a Nepal study which sought to assess the effectiveness of birth preparedness programmes, education can positively influence knowledge and intermediate health outcomes[8] however they do not positively influence household behaviours and birth planning. In addition, it also established that the source of exposure to birth preparedness messages had an influence on knowledge and behavior of the women on birth preparedness[8].

METHODOLOGY

This was a facility based descriptive cross-sectional study which utilized quantitative methods to assess the delivery of the birth preparedness messages by health workers. The study was carried out in four selected public health facilities in Migori County. The facilities were stratified as high and low volume. Simple random sampling was done to select the facilities for study. These facilities were Migori County hospital, Isibania sub-County hospital, Godkwer health centre and Arombe dispensary and they were high volume facilities. A sample size of 389 pregnant women attending antenatal care clinics (ANC) were randomly selected to participate in the study. Data was collected through an interviewer-administered questionnaire. The data was collected by research assistants who were trained. The clients who met the inclusion criteria were interviewed after receiving ANC services. Data entry and cleaning was done to check for data quality and detect any errors and omissions. Descriptive statistics were presented using figures and tables. Ethical review was sought from University of Nairobi/ Kenyatta National Hospital Ethics review committee.

RESULTS

Socio-demographic factors

Most of the participants were aged between 20.0-28.0 years with the median age being 23 years. The teenagers contributed to 20.6% of the participants. Majority of the respondents (79.2%) were married and those who had primary level of education were 51.7% while only 16.7% had attained post-secondary education. Protestant was the predominant religion among the study participants (55.2%). Most of the respondents were housewives (34.2%) and businesswomen (27%) while 11.8% of them were students. Most of them were rural residents (61.5%).

Table 1 illustrates the demographic findings.

Table 1 Socio-demographic characteristics of respondents

Characteristics	Frequency (n=389)	Percentage (%)
Age (years)		
<19	80	20.6
20-24	139	35.7
25-34	145	37.3
>35	25	6.4
Marital status		
Married	308	79.2
Single	72	18.5
Separated	1	0.3
Widowed	8	2
Education level		
None	4	1.0
Standard 1-4	28	7.3
Standard 5-8	173	44.5
Secondary	121	31.1
College incomplete	15	3.8
University incomplete	7	1.8
College complete	23	5.9
University completed	18	4.6
Religion		
Protestant	213	55.2
Catholic	143	37.1
Muslim	10	2.6
None	3	0.7

Others	17	4.4
Occupation		
Housewife	133	34.2
Businesswoman	105	27
Peasant farmer	48	12.3
Casual labourer	7	1.8
Employed/ salaried job	45	11.6
Student	46	11.8
Others	5	1.3
Residence		
Urban	150	38.6
Rural	239	61.4

Birth preparedness education messages

Overall, the majority of the respondents (92.6%) reported that they had received information on birth preparedness during ANC visit. The messages were delivered predominantly during their first ANC visit (84.6%). Out of those who had received birth preparedness (BP) education messages, 93.6% reported that they had a review of the messages which was done once for most of the respondents (67.8%).The methods used to deliver BP education were group and individualized teaching. Majority of the respondents (95.8%) received the birth preparedness messages delivered verbally to the majority. Most of the respondents (93.9%) were satisfied with the mode of information used to deliver the health education. The key reason for preference of the delivery method was that the messages were short and clear. However, some of the clients, 13(3.7%) were dissatisfied with the method used to deliver BP messages indicating that it was a waste of time or the messages were too brief. Other than the verbal messages shared during ANC, some respondents 239(66.2%) received additional materials on BP health education which was mainly the Mother Child Health (MCH) booklet 167(69.9%) and pamphlets (58(24.3%). Only 33(29.5%) of the respondents got information on reference materials on BP heath education. These findings are illustrated in table 2.

Table 2: Delivery of birth preparedness information

Characteristics	Frequency	%
Method of delivery of BP message at ANC (n=361)		
Group teaching	222	61.5
Individualized teaching	135	37.4
No response	4	1.1
Delivery of BP information (n=361)		
Verbal	346	95.8
Pamphlets	8	2.2
No response	7	1.9
Preferred mode of information delivery (n=361)		
Yes	339	93.9
No	19	5.3
No response	3	0.8
Reasons for liking the method (n=339)		
It was short and clear	196	57.8
It was convenient	130	38.3
It aids memory better	61	18.0
Reasons for not liking the method (n=19)		
Too complicated	1	5.3
Time wasting	5	26.3
Too brief	5	26.3
Others*	2	10.5

No response	6	31.6
Any additional materials to the BP health talk (n=361)		
Yes	239	66.2
No	112	31
No response	10	2.8
Additional materials(n=239)		
Videos	4	1.7
Mother - child booklets	167	69.9
Journal	2	0.8
Pamphlets	58	24.3
No response	8	3.3
Informed about any reference materials (n=112)		
Yes	33	29.5
No	68	60.7
No response	11	9.8

*Language barrier, need written materials

In the health facilities, the health care providers mostly taught the clients about having a birth plan, however, planning for the family while away was least taught compared to other components of birth preparedness as shown on figure 1.

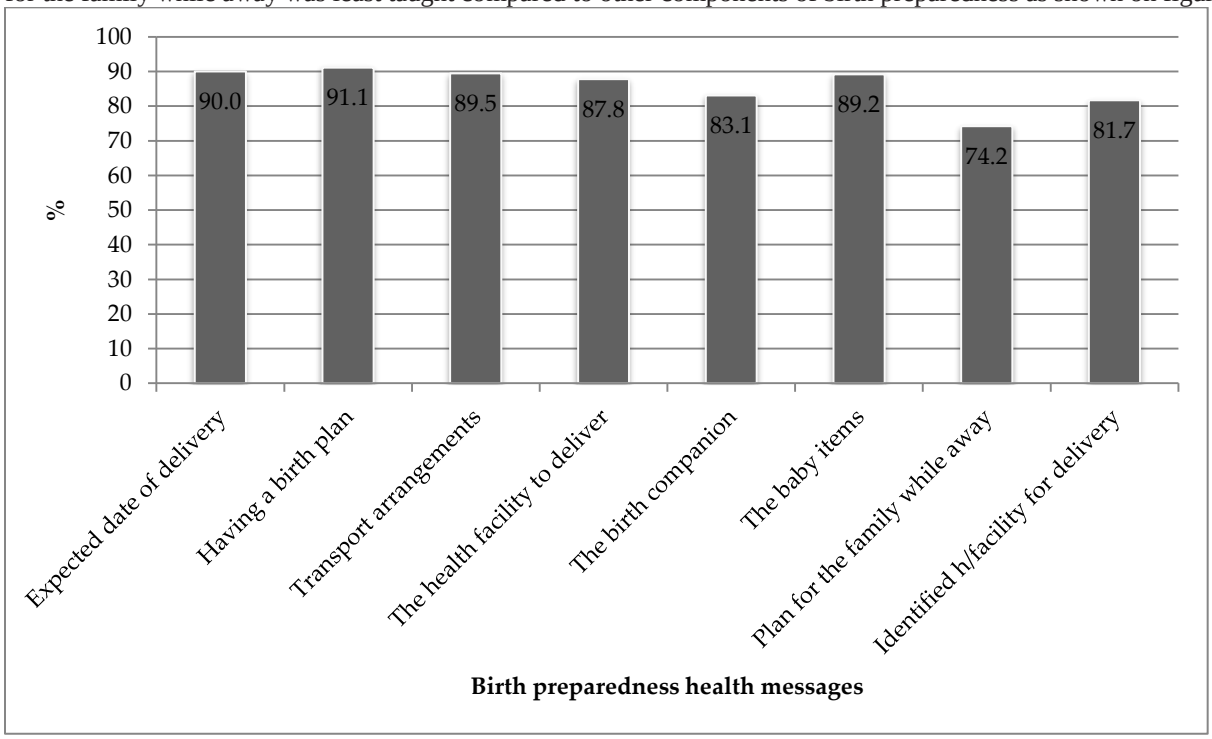
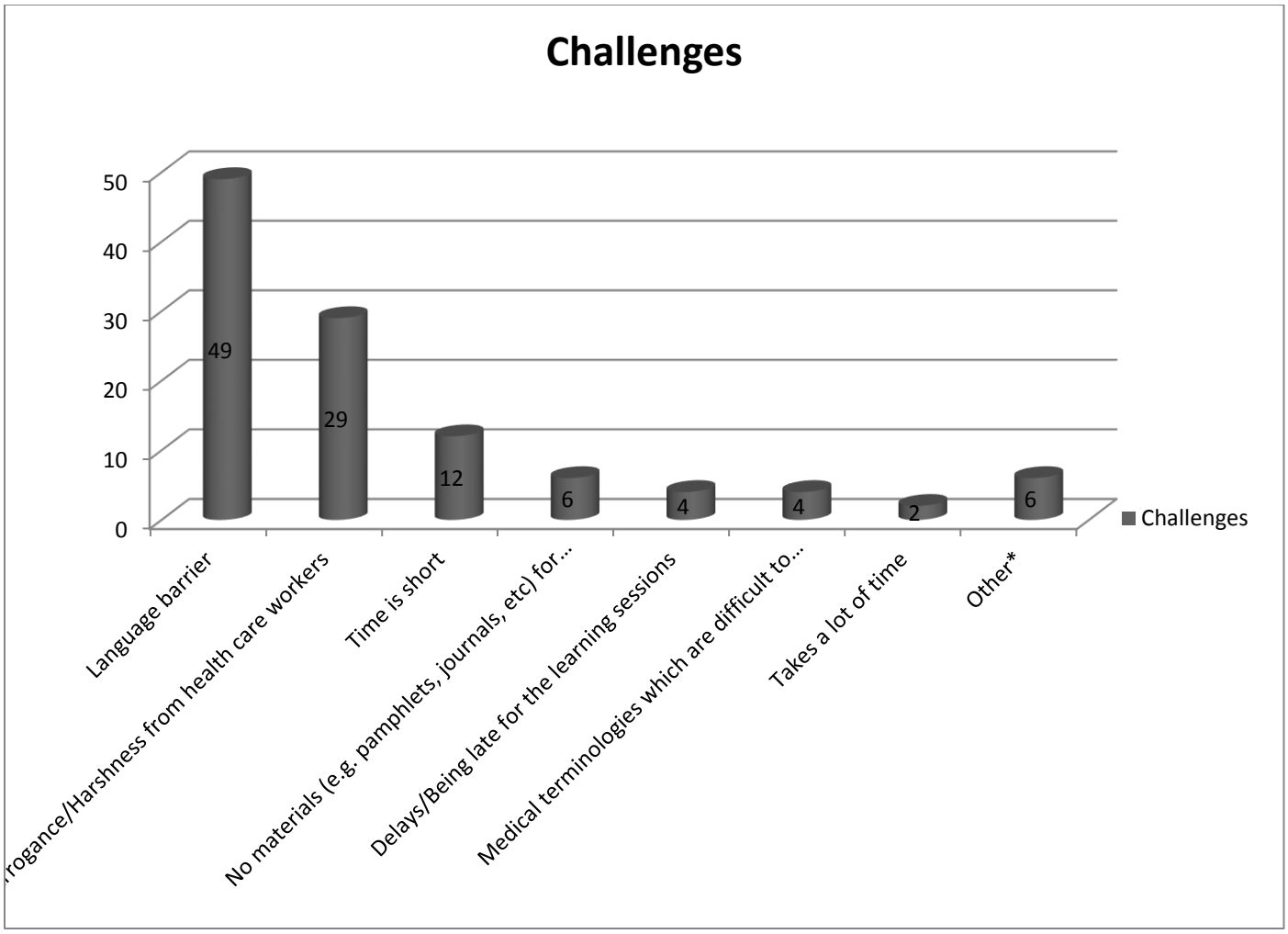


Fig. 1. Birth preparedness health messages provided

The session(s) dedicated to BP health messages delivery ranged from one to four. Those who had BP health education during each ANC visit wereonly 5.3% (n=15) of the respondents while 22.4% had one session of BP messages during their ANC visits. The BP health education sessions lasted between 10 to 20 minutes (41.5%), 21-30 minutes (28.2%), less than 10 minutes (23.3%) and only 6.4% had the session lasting more than 30 minutes.

The study also established the challenges encountered by the respondents when receiving BP health education from health care providers which included language barrier and arrogance/harshness from health care providers as illustrated in figure 2.



**Lack of privacy, lack of video for demonstration, nervousness, not being audible, planning for finances, too fast (for each challenge, n=1)*

Fig. 2. Challenges faced during health education

Enquiries on the documentation of the delivery of BP messages, from the respondents, revealed that MCH booklets were the most commonly used for documentation (75.1%) followed by ANC Registers (39.6%). No documentation on the delivery of BP messages was done as reported by 24.1% of the respondents. Information documented included birth plan, details of the messages shared and date of the day when the BP was discussed as shown in Table 3.

Table 3: Information on the documentation of delivery of BP messages

Attribute	Frequency (n=361)	%
Documentation of delivery of BP messages at ANC		
MCH booklets	271	75.1
ANC Register	143	39.6
No documentation done	87	24.1
Separate piece of paper	2	0.6
Information documentation		
Birth plan	186	51.5
The messages shared	123	34.1
Trimester when the BP was discussed	85	23.5

Association between selected factors and delivery of BP messages

The study evaluated some selected factors with the mode of delivery of BP messages. The area of residence was associated with the mode of delivery of BP messages (p=<0.001). Women from urban areas were less likely to have received the messages as a group when compared to those from rural areas (OR 0.317 (95% CI 0.203 0.496), p<0.001). Women whose partners had post-secondary education were 85% less likely to have received group teachings during their ANC visit when evaluated against those with no formal education or primary school level of education (OR 0.153 (95% CI 0.081 - 0.290), p<0.001). Two health facilities visited by the respondents were associated with the method of delivery of BP messages (p=<0.001). All the other factors were not associated with the method of delivery of BP messages at the ANC clinic.

DISCUSSION

The aim of health education during pregnancy is to improve the outcome of both the mother and her baby[9]. Birth preparedness education was provided by the health workers to a majority of the respondents. However, only different aspects of birth preparedness could be mentioned to have been taught. The findings are in contrast to those of a study assessing delivery of health education to patients with chronic illnesses which established that only a few of the patients received the health messages[10]. Verbal communication sometimes fails or the women may misunderstand or forget the information[9]. Many a times, the focus is usually not on the quality of education provided[11]. The use of written material such as pamphlets in promoting health education can be used successfully[6] however, the health care workers may not have adequate time to explain to the women about them [11]. The methods used to deliver the messages were group or individualized teachings which were delivered mainly verbally. Use of individualized teaching can allow for development of individual birth plan since the woman will have own time with the provider[12]. A Cochrane review involving four studies concluded that group antenatal care was positively viewed by women and was not associated with adverse pregnancy outcomes[13]. Some of the clients received additional information through the MCH booklets, pamphlets and videos. Use of these teaching aids has been found to reinforce the verbal teaching[14]. Only 29.5% of the respondents were informed of any other reference materials that they could read to gain more knowledge on their journey of pregnancy. This could be because there are no other available references in the health institution. Similar findings are shared by a study assessing quality and suitability of patients' written educational materials[15]. A study conducted in Nakuru, Kenya revealed that among the mothers who were given the maternal – child health (MCH) booklet, 59% of them were explained to about the content while 33.5% of them did not read the content (Kibaru & Otara 2015). The MCH booklets play a very important role in enhancing retention of information since the mother can access it at her convenience. Documentation regarding birth preparedness was done in the booklets for the majority (75.1%). No documentation was done for 24.1% of the respondents. Similar findings were obtained in a descriptive study carried out among surgical patients[15]. Documentation of birth plans during ANC can increase the utilization of skilled care at birth and postnatal services[12]. Two health facilities, the County hospital and the dispensary were associated with delivery of birth preparedness messages (p=<0.001 and 0.001) respectively. This could be attributed to the staffing or the number of clients in the facilities. A study in western Kenya assessing the impact of birth preparedness on pregnancy outcome established that the type of facility attended for ANC was a predictor for birth outcome[17].

CONCLUSION

The health care providers delivered health messages on birth preparedness, however, there were challenges affecting delivery. The factors which were associated with delivery of health messages included the place of residence, level of education and the type of health facility visited during antenatal care.

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APPENDIX III: RESEARCH METHODOLOGY MATRIX

This indicates the summary of data analysis approach.

Research Objective	**Type of data required**	**Sources of data**	**Research instruments**	**Data collection procedures**	**Data analysis techniques**
To describe the characteristics of mothers attending ANC in public health facilities in Migori County.	Quantitative	Baseline survey	Mothers' baseline questionnaire		Descriptive analysis
To determine the knowledge of birth preparedness among mothers attending ANC in public health facilities in Migori County.	Quantitative	Baseline survey	Mothers' baseline questionnaire FGD	Interviewer-administered questionnaire FGD guide	Descriptive analysis
To establish the level of birth preparedness among mothers attending ANC in public health facilities in Migori County	Quantitative	Baseline survey	Mothers' baseline questionnaire	Interviewer-administered questionnaire	Descriptive analysis
To examine the implementation of birth preparedness guidelines by health care providers in Migori County.	Quantitative	Baseline survey	Mothers' baseline questionnaire	Interviewer-administered questionnaire	Descriptive analysis

To assess the effectiveness of the modified approach in delivering birth preparedness messages to mothers attending ANC in public health facilities in Migori County.	Quantitative Qualitative	Post-intervention survey Birth preparedness check list	Post-intervention questionnaire Observation	Interviewer-administered questionnaire	Regression analysis Content analysis

APPENDIX IV: PARTICIPANT INFORMATION CONSENT

Title of Study: Evaluation of Birth Preparedness Health Education among Mothers attending Public Antenatal Care Clinics in Migori County, Kenya

Introduction

My name is Joyce Jebet Cheptum, a PhD student at the University of Nairobi. I am conducting a research to evaluate birth preparedness health education among mothers attending public antenatal care clinics in Migori County, Kenya.

Purpose of the study

The main purpose of the study is to evaluate birth preparedness health education among mothers attending antenatal care clinics in Migori County. The study also aims to compare the effectiveness of delivering birth preparedness health education using two different approaches – the routine and the modified approach where health education on birth preparedness is delivered verbally and a reminder is done through mobile phone text message.

Interventions

The research will involve two phases. A baseline survey will be conducted to assess the knowledge and practice of birth preparedness and the delivery of health education messages in Migori County. Questionnaires and focus group discussions (FGDs) will be used to collect data from the antenatal mothers attending antenatal clinic. The research assistants will administer the research tools after being trained on the data collection and handling process.

On the second phase of the study, the eligible respondents will be recruited into the study, provided with health education messages on birth preparedness and followed up until the time of delivery to evaluate birth preparedness.

Voluntary Participation

Your participation in the study is fully voluntarily and you have the right to withdraw at any stage with no consequences to you.

Risks and Benefits

There are no major risks involved in the research. The information collected will be used to give recommendations on enhancing birth preparedness among antenatal mothers and their families.

Confidentiality

Confidentiality will be guaranteed throughout the research. The participants' names or any form of identification will not be used to ensure anonymity.

Participant's consent

I _____of_____

Hereby give consent for myself to participate in the above research whose nature benefits and risks have been explained to me by the researcher. I voluntarily give permission to the researcher. I have been assured of confidentiality and I am free to withdraw from the research at any stage.

Consent by the Researcher

I_____ have explained the nature of the study to the participants with the details of benefit of the research information. I have assured the participants of confidentiality and the right to withdraw from the research at any stage.

Signature _____

Witnessed by:

Name _____

Signature_____

Contacts _____

If you need any further information, do not hesitate to contact :

Principal Investigator

Joyce Jebet Cheptum

University of Nairobi, School of Nursing Sciences

P.O Box 19676 – 00202, Nairobi

Tel: 0721475165

Co-Investigators

1. Prof. Grace Omoni

   University of Nairobi, School of Nursing Sciences

   Midwifery/ Obstetrics thematic unit

   P.O Box 19676 – 00202, Nairobi
2. Dr. Waithira Mirie

   University of Nairobi, School of Nursing Sciences

   Community Health thematic unit

   P.O Box 19676 – 00202, Nairobi
3. The chairman,

   Ethical and research Committee,

   Kenyatta National Hospital/ University of Nairobi,

   P.O Box 20273,

   Nairobi

APPENDIX V: INFORMED CONSENT (English Version)

This was read to the respondents before the interview so that their consent was sought.

Hello, my name is Joyce Jebet Cheptum. I am a PhD student at the University of Nairobi and the principal investigator in this study. You have been chosen at random to be in a study about birth preparedness among pregnant women. This study involves research whose purpose is to evaluate the methods of birth preparedness health education among pregnant women in Kenya. This will take 30 minutes of your time. If you choose to be in the study, I will ask you questions regarding birth preparedness and you will be expected to answer the questions. Also, you will be recruited in the study where health education on birth preparedness will be provided to you and follow up will be done from the time you are recruited to the study until delivery.

There are no foreseeable risks or benefits to you for participating in this study. There is no cost or payment to you. If you have questions while taking part, please stop me and ask. We will do our best to keep your information confidential but we cannot guarantee absolute confidentiality. We will link your answers to you initially by using a special code assigned to you but this link will be removed later in order to protect you.

If you have questions about this research study you may contact Joyce Jebet Cheptum at 0721-475165 in the event of a research related injury. If you feel as if you were not treated well during this study, or have questions concerning your rights as a research participant call the KNH/UoN-ERC Chairperson on Tel. No. 2726300 Ext 44102.

Your participation in this research is voluntary, and you will not be penalized or lose benefits if you refuse to participate or decide to stop. May I continue?

I certify that I have consented to participate (code no.) …….

Researcher's name …….

Signature……

Date…….

APPENDIX VI: INFORMED CONSENT (Kiswahili version)

Hii itasomwa kwa watakaohojiwa kabla ya mahojiano ili ridhaa yao ya kushiriki kwenye utafiti ipatikane.

Habari yako, jina langu ni Joyce Jebet Cheptum. Mimi ni mwanafunzi wa uzamili katika Chuo Kikuu cha Nairobi na mpelelezi mkuu katika utafiti huu. Umechaguliwa kushiriki katika utafiti kuhusu maandalizi ya kuzaliwa miongoni mwa wanawake wajawazito. Utafiti huu unahusisha utafiti ambao lengo ni kufanya tathmini ya mbinu za elimu ya afya ya maandalizi ya kuzaliwa miongoni mwa wanawake wajawazito nchini Kenya. Hii itachukua muda wa dakika 30 ya muda wako. Ikiwa utachagua kushiriki katika utafiti huu, mimi nitakuuliza maswali kuhusu maandalizi ya kuzaliwa na nitatarajia kuwa utajibu maswali. Pia, utashiriki katika utafiti ambapo elimu ya afya juu ya maandalizi ya kuzaliwa zitatolewa na wewe utafuatiliwa tangia wakati utakapochaguliwa kushiriki katika utafiti mpaka wakati wa kujifungua.

Hakuna hatari inayoonekana au faida kwa kushiriki katika utafiti huu. Hakuna gharama au malipo yoyote ikiwa utashiriki. Kama una maswali wakati unaposhiriki katika utafiti, tafadhali uliza. Sisi tutafanya kazi nzuri ya kuweka habari yako ya siri lakini hatuwezi kuthibitisha usiri kabisa. Sisi tutakuwa na kiungo na majibu yako ya awali kwa kutumia kanuni maalum kwa ajili utafiti. Lakini kiungo hiki kitatolewa baadaye ili kukulinda wewe.

Kama una maswali kuhusu utafiti huu unaweza kuwasiliana na Joyce Jebet Cheptum katika 0721-475165 katika tukio la kuumia kuhusiana na utafiti. Kama wewe utajisikia kama hujatibiwa vizuri

wakati wa utafiti huu, au una maswali kuhusu haki zako kama mshiriki utafiti, waweza wasiliana na Mwenyekiti KNH / UON-ERC nambari ya simu 2726300 Ext 44102.

Ushiriki wako katika utafiti huu ni hiari, na wewe hautaadhibiwa au kupoteza faida ukikataa kushiriki au kuamua kuacha. Naweza kuendelea?

Ninathibitisha kwamba mimi nimekubali kuwa mshiriki (nambari kificho) .....

Jina la mtafiti.....

Saini .....

Tarehe .....

APPENDIX VII: CONSENT FORM FOR PARENT/GUARDIAN OF THE YOUNG MOTHERS

This was read to the parents/ guardian of those below the reproductive age (15 years) to get their consent to allow the young mothers to participate in the study.

Dear Parent/Guardian

This young mother has been invited to participate in a study to evaluate birth preparedness health education among mothers attending antenatal clinics in Migori County. Participation in the study is entirely voluntary thus consent is sought from you. It is important that the young mother participates in the study; however, you may decline her participation without giving a reason and without any consequences. No material that could personally identify the young mother will be used in any reports on this study. To ensure privacy and confidentiality, all original documents will be numbered, and only a code number will identify all data collected from the respondents. Information collected from the survey will be analyzed locally and thereafter the records kept under safe custody. There will be no financial compensation for participating in this study. However this research will help us to find out more about health education on birth preparedness provided to mothers in the antenatal clinics.

Should you need any clarifications, kindly contact the following:-

Researcher: Joyce Jebet Cheptum Tel. No: 0721475165

I …… confirm that I have understood the information. I …… confirm that I have read and

understood the information sheet. I understand my child's participation is voluntary and that I am free to deny consent without giving any reason.

I willingly provide/ do not provide consent for the young mother to take part in the above study.

Signed …… Date ……

APPENDIX VIII: CONSENT FORM FOR PARENT/GUARDIAN OF THE YOUNG MOTHERS (Kiswahili version)

Hii ilisomwa kwa wazazi / walezi wa wale akina mama waliokua chini ya umri wa kuzaa (miaka 15) na kupata ridhaa yao ya kuwaruhusu kushiriki katika utafiti.

Kwa Mzazi / Mlezi

Akina mama wanaojifungua amealikwa kushiriki katika utafiti ili kutathmini elimu ya afya kuhusu maandalizi ya uzazi kati ya akina mama wanaohudhuria kliniki za wajawazito katika Migori County. Kushiriki katika utafiti ni kwa hiari na hivyo ninatafuta kibali kutoka kwako. Ni muhimu kwamba akina mama waweze kushiriki katika utafiti. Hata hivyo, unaweza kukataa kushiriki kwake bila kutoa sababu na hii haitafanya awe na madhara yoyote katika kliniki. Hakuna vifaa vyovyote vitakavyotumika ambavyo vitamtambulisha mama mchanga ikiwa atashiriki katika utafiti huu. Kuhakikisha siri na usiri, nyaraka zote awali zitatahesabiwa, na nambari ya siri itatumika kutambua jumbe zote zilizokusanywa kutoka washiriki. Taarifa zilizokusanywa kutoka utafiti zitachambuliwa na baada ya hapo kumbukumbu kuwekwa chini ya ulinzi salama. Hakutakuwa na fidia ya fedha kwa ajili ya kushiriki katika utafiti huu. Hata hivyo utafiti huu itatusaidia kujua zaidi kuhusu elimu ya afya juu ya maandalizi ya kujifungua inayotolewa kwa akina mama katika kliniki.

Ukiwa unahitaji ufafanuzi wowote, wasiliana na:

Mtafiti: Joyce Jebet Cheptum Tel. No: 0721475165

Mimi ..... nathibitisha kwamba nimeelewa habari hii. Mimi ..... nathibitisha kwamba nimesoma na kuelewa ujumbe huu.

Naelewa ushiriki mama huyu mchanga ni kwa hiari na kwamba mimi niko huru kukataa idhini bila kutoa sababu yoyote.

Mimi ninatoa idhini kwa hiari / sitoi idhini kwa mama mchanga wa kushiriki katika utafiti juu.

Saini ..... Tarehe .....

APPENDIX IX: ETHICAL APPROVAL LETTER

UNIVERSITY OF NAIROBI
COLLEGE OF HEALTH SCIENCES
P O BOX 19676 Code 00202
Telegrams: varsity
(254-020) 2726300 Ext 44355

KNH-UON ERC
Email: uonknh_erc@uonbi.ac.ke
Website: http://www.erc.uonbi.ac.ke
Facebook: https://www.facebook.com/uonknh.erc
Twitter: @UONKNH_ERC https://twitter.com/UONKNH_ERC

KENYATTA NATIONAL HOSPITAL
P O BOX 20723 Code 00202
Tel: 726300-9
Fax: 725272
Telegrams: MEDSUP, Nairobi

11 NOV 2015

Ref: KNH-ERC/A/465

11th November 2015

Cheptum Joyce Jebet
Reg. No.H80/97950/2015
School of Nursing Sciences
College of Health Sciences
University of Nairobi

Dear Joyce

Revised research proposal: Evaluation of birth preparedness health education among mothers attending public antenatal care clinics in Migori county, Kenya (P551/07/2015)

This is to inform you that the KNH- UoN Ethics & Research Committee (KNH-UoN ERC) has reviewed and **approved** your above proposal. The approval periods are 11th November 2015 – 10th November 2016.

This approval is subject to compliance with the following requirements:

a) Only approved documents (informed consents, study instruments, advertising materials etc) will be used.
b) All changes (amendments, deviations, violations etc) are submitted for review and approval by KNH-UoN ERC before implementation.
c) Death and life threatening problems and serious adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the KNH-UoN ERC within 72 hours of notification.
d) Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH/UoN ERC within 72 hours.
e) Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. (*Attach a comprehensive progress report to support the renewal*).
f) Clearance for export of biological specimens must be obtained from KNH/UoN-Ethics & Research Committee for each batch of shipment.
g) Submission of an *executive summary* report within 90 days upon completion of the study. This information will form part of the data base that will be consulted in future when processing related research studies so as to minimize chances of study duplication and/or plagiarism.

Protect to Discover

APPENDIX X: REVISED ETHICAL APPROVAL LETTER

UNIVERSITY OF NAIROBI
COLLEGE OF HEALTH SCIENCES
P O BOX 19676 Code 00202
Telegrams: varsity
(254-020) 2726300 Ext 44355

KNH-UoN ERC
Email: uonknh_erc@uonbi.ac.ke
Website: http://www.erc.uonbi.ac.ke
Facebook: https://www.facebook.com/uonknh.erc
Twitter: @UONKNH_ERC https://twitter.com/UONKNH_ERC

KENYATTA NATIONAL HOSPITAL
P O BOX 20723 Code 00202
Tel: 726300-9
Fax: 725272
Telegrams: MEDSUP, Nairobi

Ref: KNH-ERC/ Mod&SAE/216

1st July 2016

Joyce Jebet Cheptum
Reg. No.H80/97950/2015
School of Nursing Sciences
College of Health Sciences
University of Nairobi

Dear Joyce

Re: Approval of modifications – study titled "Evaluation of Birth Preparedness Health Education among mothers attending Public Antenatal Care Clinics in Migori County, Kenya (P551/07/2015)

Your communication of 29th May, 2016 refers.

Upon review of the amendments, the KNH-UoN ERC has approved the following:

1. Change of study design from quasi experimental to randomized controlled study.
2. Change of sample size from 420 to 185 per each arm.
3. Dropping health facility interview guide and introduction of a focus group discussion guide.
4. The modified baseline survey questionnaire.

The documents are hereby endorsed and stamped for use.

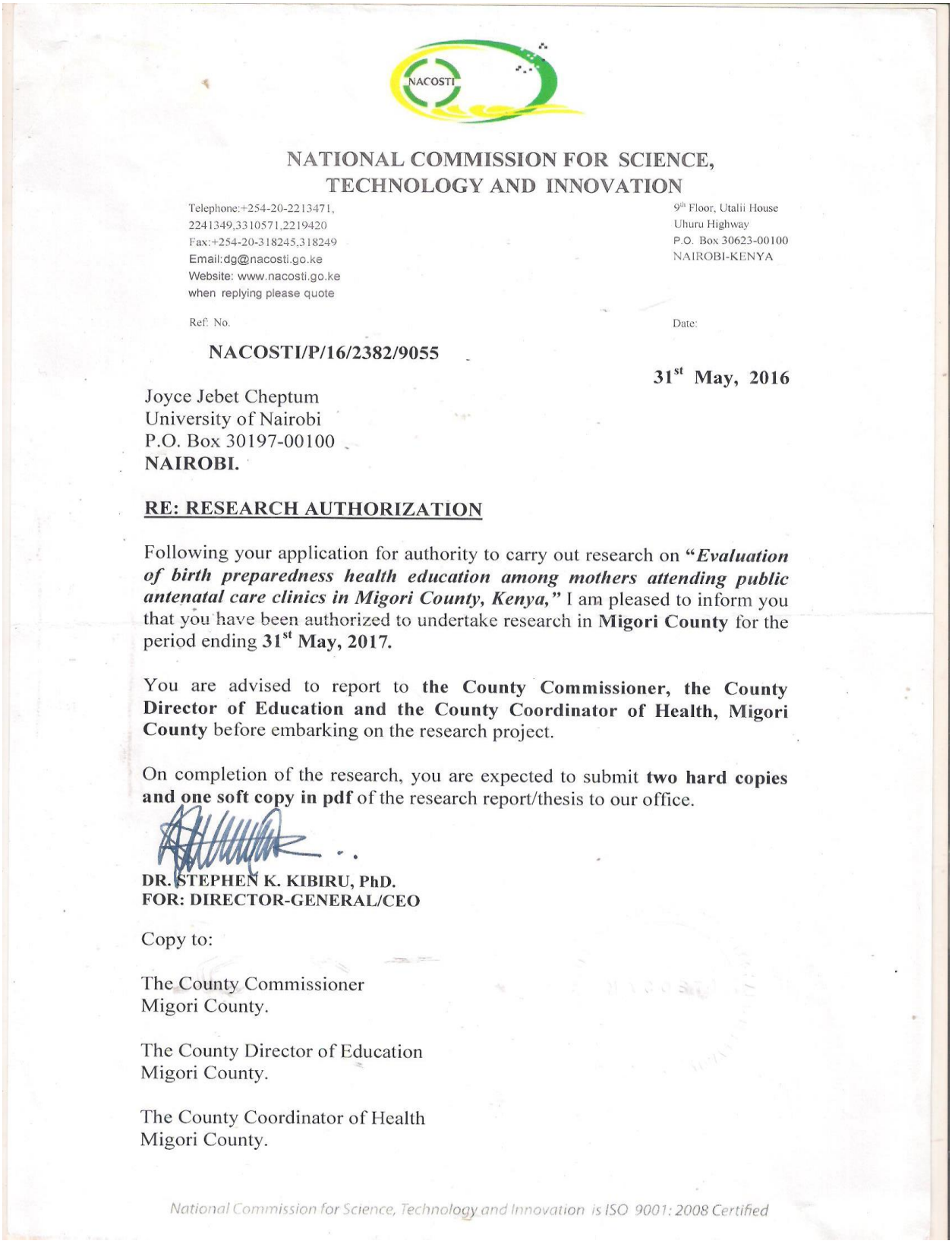
Yours sincerely,

PROF. M. L. CHINDIA
SECRETARY, KNH/UON-ERC

c.c. The Principal, College of Health Sciences, UoN
The Deputy Director, CS, KNH
The Chair, KNH- UoN ERC
The Director, School of Nursing Sciences,UoN

"Protect to Discover"

APPENDIX XI: RESEARCH AUTHORIZATION BY NACOSTI



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. NACOSTI/P/16/2382/9055

Date: 31st May, 2016

Joyce Jebet Cheptum
University of Nairobi
P.O. Box 30197-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Evaluation of birth preparedness health education among mothers attending public antenatal care clinics 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 **31st May, 2017.**

You are advised to report to **the County Commissioner, the County Director of Education and the County Coordinator of Health, 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.

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

Copy to:

The County Commissioner
Migori County.

The County Director of Education
Migori County.

The County Coordinator of Health
Migori County.

National Commission for Science, Technology and Innovation is ISO 9001: 2008 Certified

APPENDIX XII: NATIONAL COUNCIL FOR SCIENCE, TECHNOLOGY AND INNOVATION (NACOSTI) RESEARCH PERMIT

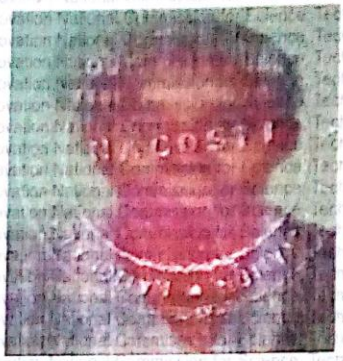
THIS IS TO CERTIFY THAT:
MS. JOYCE JEBET CHEPTUM
of of UNIVERSITY OF NAIROBI, 0-10100
Nyeri,has been permitted to conduct
research in *Migori County*

on the topic: *EVALUATION OF BIRTH PREPAREDNESS HEALTH EDUCATION AMONG MOTHERS ATTENDING PUBLIC ANTENATAL CARE CLINICS IN MIGORI COUNTY, KENYA*

for the period ending:
31st May,2017

.....
Applicant's Signature

Permit No : NACOSTI/P/16/2382/9055
Date Of Issue : 31st May,2016
Fee Recieved :ksh 2000



.....
Director General
National Commission for Science, Technology & Innovation

APPENDIX XIII: MIGORI COUNTY AUTHORIZATION LETTER

MIGORI COUNTY

DEPARTMENT OF HEALTH SERVICES

Telegrams: "MOH", Migori
Telephone: Suna (059) 20058
Email:migoricountyHMT@gmail.com
When replying please quote

COUNTY DIRECTOR OF HEALTH
MIGORI COUNTY
P O BOX 1045-40400
SUNA - MIGORI

MIG/CDH/TR./VOL II/38

10th December, 2015

To Whom It May Concern

RE: RESEARCH AUTHORIZATION

Referecne is made to your letter ref: KNH-ERC/A/465 dated 11th November, 2015 regarding **Revised research proposal on Evaluation of Birth preparedness health education among mothers attending public antenatal care clinics in Migori County, Kenya (P551/07/2015).**

This letter therefore gives you permission to carry out your study in selected public health facilities within the county.

Finally, I advice that you make arrangemetns to share with the CHMT and sub county Health management team on updates and progress of the study and finnaly the study outcome.

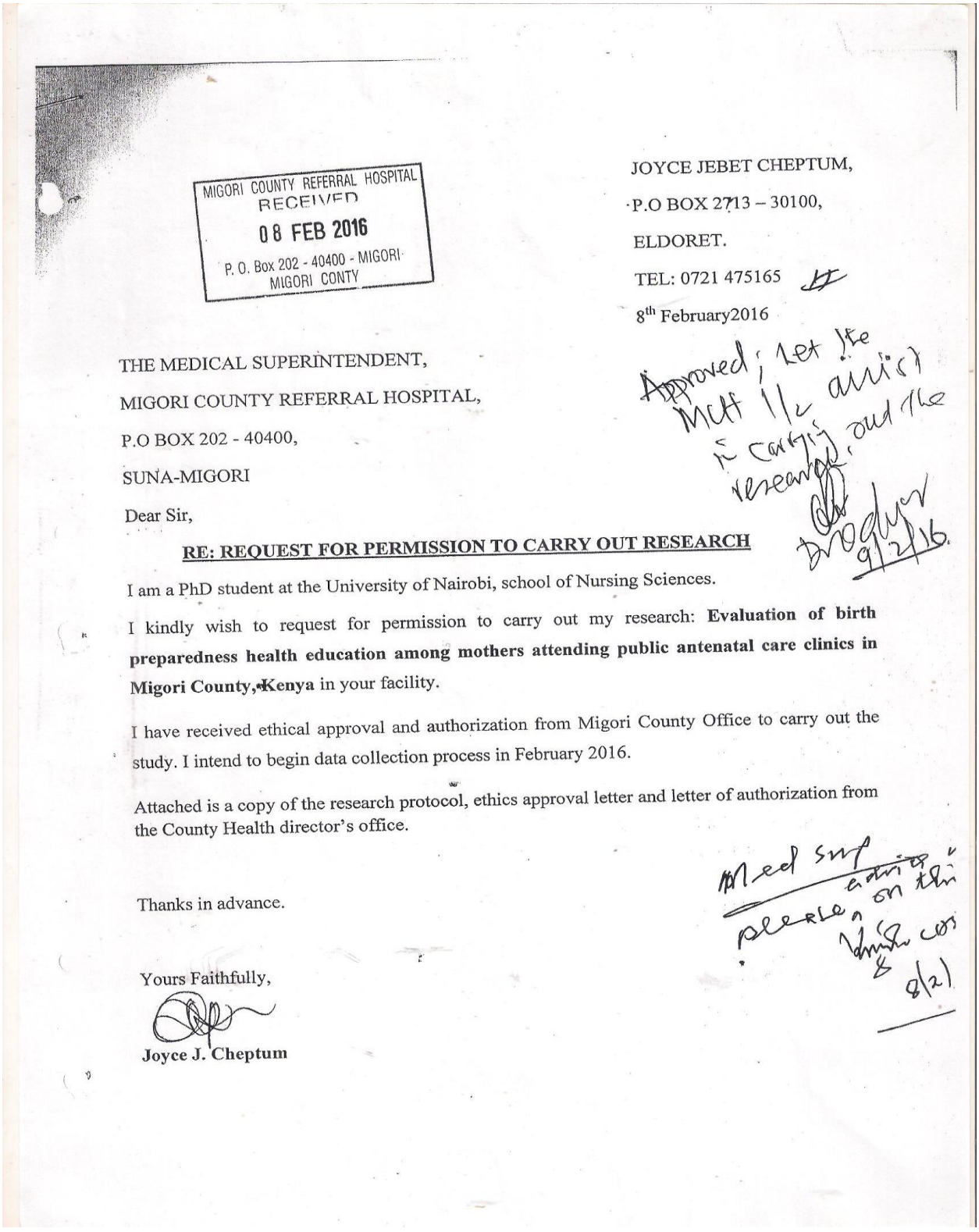
Thank you.

OFFICE OF THE COUNTY DIRECTOR
OF HEALTH SERVICES - MIGORI
P. O. BOX 1045, SUNA - MIGORI

Dr. Gondi J.O
County Director of Health
MIGORI COUNTY

CC
1. Chief Officer, Health Services

APPENDIX XIV: RESEARCH AUTHORIZATION – MIGORI COUNTY REFERRAL HOSPITAL



MIGORI COUNTY REFERRAL HOSPITAL
RECEIVED
08 FEB 2016
P. O. Box 202 - 40400 - MIGORI
MIGORI CONTY

JOYCE JEBET CHEPTUM,
P.O BOX 2713 – 30100,
ELDORET.
TEL: 0721 475165

8th February2016

Approved; let the MCH 1/c assist in carrying out the research.
Dr Ogutu 9/2/16.

THE MEDICAL SUPERINTENDENT,
MIGORI COUNTY REFERRAL HOSPITAL,
P.O BOX 202 - 40400,
SUNA-MIGORI

Dear Sir,

RE: REQUEST FOR PERMISSION TO CARRY OUT RESEARCH

I am a PhD student at the University of Nairobi, school of Nursing Sciences.

I kindly wish to request for permission to carry out my research: **Evaluation of birth preparedness health education among mothers attending public antenatal care clinics in Migori County, Kenya** in your facility.

I have received ethical approval and authorization from Migori County Office to carry out the study. I intend to begin data collection process in February 2016.

Attached is a copy of the research protocol, ethics approval letter and letter of authorization from the County Health director's office.

Med Sup please assist on this
8/2/16

Thanks in advance.

Yours Faithfully,

Joyce J. Cheptum

APPENDIX XV: BIRTH PREPAREDNESS OBSERVATION CHECKLIST

This was used during the intervention phase to evaluate the level of birth preparation for each participant.

List of items	**Yes**	**No**
Knowledge of the expected date		
Having a ready bag with supplies in readiness for delivery • Razor blade • Ligatures • Baby clothes • Mother's clothes • Sanitary pads • ANC card		
Delivery at a health facility		
Having a birth companion		
Having ready means of transport to the health facility		
Having funds for delivery		
Having a caretaker at home		

APPENDIX XVI: BASELINE SURVEY QUESTIONNAIRE FOR MOTHERS

Code No._____

Facility_____

Socio - Demographic Data

1. Age----------
2. Marital status

   a) Married b) single c) separated d) widowed e) Others (Specify)
3. Age at first birth----------
4. Residence

   a) In town b) In the village c) Others (Specify)
5. Education level

   a) None b) Standard 1-4 c) Standard 4-8 d) Form I-II

   e) Form III-IV f) College incomplete g) University incomplete

   h) College complete i) University completed
6. Religion

   a) Protestant b) Catholic c) Muslim d) Other (Specify)
7. Occupation

   a) Housewife b) Business c) Peasant Farmer d) casual labourer

   e) employed/ salaried job f) Others (specify)
8. Husband's education

   a) None b) Standard 1-4 c) Standard 1-4 d) Form I-II

   e) Form III-IV f) College incomplete g) University incomplete

   h) College complete i) University completed

9. Husband/partner's occupation

   a) Fishing b) Business c) Peasant Farmer d) casual labourer

   e) employed/ salaried job f) Others (specify)

Obstetric history

10. Parity----------

11. How many children are alive……..

12. How many children have died……

    Cause of death……..

13. ANC attendance a) Yes b) No

14. Gestation of booking ANC……

15. Expected date of delivery (EDD)……..

16. Complications during the current pregnancy……

    ……

    ……

17. Past obstetric history

Year of birth	ANC attendance Yes/No	Place of delivery	Mode of delivery	Delivery assistant	Sex of the baby	Alive/Dead

Knowledge on Birth Preparedness

18. Have you ever heard of birth preparedness? a) Yes b) No

19. What do you know about birth preparedness?

    a) It is about buying clothes for the baby

    b) It is about having a ready bag for delivery

    c) It is about choosing the health facility to deliver

    d) It is about knowing the expected date of delivery

    e) It is about having a birth companion

20. Do you believe in preparing for child birth? a) Yes b) No

A. If yes, what do you prepare?

    a) Baby clothes

    b) Finances

    c) Health facility for delivery

    d) Transport to health facility

    e) The care taker at home while away

B. If no, what are the reasons for not preparing?

    a) Cultural factors

    b) Lack of money

    c) Lack of family support

    d) Lack of knowledge

21. Who should be responsible for preparing for a birth?

    a) The woman b) The husband c) Mother in law d) Others (specify)

22. When do you think preparation of childbirth should begin?

a) As soon as pregnancy is diagnosed b) first trimester c) second trimester

d) Third trimester e) never prepare f) Others (Specify)

Birth preparedness health education messages

23. Do you receive birth preparedness health education in your facility?

a) Yes b) No

24. When are the messages on birth preparedness health education initiated during ANC?

a) First visit b) second visit c) Third visit d) Fourth visit e)Others (specify)

25. Is a review on birth preparedness health messages done after the initial health education?

(Check with ANC card if documented)

a) Yes b) No

If Yes, how often is it done?

a) Once b) Twice c) Thrice d) Every ANC visit e) None

26. Which method of delivery is used to teach you on birth preparedness when you attend ANC?

a) Group teaching

b) Individualized teaching

27. How is the information on birth preparedness delivered to you?

a) Verbal b) Pamphlet c) Audio/visual d) Demonstration e) Others (specify)

28. Is this your preferred mode of information delivery?

a) Yes b) No

A. If yes, what do you like about the method?

a) It is short and clear

b) It is convenient

c) It aids memory better

d) Others (specify)

B. If no, why?

a) Too complicated

b) Time wasting

c) Too brief

d) Do not believe in birth preparedness

e) Others (specify)

29. Are there any additional materials to the birth preparedness health talk?

a) Yes b) No

A. If yes, which are the additional information?

a) Videos b) Books c) Journal d) Pamphlets

B. If no, are you told of any reference materials?

a) Yes b) No

30. What information about birth preparedness are you taught? ***(Tick where appropriate)***

Message	**Yes**	**No**
Expected date of delivery		
Having a birth plan		
Transport arrangements		
The health facility to deliver		
The birth companion		

The baby items		
Plan for the family while away		
Identified health facility for delivery		

31. What other information on birth preparedness are you taught?

.....

.....

.....

32. How many sessions of birth preparedness are you taught during the ANC visits?

a) One b) Two c) Three d) Four e) others (specify)

33. How much time does it take to be taught on birth preparedness?

a) Less than 10 minutes

b) 10 – 20 minutes

c) 20 – 30 minutes

d) More than 30 minutes

34. The birth preparedness strategy is helpful in reduction of maternal and neonatal mortality.

	Tick (√)
Strongly agree	
Agree	
Neutral	
Disagree	
Strongly disagree	

35. What do you think is the best way of ensuring information on birth preparedness is retained?
    a) Through feedback
    b) Repeating the message verbally several times
    c) Reminders through mobile text messages
    d) Reminders through phone calls
    e) Health education with pamphlets
    f) Health education through video
    g) Health education through demonstration
    h) Others (specify)
36. What challenges do you face when receiving birth preparedness health messages from health workers?

    .....

    .....
37. How is the documentation done after delivering health messages on birth preparedness done during ANC?
    a) No documentation done
    b) In the ANC booklets
    c) In separate piece of paper
    d) In the ANC register
38. What information is documented?
    a) The birth plan
    b) The details of the messages shared

c) The date when the birth plan was discussed

Practice of Birth Preparedness

39. What preparations have you made for birth?

a) Buying baby clothes

b) Setting aside funds for delivery

c) Identified transport

d) Having a bag with razorblade, ligatures and sanitary pads

e) Identified a caretaker while away

f) Identifying a hospital for delivery

40. If no preparations have been made, what are the reasons?

a) Doesn't see importance

b) Lack of money

c) Taboos

d) Cultural beliefs

e) The religious doctrines do not allow for that

f) Others (specify)

41. How will you get to the health facility when labour begins?

a) Walking b) *Boda boda* c) *Matatu* d) Own vehicle

e) Others (specify)

42. Are you planning to look for transport means early in pregnancy? a) Yes b) No

A. If yes, which means is available to you?

a) *Matatu*

b) *Boda boda*

c) Own vehicle

d) Others (specify)

B. If No, why?

a) Lack of money

b) The hospital is a walking distance (*identify hospital*)

c) No need

d) Partner will decide

e) Others (specify)

43. Will somebody accompany you to the hospital during labour? a) Yes b) No

A. If yes, who?

a) Mother-in-law b) Sister c) Spouse d) TBA e) Others (specify)

B. If no, why?

a) I prefer to be alone b) it is culturally wrong c) Not allowed in the health facility d) Others (specify)

44. Who will take care of the home while you are away?

a) No one b) Partner c) Mother-in law d) Older children e) Neighbour

f) Friend g) Others (specify)

APPENDIX XVII: FOCUS GROUP DISCUSSION GUIDE

This was used to collect data from the focus group discussion of mothers attending ANC in the selected facilities.

Welcome to the discussion. We will start by thinking about birth preparedness.

1. What is birth preparedness?
2. What preparations should be done for child birth and delivery? *(Probe on the items needed to prepare for delivery)*
3. Who is responsible for preparing for childbirth?
4. What beliefs, values, norms or taboos exist in regard to birth preparedness?
5. What do you think about preparing for child birth? *(probe on the choice of the place of delivery)*

We have come to the conclusion of our discussion. Thank you very much for your participation and responses.

APPENDIX XVIII: INTERVENTIONAL PHASE QUESTIONNAIRE FOR MOTHERS

Code No._____

Facility_____

Socio - Demographic Data

1. Age----------
2. Marital status

   a) Married b) single c) separated d) widowed e) Others (Specify)
3. Age at first birth----------
4. Residence

   a) In town b) In the village c) Others (Specify)
5. Education level

   b) None b) Standard 1-4 c) Standard 5-8 d) Form I-II

   e) Form III-IV f) College incomplete g) University incomplete

   h) College complete i) University completed
6. Religion

   a) Protestant b) Catholic c) Muslim d) Other (Specify)
7. Occupation

   a) Housewife b) Business c) Peasant Farmer d) casual labourer

   e) employed/ salaried job f) Others (specify)
8. Husband's education

   b) None b) Standard 1-4 c) Standard 5-8 d) Form I-II

   e) Form III-IV f) College incomplete g) University incomplete

   h) College complete i) University completed

9. Husband/partner's occupation

   a) Fishing b) Business c) Peasant Farmer d) casual labourer

   e) employed/ salaried job f) Others (specify)

Obstetric history

10. Parity----------

11. How many children are alive……..

12. How many children have died……

    Cause of death……..

13. ANC attendance a) Yes b) No

    If No, Why…….....

    ……

14. Gestation of booking ANC……

15. Expected date of delivery (EDD)……..

16. Complications during the current pregnancy……

    ……

    ……

17. Past obstetric history

Year of birth	ANC attendance Yes/No	Place of delivery	Mode of delivery	Delivery assistant	Sex of the baby	Alive/Dead

18. Present obstetric history

Date of birth	ANC attendance Yes/No	Place of delivery	Mode of delivery	Duration of labour	Sex of the baby	Birth weight	Alive/ Dead	Complications during labour/ delivery

Knowledge on Birth Preparedness

19. Have you ever heard of birth preparedness? a) Yes b) No

20. What do you know about birth preparedness?

a) It is about buying clothes for the baby

b) It is about having a ready bag for delivery

c) It is about choosing the health facility to deliver

d) It is about knowing the expected date of delivery

e) It is about having a birth companion

21. Do you believe in preparing for child birth? a) Yes b) No

A. If yes, what did you prepare?

a) Baby clothes

b) Finances

c) Health facility for delivery

d) Transport to health facility

e) The care taker at home while away

B. If no, what are the reasons for not preparing?

a) Cultural factors

b) Lack of money

c) Lack of family support

d) Lack of knowledge

22. Who should be responsible for preparing for a birth?

a) The woman b) The husband c) Mother in law d) Others (specify)

23. When do you think preparation of childbirth should begin?

a) As soon as pregnancy is diagnosed

b) first trimester

c) second trimester

d) Third trimester

e) never prepare

f) Others (Specify)

Birth preparedness health education messages

24. Did you receive birth preparedness health education in your facility?

a) Yes b) No

25. When were the messages on birth preparedness health education initiated during ANC?

a) First visit b) second visit c) Third visit d) Fourth visit

e) Others (specify)

26. Was a review on birth preparedness health messages done after the initial health education?

(Check with ANC card if documented)

a) Yes b) No

A. If Yes, how often was it done?

a) Once b) Twice c) Thrice d) Every ANC visit e) None

27. What information about birth preparedness were you taught? ***(Tick where appropriate)***

Message	**Yes**	**No**
Expected date of delivery		
Having a birth plan		
Transport arrangements		
The health facility to deliver		
The birth companion		
The baby items		
Plan for the family while away		
Identified health facility for delivery		

28. What other information on birth preparedness were you taught?

.....

.....

.....

29. Which method of delivery was used to teach you on birth preparedness when you attended ANC?

c) Group teaching

d) Individualized teaching

30. How was the information on birth preparedness delivered to you?

b) Verbal b) Pamphlet c) Audio/visual d) Demonstration e) Others (specify)

31. Was this your preferred mode of information delivery?

b) Yes b) No

A. If yes, what did you like about the method?

e) It was short and clear

f) It was convenient

g) It aided memory better

h) Others (specify)

B. If no, why?

a) Too complicated

b) Time wasting

c) Too brief

d) Do not believe in birth preparedness

e) Others (specify)

32. Are there any additional materials to the birth preparedness health talk?

b) Yes b) No

A. If yes, which are the additional information?

b) Videos b) Books c) Journal d) Pamphlets

B. If no, are you told of any reference materials?

b) Yes b) No

33. How many sessions of birth preparedness were you taught during the ANC visits?

b) One b) Two c) Three d) Four e) others (specify)

34. How much time did it take to be taught on birth preparedness?

e) Less than 10 minutes

f) 10 – 20 minutes

g) 20 – 30 minutes

h) More than 30 minutes

35. The birth preparedness strategy is helpful in reduction of maternal and neonatal mortality.

	Tick (√)
Strongly agree	
Agree	
Neutral	
Disagree	
Strongly disagree	

36. What do you think is the best way of ensuring information on birth preparedness is retained?

a) Through feedback

b) Repeating the message verbally several times

c) Reminders through mobile text messages

d) Reminders through phone calls

e) Health education with pamphlets

f) Health education through video

g) Health education through demonstration

h) Others (specify)

37. What challenges did you face when receiving birth preparedness health messages from health workers?

.....

.....

38. How was the documentation done after delivering health messages on birth preparedness done during ANC?
    e) No documentation done
    f) In the ANC booklets
    g) In separate piece of paper
    h) In the ANC register
39. What information was documented?
    d) The birth plan
    e) The details of the messages shared
    f) The date when the birth plan was discussed

Practice of Birth Preparedness

40. What preparations have you made for birth?
    g) Buying baby clothes
    h) Setting aside funds for delivery
    i) Identified transport
    j) Having a bag with razorblade, ligatures and sanitary pads
    k) Identified a caretaker while away
    l) Identifying a hospital for delivery
41. If no preparations have been made, what are the reasons?
    a) Doesn't see importance
    b) Lack of money

c) Taboos

d) Cultural beliefs

e) The religious doctrines do not allow for that

f) Others (specify)

42. How did you get to the health facility when labour began?

a) Walking b) *Boda boda* c) *Matatu* d) Own vehicle

e) Others (specify)

43. Did you look for transport means early in pregnancy? a) Yes b) No

A. If yes, which means was available to you?

b) *Matatu*

b) *Boda boda*

c) Own vehicle

d) Others (specify)

B. If No, why?

g) Lack of money

h) The hospital is a walking distance (*identify hospital*)

i) No need

j) Partner will decide

k) Others (specify)

44. Did somebody accompany you to the hospital during labour? a) Yes b) No

A. If yes, who?

b) Mother-in-law b) Sister c) Spouse d) TBA e) Others (specify)

B. If no, why?

b) I prefer to be alone b) it is culturally wrong c) Not allowed in the health facility d) Others (specify)

45. Who is taking care of the home while you are away?

b) No one b) Partner c) Mother-in law d) Older children e) Neighbour l) Friend g) Others (specify)

The use of specific birth preparedness messages and mobile phone text message reminder

46. How did you find the specific verbal messages on birth preparedness?

	Tick (√)
Very good	
Good	
Neutral	
Bad	
Very bad	

47. How were the birth preparedness messages during ANC helpful?

.....

.....

.....

48. Did you receive a reminder on birth preparedness through the mobile phone text message?

a) Yes b) No

A. If yes, how was it helpful?

.....

.....

.....

49. Had you made any preparations prior to receiving the mobile phone reminder?

    a) Yes b) No

50. What are your suggestions in regard to health messages regarding mode of delivery?.....

    .....

    .....

APPENDIX XIX: CODE BOOK FOR QUALITATIVE DATA (FGD)

CATEGORY	SUB-CATEGORY	CODES
Knowledge of birth preparedness (BP)	Knowledgeable	Items to be bought Baby items Expected date of delivery Finance preparation
	Lack of knowledge	Eating good food Exercising Not having mother's clothes
Preparation for birth preparedness	What to prepare	Baby clothes "Leso" Napkin Money Transport means
	Nothing	No need to prepare
Not preparing for BP	Beliefs Culture	Baby will die if preparation is done It is culturally wrong It is a bad omen
Perception of birth preparedness	Good	You will have everything you need You will be ready
	Bad	Baby will die What will happen to clothes bought
Messages taught on BP	What to prepare	Items to buy Finance Transport
	Not taught	BP package Danger signs Expected date of delivery
Challenges experienced in BP health education	Staff	Few staff Negative attitude
	Messages of BP	Language used by staff is technical Messages are non-specific on BP
	Number of clients	Clients are many

Role of men in BP	What they do	Look for money Take care of the home Companion to the hospital
	What they don't do	Household chores Stay in labour ward till delivery
	Why they don't do anything	Culturally wrong Childbirth is a woman's affair

APPENDIX XX: MAP OF KENYA AND MIGORI COUNTY

Adapted from Google maps