DISSERTATION ON

EFFECT OF COMMUNITY LEVEL INTERVENTION ON MATERNAL HEALTH CARE UTILIZATION: EVIDENCE FROM POPULATION BASED INTERVENTIONAL-STUDY IN SOUTH-WEST ETHIOPIA

Zum Erwerb des Doctor of Philosophy (Ph.D.)

an der Medizinischen Fakultät der

Ludwig-Maximilians-Universität zu München

Doctoral Thesis for the awarding of a Doctor of Philosophy(Ph.D.)

at the Medical Faculty of

Ludwig-Maximilians-Universität, Munich

vorgelegt von

submitted by

ABERA MULUEMEBET

aus (Geburtsort)

born in (place of birth)

ASELLA, ETHIOPIA

am (Tag an dem die Dissertation abgeschlossen wurde)

submitted on (day of finalization of the thesis)

September 30, 2014

Supervisors LMU:

Habilitated Supervisor   Prof. Dr. Ulrich Mansmann

Direct Supervisor   Dr. Maria Delius

Supervisor External:

Local Supervisor   Prof. Abebe G/Mariam

Reviewing Experts:

1st Reviewer   Prof. Dr. Ulrich Mansmann

2nd Reviewer   Dr. Maria Delius

Dean: Prof. Dr. Dr. h. c. M. Reiser, FACR, FRCR

Date of Oral Defence: 17.03.2015

Affidavit

Abera, Muluemebet
_____
Surname, first name

Jimma University
_____
Street

PO Box 5093 Jimma Ethiopia
_____
Zip code, town

Ethiopia
_____
Country

I hereby declare, that the submitted thesis entitled

EFFECT OF COMMUNITY LEVEL INTERVENTION ON MATERNAL HEALTH CARE UTILIZATION:
_____
Thesis Title

EVIDENCE FROM POPULATION BASED INTERVENTIONAL-STUDY IN SOUTH-WEST ETHIOPIA
_____
Thesis Title (cont.)

_____
Thesis Title (cont.)

is my own work. I have only used the sources indicated and have not made unauthorised use of services of a third party. Where the work of others has been quoted or reproduced, the source is always given.

The submitted thesis or parts thereof have not been presented as part of an examination degree to any other university.

I further declare that the electronic version of the submitted thesis is congruent with the printed version both in content and format.

_____   _____
Place, Date   Signature PhD Student

EFFECT OF COMMUNITY LEVEL INTERVENTION ON MATERNAL HEALTH CARE UTILIZATION: EVIDENCE FROM POPULATION BASED INTERVENTIONAL-STUDY IN SOUTH-WEST ETHIOPIA

Muluemebet Abera Wordofa

ABSTRACT

Background: In areas where maternal and neonatal mortality rates is high, cost-effective and sustainable interventions are needed in order to reduce morbidity and mortality rates among women of childbearing age. Where health systems are weak and many women deliver at home, community based interventions have the potential to make an important contribution to health improvements.

Objective: to assess the effect of community-based interventions on maternal health service utilization.

Methods: A quasi-experimental pre-post comparison study was conducted in eight rural areas comprising four intervention and four comparison Kebeles of Gilgel Gibe Health and Demographic surveillance system site, south west Ethiopia. Women facilitators were selected and trained to lead participatory sessions on maternal health. Data on health seeking behaviour for maternal health and knowledge about obstetric danger signs were collected from a repeated cross sectional household survey conducted from December 2011 to April 2013. Effect of intervention was assessed using multivariable logistic regression with generalized estimating equation model. P value 0.05 was used to declare statistical significant association.

Results: Women in the intervention group reported more early prenatal care seeking behaviour during their last pregnancy than women in the control group (OR: 6.3, 95% CI (2.8, 14.5)). Odds ratios for any antenatal care showed significant improvements in the intervention group as compared to control group(OR: 1.7, 95% CI (1.3, 2.3)). Women's knowledge of obstetric danger signs, birth preparedness, and complication readiness increased in both areas from baseline (OR: 1.2, 95% CI (1.1, 1.5)) however, increase in the intervention area was stronger (OR: 2.8, 95% CI (2.1, 3.8)) compared to the control group. There was an increase in delivery care utilization in both areas from the baseline (OR: 1.44, 95% CI (1.04, 1.99)) even though there is no statistically significant difference in increase between the two group (OR: 1.7, 95% CI (0.9, 3.2)).

Conclusions: This study indicated that participatory sessions led by local women facilitators in the community can increase knowledge about obstetric danger signs and encourage use of maternity services.

Key words: quasi experimental, maternal health, Ethiopia

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

ANC   antenatal care

BCC   Behavioral Change Communication

CBE   Community Based Education

CHA   Community health agent

CSA   Central Statistical Authority

EDHS   Ethiopia Demographic and Health Survey

FGD   Focus Group Discussion

FHD   Family Health Department

FMOH   Federal Ministry of Health

FP   Family planning

GEE   Generalized Estimating Equations

GGFRC   Gilgel Gibe Field Research Center

GTP   Growth and Transformation Plan

HEP   Health Extension Program

HDSS   Health and Demographic Surveillance System

HDSP IV   Health Sector Development Plan IV

HEW   health extension workers

HO   Health Officer

HP   Health Post

ICPD   International Conference on Population and Development

IEOS   Integrated Emergency Obstetric and Surgery

IHSR   Institute of Health Science Research

IMR   Infant Mortality Rate

JU   Jimma University

MCH   Maternal and child health

MDGs   Millennium Development Goals

MMR   Maternal Mortality Ratio

MOH   Ministry of Health

NGO   Non-governmental organization

PAD   professionally Assisted Delivery

PHCU   Primary Health Care Unit

PNC   Postnatal Care

STDs   Sexually Transmitted Diseases

TBA   Traditional birth attendant

UNFPA   United Nations Population Fund

UNICEF   United Nations Children's Fund

WHO   World Health Organization

Chapter 1 : INTRODUCTION

1.1. BACKGROUND INFORMATION

Ethiopia is a Federal Democratic Republic country having 11 regions with nine national regional states and two city administration and further divided in to 805 districts. Ethiopia is the second largest country in sub-Saharan Africa with an estimated population of about 82 million of which more than 69 million (84 percent) live in rural areas. The proportion of male and female is almost equal. Around 23.4 percent of women are in a reproductive age and 45 percent of the population is less than 15 years old. As in many other developing countries the rate of growth of the urban population (4.1%) is higher than that of the total population (2.6%). Rapid population growth exacerbates critical gaps in basic health services especially when growth of the economy is low or per capita incomes are in decline.

Ethiopia is situated in the Horn of Africa between 3 and 15 degrees North latitude and 33 and 48 degrees East longitude. The total area of the country is around 1.1 million square kilometers, and it shares borders with Djibouti, Eritrea, Sudan, South Sudan, Kenya and Somalia. The climate has three zones: "dega" the highlands, "wina dega" middle zone and kola" hot area. [1]

Health profile:

The health sector has introduced a three tire system that involves a primary Health Care Unit (PHCU), General hospitals and specialized hospitals. PHCU consists of five satellite health posts, one health center and one primary hospital serve 5,000; 25,000 and 100,000 people respectively. The secondary level, the General hospital, serves for 1,000,000 population and the tertiary level, specialized hospital, serves 5,000,000 people.[1]

The national health policy [2] emphasizes the importance of achieving access, for all segments of the population to a basic package of quality primary health care services via a decentralized system of governance. The service package includes preventive, promotive and basic curative services. Currently the potential health service coverage is about 92%. There are 122 public hospitals, 2660 health centers, and 15,095 health posts. Almost all of these health institutions provide maternal and child health services.

Since 1991, the Ethiopian Federal Ministry of Health has built an impressive framework for improving health for all, including maternal and neonatal health, which are being implemented so far. This has included a wide range of strategies such as Making Pregnancy Safer program (2000); the abortion law (2005); National Reproductive Health and Adolescent & Youth Reproductive Health Strategy (2006). There are also strategies such as, free service for key maternal and child health services (Health Care Financing Strategy), the training and deployment of new workforce of female Health Extension Workers (HEWs) for institutionalising community health care with clean and safe delivery at Health Post (HP) level, and deployment of Health Officers (HOs) with MSc training in Integrated Emergency Obstetric and Surgery (IEOS) skills. One of the objectives of the ongoing GTP is also expanding and ensuring the qualities of education and health services to achieve MDGs in the social sector.[3]

The major health problems of the country remain largely preventable communicable diseases and nutritional disorders. Despite major progresses have been made to improve the health status of
the population in the past, Ethiopia's population still faces a high rate of morbidity and mortality and the health status remains relatively poor. Figures on vital health indicators from DHS 2011 show MMR 676/100,000LB, an IMR of 59/1000 and under-five mortality rate has been reduced to 88/1000 in 2011.

To improve the health status of Ethiopia, the ministry has formulated consecutive phases of a comprehensive Health Sector Development Program (HSDPs), that started 1997/98. Currently the fourth HSDP is in place from 2010/11 – 2014/15.
The flagship program to ensure health service delivery and quality of care is the Health Extension Programme (HEP), which is the main vehicle for prevention, health promotion, behavioural change communication (BCC) and basic curative services.

The target is to construct one health post for each *kebele(smallest administrative unit)*, for an estimated population of 5,000 on average. Two Health Extension Workers (HEWs), who underwent one year training on disease prevention measures, are assigned in each health post to provide basic curative and preventive health services which include maternal and newborn health services. This is aimed to improve distribution of primary health care services in the country.

1.2. Maternal health issues worldwide

Women have the right to the enjoyment of the highest attainable standard of physical and mental health. Women's health involves their emotional, social and physical well-being and is determined by the social, political and economic context of their lives, as well as by biological factors related to being a woman.

Women are crucial to social and economic development. So their health and well-being matters to themselves, to their families and to communities. Moreover, the health and well being of women is a critical ingredient of future generation.[4]

The safe motherhood conference of 1987 in Nairobi was an attempt to address maternal health as in the previous days UNICEF and other organizations focused only on child health by forgetting the "M" part of MCH. The safe motherhood initiative was launched at that time and now is a program of WHO, with its major aim to reduce the neglected tragedy of maternal mortality and morbidity world-wide.[5] The International Conference on Population and Development (ICPD) in Cairo in 1994 re-emphasized safe motherhood as a major priority in its program of action followed by recent international conferences of the Millennium Development Goals (MDGs), which also emphasized the reduction of maternal mortality and improvement of child health [6], [7]

In June 2012, world leaders got together in Rio de Janeiro, Brazil for the Rio + 20 sustainable development conference, reaffirm their commitment to gender equality and to protect the rights of women, men and youth to have control over and decide freely and responsibly on matters related to their sexuality, including access to sexual and reproductive health, free from coercion, discrimination and violence. Also to ensure that health systems provide the necessary information and health services addressing the sexual and reproductive health of women, including working towards universal access to safe, effective, affordable and acceptable modern methods of family planning, as this is essential for women's health and advancing gender equality.[8]

Despite All these international commitments and effort, every two minutes, a woman dies of pregnancy-related complications, the four most common causes being: severe bleeding after childbirth, infections, high blood pressure during pregnancy, and unsafe abortion. Ninety-nine per cent of maternal deaths occur in developing countries; most could have been prevented. [9]

According to WHO report, the annual number of maternal deaths dropped from more than 523,000 in 1990 to 289,000 in 2013 a decline of 45 per cent. In the same period the global maternal mortality ratio declined from 380 maternal deaths per 100 000 live births to 210 maternal deaths per 100 000 live births. But the MMR in developing regions was still 14 times higher than in the developed regions. At the high end, sub-Saharan Africa had an MMR of 510. At the other end of the scale in developing regions, Eastern Asia had the lowest level, at 33 deaths per 100,000 live births.

The maternal mortality rate showed an average annual decline of 2.6%. While substantial progress has been achieved in almost all regions, many countries particularly in sub-Saharan Africa will fail to reach the Millennium Development Goal (MDG) target of reducing maternal death by 75 per cent from 1990 to 2015. As depicted in fig 1.1 with the current trend reaching the MDGs target in 2015 is impossible.
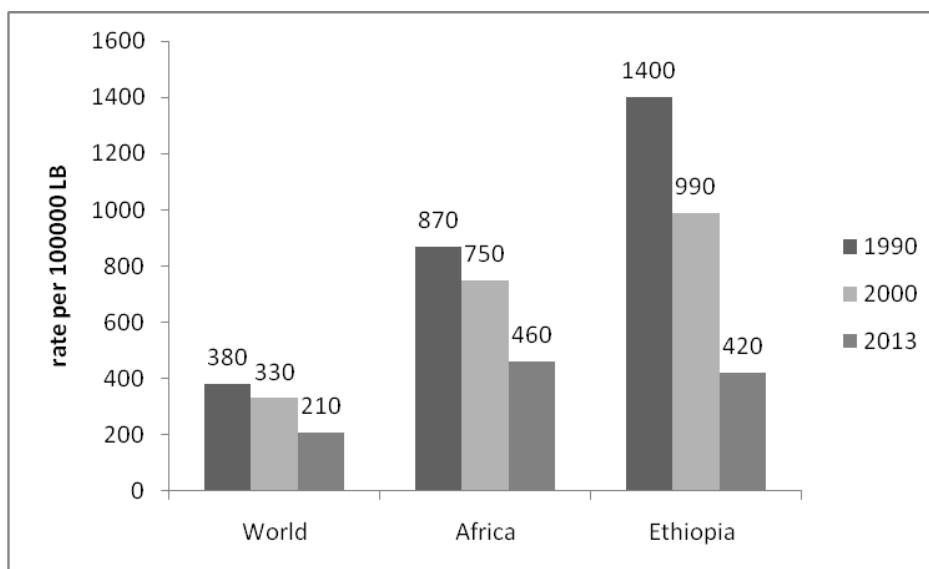
Figure 1-1 Trends in maternal mortality global, regional and National 1990 – 2013

Disparity and inequity in access to health services underlies this global trend. One out of every 39 women in sub-Saharan Africa risks dying of preventable or treatable complications of pregnancy during her lifetime, compared to one in 3,800 in developed countries. Ten countries account for 58 percent of global maternal deaths: India (50 000, 17%); Nigeria (40 000, 14%); Democratic Republic of the Congo (21 000, 7%); Ethiopia (13 000, 4%); Indonesia (8800, 3%); Pakistan (7900, 3%); United Republic of Tanzania (7900, 3%); Kenya (6300, 2%); China (5900, 2%); Uganda (5900, 2%)[9].

Regarding maternal health service utilization progress was made in all regions. Worldwide in the period 2006 to 2013, around 72% of women were assisted by a skilled attendant during childbirth. However, there were significant differences across regions and between income groups. Access to skilled care is lowest in the WHO Africa and Eastern Mediterranean regions. In low-income countries, the coverage of skilled attendant at delivery was only 46%, compared with 64% in lower middle-income countries and 95% in upper middle-income countries. **Fig 1.2** shows the overall situation of maternal health service at global, regional and national levels, and reflects that the overall maternal health situation in Ethiopia is low compared to the regional and global average.[10]
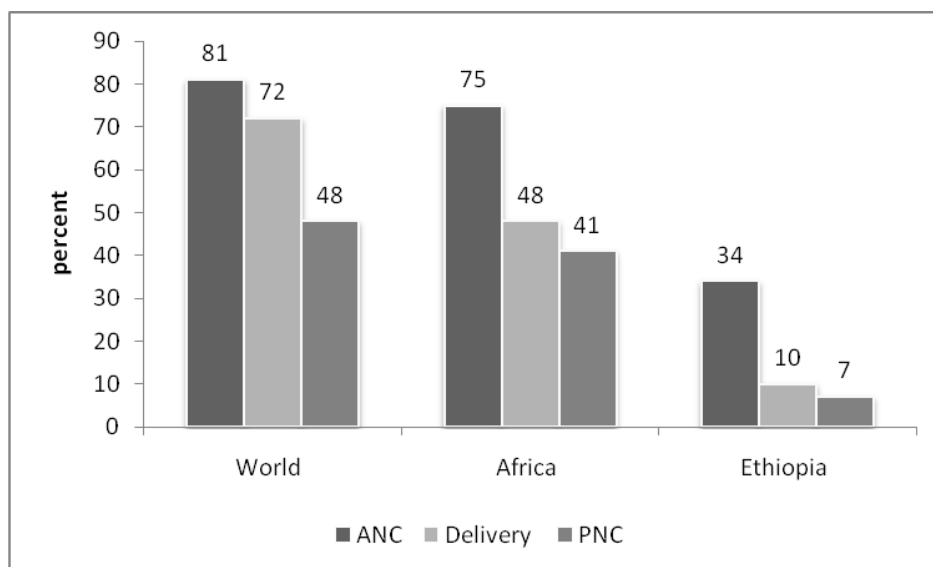
Figure 1-2 Maternal health services utilization global, regional and National, 2013. [10]

1.3 Maternal health status in Ethiopia

Forty nine percent of Ethiopia's populations are females, of which 47% are in the age range of 15-49 years, who are in need of comprehensive Reproductive Health services. In Ethiopia the total fertility is very high; on average a woman bears six children until the end of her reproductive life. Two women out of five (38.5%) have four or more children. Such high fertility is characterized by early marriage and child bearing age, high parity and short birth intervals, which contribute to ill health and in some instances premature death of both the mother and the child [11]. The Government of Ethiopia is committed to achieving Millennium Development Goal 5, to improve maternal health, with a target of reducing the maternal mortality ratio (MMR) by three-quarters over the period 1990 to 2015. Accordingly, the Federal Ministry of Health (FMOH) has applied multi-pronged approaches to reducing maternal and newborn morbidity and mortality. Improving access to and strengthening facility-based maternal and newborn services is one such approach, and is also a Health Sector Development Plan (HSDP) strategic objective.

According to the report of health facilities in Ethiopia reproductive health problems account for 12.3 % of inpatient mortality among females. In which delivery related causes accounted for 2.6%. On the other hand utilization maternal health services that are proven to have effect in reducing maternal mortality are very low[12]

Women's lives can be saved and their sufferings reduced if health care systems could address the serious and life threatening complications of pregnancy and child birth when they occur. One of the best ways to do this is to make sure that every woman receives skilled care at pregnancy and during delivery. However, there are disparities in the utilization of maternal health services among different regions in Ethiopia. As depicted in fig 1.3 Oromia region in which this study is conducted ranked among the lowest.[11]
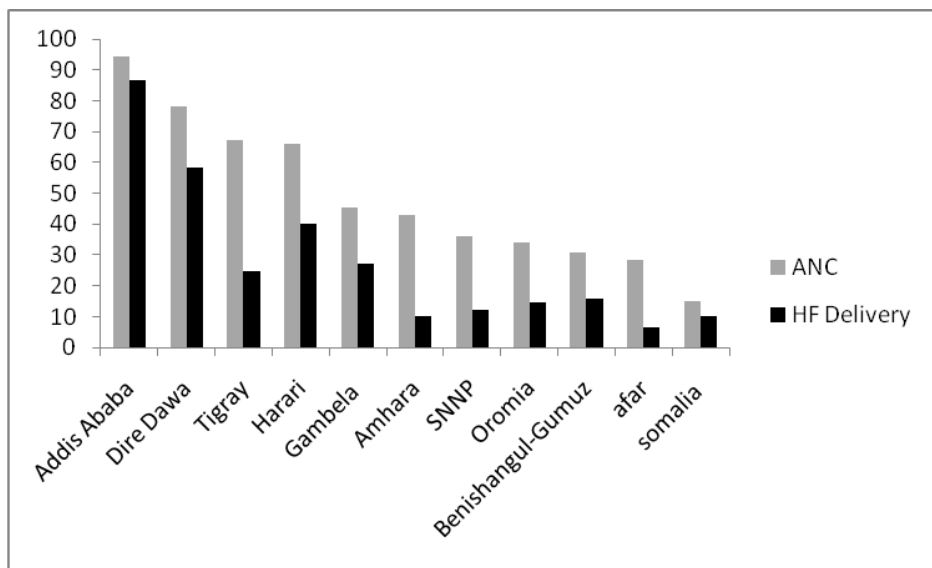
Figure 1-3 ANC coverage and institutional delivery by regions in Ethiopia, 2014

For better utilization of health services, knowledge about the severity of the problem, the availability of the services and attitude and belief on health and health service use are considered as components of predisposing characteristics. *[13]*

One of the strategies to bring a positive health behavior is behavioral change communication. Behavior Change Communication, or BCC, is an approach to behavior change focused on communication. The assumptions is that through communication of some kind, individuals and communities can somehow be persuaded to behave in ways that will make their lives safer and healthier. *[14], [15]*

1.4. Statement of the problem

Epidemiological studies have confirmed that about 80 percent of maternal deaths are due to causes directly related to pregnancy and childbirth like unsafe abortion and obstetric complications such as severe bleeding, infection, hypertensive disorders, and obstructed labor. Women also die from causes such as malaria, diabetes, hepatitis, and anemia which are aggravated by pregnancy.

For every woman who dies, many more suffer from serious conditions like obstetric fistula and ruptured uterus that can affect them for the rest of their lives. The poor health and nutrition of women and the lack of care that contributes to their death in pregnancy and childbirth also compromise the health and survival of the infants and children they leave behind [16]

In sub Saharan Africa including Ethiopia the lifetime risk of maternal death which takes into account both the probability of becoming pregnant and the probability of dying as a result of that pregnancy cumulated across a woman's reproductive years is one in twenty-two. The majority of these deaths may be attributed directly to hemorrhage, Infection, obstructed labor, and hypertensive disorders of pregnancy [17].

Maternal death has implications for the whole family and an impact that rebounds across generations. The complications that cause the deaths and disabilities of mothers also damage the infants they are carrying. In 2012 nearly 44 percent of under five deaths were during the neonatal period, before the age of 1 month; 75% of these neonatal deaths occur within the first week of life and are largely a consequence of inadequate or inappropriate care during pregnancy, delivery, or the first critical hours after birth. Moreover, for every neonate who dies at least one other infant is stillbirth [18]. These deaths could be avoided if preventive measures were taken and adequate cares were available and accessible during pregnancy, childbirth and postpartum periods.

But the utilization of the existing maternal health services in Ethiopia is very low. According to the EHDS 2011 only 19% of pregnant women had the recommended four visit of ANC, less than 10 percent delivered their last child in a health facility and 7% received postnatal care during the first two days of delivery.[11]

Major factors that contribute to the low utilization of the existing maternal health services are related to behavior individuals communities or health system function:- lack of awareness of the importance of skilled hospital deliveries, cultural beliefs and the difficulties of transport in rural areas. In improving knowledge about obstetric danger signs, birth preparedness practices, and readiness for emergency complications, behavioural change communication is crucial strategy ([14]

1.5. Significance of the study

In Ethiopia the level of maternal and infant mortality are among the highest in the world, 676/100000LB and 59/1000LB, respectively. The Federal Government of Ethiopia is committed to improve these indicators and adopted the United Nations MDGs indicators to reduce the current maternal death by 75% by the end of 2015. To monitor the progress towards maternal health, the Millennium Development Goals (MDGs) had set two indicators: maternal mortality ratio (MMR)

and proportion of births attended by skilled health personnel. But the proportion of pregnant women who have care during delivery is universally lower than those who receive ANC. Poor, rural women in sub-Saharan Africa and South Asia are the least likely to receive antenatal, delivery or PNC. Different studies on factors influencing the utilization of maternity health services were done in the country and abroad. In Ethiopia, under utilization of the existing health service is a major problem. This study is designed to empower the community with knowledge and skill for better utilization of existing service for improvement of maternal and newborn health. Such strategies will support the government and other development partners to alleviate the serious shortage of human resources in Ethiopia.

Chapter 2 LITERATURE REVIEW

2.1: Maternal health

In recent years, much attention has been given to maternal mortality changes in developing countries, especially in relation to achieving the fifth Millennium Development Goal (MDG). Maternal death is the death of a woman while pregnant or within 42 days after birth, irrespective of the duration of pregnancy from any cause related to or aggravated by the pregnancy or its management but not from accidental causes. Death from maternal causes represents the leading cause of death among women of reproductive age in most developing countries [7].

Many interrelated factors contribute to maternal mortality. These include lack of information among women and their families on the key danger signs of obstetric complications, inability to access care when complications arise, the other factor lack of resources to reach an appropriate care facility in time and medical service factors such as delay in treatment, in addition socio cultural factors like women's low status and lack of decision-making power. A study done in rural Malawi on 32 maternal death cases showed that eleven of the 32 women had illnesses and symptoms from two days up to a month before they or their families decided to seek care in a hospital. This indicates that lack of knowledge about danger sings led to underestimation of the severity of the problem.[19].

Key danger signs are not the actual obstetric complications, but symptoms that are easily identified by non-clinical personnel and indicatives of the occurrence of complications. These are:- key danger signs during pregnancy vaginal bleeding, Swollen hands/face and Blurred vision. key danger signs during labour and childbirth Severe vaginal bleeding, Prolonged labour (> 12 hours), Convulsions and Retained placenta(> 30 min). key danger signs during the postpartum Severe vaginal bleeding, Foul-smelling vaginal discharge and High fever.([20])

During pregnancy, the pregnant mother and her family needs to prepare for welcoming the newborn baby and overcoming any unexpected complications. This process is called birth Preparedness and Complication readiness which is the process of planning for birth and drafting the actions to be taken in case of any obstetric complications. A plan for birth and emergency preparedness includes the following elements: identifying and contacting a skilled birth attendant; identifying nearest appropriate health care facility; saving money for birth related and other related expenses; transport to a health facility for the birth and obstetric emergency; and identification of compatible blood donors in case of emergency.([21])

Most maternal deaths are avoidable, as the health-care solutions to prevent or manage complications are well known. All women need access to antenatal care in pregnancy, skilled care during childbirth, and care and support in the post partum period. It is particularly important that all births are attended by skilled health professionals, as timely management and treatment can make the difference between life and death.

However, the basic services that thought to be beneficial to reduce maternal mortality are not accessed by poor women in remote areas. This is especially true for regions with low numbers of skilled health workers, such as sub-Saharan Africa. While levels of antenatal care have increased in many parts of the world during the past decade, only 37% of women in low-income countries made the recommended four visits of antenatal care and 46% benefit from skilled care during childbirth.[10]

2.1.2 Maternal health service utilization

Promoting healthy behavior and increasing knowledge about pregnancy and pregnancy-related complications among women, families and communities are essential to the health and well-being of pregnant women. The immediate causes of pregnancy-related complications, ill-health and death are inadequate care of the mother during pregnancy and delivery. The elements of maternal healthcare services include antenatal, delivery, and postpartum care. However the utilization of these maternal health service is low in most developing countries[22]

Antenatal care

Antenatal care includes all care given to pregnant women during pregnancy - provides an important opportunity for discussion between a pregnant woman and a health care provider about healthy behavior during pregnancy (such as adequate nutrition), about recognizing complications that may arise during pregnancy, and about a delivery plan that will meet the needs of the individual woman. Antenatal care is important also for preventive care, including tetanus toxoid immunization and provision of iron/folic acid tablets to prevent and treat anaemia. Finally ANC is important for early diagnosis and prompt treatment for complications of pregnancy and other illness that can arise during pregnancy, such as sexually transmitted diseases (STDs), and others illness. WHO has recommended a minimum of four antenatal visits for woman with a normal pregnancy. However, some women will require more than four visits, especially those who develop complications [23].

Safe delivery utilization

Appropriate delivery care is important for both maternal and newborn health. More than 60 percent of maternal deaths take place in the period immediately following delivery, with more than half occurring within a day of delivery. The complications during childbirth can be sudden and unpredictable. Maternal and perinatal outcomes in such instances are greatly improved when such complications occur in presence of a trained attendant and in a facility well equipped to handle such emergencies. Skilled attendant at delivery is the most widely adopted process indicator that is closely correlated with maternal and perinatal mortalities. To monitor the progress towards maternal health, the Millennium Development Goals (MDGs) had set two indicators: maternal mortality ratio (MMR) and proportion of births attended by skilled health personnel.[24]

2.2. Determinants of maternal health service utilization

It is widely accepted that the use of maternal health services helps in reducing maternal morbidity and mortality. However, the utilisation of maternal health services is a complex phenomenon influenced by many factors. Various studies conducted worldwide [25]–[27] and in Ethiopia [28], [29] have recognized socio-economic and demographic characteristics of women, socio cultural make up of community, gender issues decision-making process, individual factors and service delivery environment as important determinants for the use of maternal health services.

2.2.1. Socio- demographic factors

A number of socio-demographic characteristics of the individual affect the underlying tendency to seek care. In this regard, good examples are maternal age and parity, educational attainment family income, which have been repeatedly examined as determinants of maternal health care use especially delivery service. The greater confidence and experience of the older and higher parity women, together with greater responsibilities within the household and for childcare, have been suggested as explanatory factors for their tendency to use services less frequently [30]–[32].

Maternal education is considered one of the strongest factors associated with receiving trained assistance at delivery. Studies done in Ethiopia, and Guatemala show that, women with at least 2ry education were more likely to have received delivery assistance from health professional [33], [34]. Other individual level factors which, affect utilization of maternal health service are lack of knowledge of importance of maternity health service and complications of pregnancy and childbirth,

perceived need for care and bad experience with health system. Study done in southern Laos showed knowledge about obstetric care as a determining factor for the use of maternal health services. As described by many studies the main reasons for not attending ANC were "Ignorance for the purposes of ANC", "Not having enough information about the purposes of ANC" and "not being satisfied with previous ANC"[35]–[37]

2.2.2. Socio cultural factors

Another important factor in the utilization of maternity care services, especially in Africa, is the cultural background of women. The cultural perspective on the use of maternal health services suggests that medical need is determined not only by the presence of physical disease but also by cultural perception of illness. In Tanzania, a study of women who died of pregnancy-related complications found that patient compliance to referral was only 44.4%. Mothers and their families followed strong cultural beliefs even when they were detrimental to the mother's health. [38], [39]. Another qualitative study done in Ethiopia revealed that women only seek skilled care during childbirth for complications if local or herbal, remedies and prayer are defeated.[40]

2.2.3. Gender role and women decision making power

Decision making power of women is one of the essential factors which have influence on maternal health care service utilization. Culturally in most households men are decision makers and in control of all resources, they decide when and where women should seek maternal health care. Thus, the low status of women prevents them from recognizing their concerns about health needs. A study done in Ethiopia showed that about five percent of women who did not seek antenatal care at all gave husband's disapproval as a reason for not utilizing the service [37].

2.2.4. Factors related to health institutions

Factors related to health service which affect the utilization of maternal health care includes access, cost of service, availability of drugs and other equipments, provider attitude or interaction and perceived quality of care. Coverage of health facilities especially in rural areas remains a big barrier. In most rural areas, one in three women lives more than five kilometres from the nearest health facility. Poor road infrastructure and lack of public transport make access difficult especially when there are complications. Walking is the primary mode of transportation, even for women in labour. As a result poor women will seek health care from less trained providers who are more accessible[29], [41], [42]

The quality of care that is perceived quality of care, plays in the decision to seek care is related to people's own assessment of service delivery, which largely depends on their own experiences with the health system and those of people they know. Many studies in developed and developing countries indicate health service barriers and women's perception of quality of ANC were important factors affecting women's attendance during pregnancy [43].

2.3. Community interventions for maternal and neonatal survival

Involving communities or participatory approaches (community mobilization, individual health education) is thought to be crucial in improving health equity, healthcare service delivery and uptake [44], and has been repeatedly recommended in international conferences and declarations [[45]–[48]. As evidenced by many researches community-based interventions can effectively tackle maternal, newborn and child health problems as decisions to seek and access health services are strongly influenced by socio-cultural norms [49]–[52].

Behavioral change communication (BCC) is part of an integrated, multilevel, interactive process with communities aimed at developing tailored messages and approaches using a variety of communication channels. BCC aims to foster positive behavior; promote and sustain individual, community, and societal behavior change and maintain appropriate behavior. BCC and community participation are known to play a key role in utilization of health services, by ensuring ownership and sustainability of health programs and interventions. BCC involves encouraging individuals and the community to take part in their health care and development .

  In the past interventions to improve maternal and neonatal health have focused mainly on quality improvement in service provision (antenatal care, skilled delivery care and emergency obstetric care). However, in countries like Ethiopia where most mothers deliver at home and the capacity of health services is severely stretched, the impact of interventions focusing on skilled attendance and improved obstetric care at facilities alone is likely be limited.

The rationale for using community-based interventions is based on the fact that many maternal and neonatal deaths occur at home, and could potentially be avoided by changes in antenatal and newborn care practice. Consolidation of the links between primary health care services and their users – a need spelt out in the Alma-Ata Declaration [45] – is an essential part of this process, and

14

involves both improving the quality of the services and creating a demand and awareness among the community to use them.

As described in section 2.1, reasons for under-use of existing services are complex, and in order to increase the uptake of services, not only must physical barriers to access be removed, but issues of service quality and community perceptions of service providers must be addressed.

2.3.1 Past experiences in community-based interventions

Studies in Bolivia, India, Nepal, Bangladesh, Ethiopia and Malawi have shown that it is possible to achieve significant reductions in mortality and also improve health seeking behaviour using cost-effective community-based interventions that reach the poorest people [53], [51], [54], [50], [55], [56]. These approaches emphasise the importance of active community participation in tackling health problems, rather than achieving high coverage of interventions in populations through more passive means.

An intervention to improve maternal and child health was conducted in a remote Bolivian province with limited access to modern medical facilities. The intervention focused on initiating and strengthening women's organizations, developing women's skills in problem identification and prioritization, and training community members in safe birthing techniques. Within three years, the intervention had achieved a substantial decrease in PMR, from 117 to 43.8 per thousand. However, this study lacked a control group and had relatively low power, so the quality of evidence it provides is limited.[54]

A study done in India in a poor rural population of 104,123 with little health system infrastructure, which worked with behavior change management documented more than 50% fall in perinatal mortality and improvement in care seeking behavior [52], suggesting that a participatory approach might have more effect on home care practices and might increase consultation in high risk pregnancies and for at-risk newborn infants. Another large cluster randomized controlled trial in Nepal suggested that participatory work with women's groups could reduce neonatal mortality by 30% [51]. On the other hand a randomised controlled trial in Sylhet district of Bangladesh and in Mchinji District of Malawi did not show any effects of community participation on the outcomes of interest (perinatal, neonatal and maternal mortality). [56]. However, in the Bangladesh study which has three study arm one of the study arm, that is home-care (in which trained female

community health workers identified pregnant women, made two antenatal home visits to promote birth and newborn-care preparedness, made postnatal home visits to assess newborns on the fi rst, third, and seventh days of birth, and referred or treated sick neonates,) showed a reduction in neonatal mortality by 34% (adjusted relative risk 0·66; 95% CI 0·47–0·93) during the last 6 months of the intervention period compared to the comparison arm.

In Ethiopia two trial studies were document in the area of community based intervention for the reduction of mortality among children. Both conducted in the Northern part of the country, Tigry region. One of the studies was about promotion of community-based IMCI activities in Ethiopia which showed some impact on infant mortality and other behavioural outcomes, though neonatal outcomes were not reported. [57]

A community-based approach to malaria management was the second trial in the region developed in Tigray, Ethiopia, in which mother coordinators were selected and trained to teach all mothers to recognise and treat the symptoms of malaria, this strategy was evaluated through a cluster randomised controlled trial. In this study a 40% reduction in under-five mortality was observed in intervention areas (95% CI 29·2–50·6, p<0·003).[53]

Several large trials specifically targeting neonatal health have now been conducted in Asian countries. Community-based, participatory intervention for maternal and child health improvement in a rural African settings are scare. Moreover the existing literatures on community based intervention to improve maternal and newborn health showed mixed results.

Therefore, this study was conducted to assess the effectiveness of community level behavior change communication for the improvement of maternal health service utilization in Southwest Ethiopia.

2.4. Conceptual framework of the study

According to Thaddeus and Maine the three delay model for maternal death, delay can occur at three different levels: (i) delay in decision to seek care, (ii) delay in reaching the appropriate facility and (iii) delay in receiving adequate care in the facility.[58] The reasons for the first delay may be late recognition of the problem, fear of the hospital or the costs or lack of an available decision maker. The second delay is usually caused by difficulty in transport and the third delay is often due to difficulty in getting blood supplies, equipment and operation theatre[59]

16

To address the determinant factors of maternal health service utilization, a simple conceptual framework was developed based on the literature review. The relation of different factors with utilization of maternal health services and the area of intervention is depicted in the following diagram.
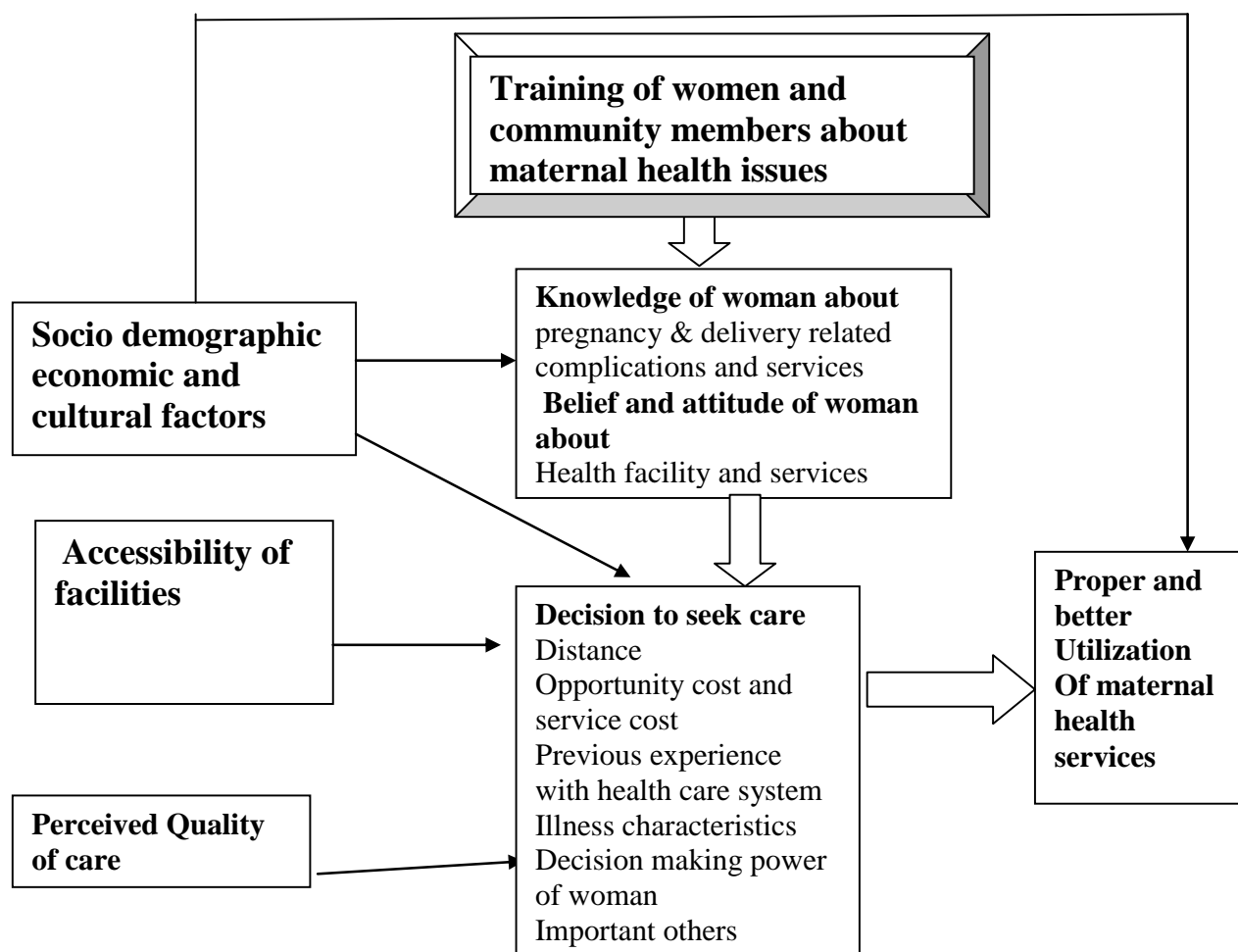
Figure 2-1Conceptual frame work of the study

Chapter 3 :   PURPOSE OF THE STUDY

Maternal mortality is a major public health issue and global priority agenda. Use of skilled birth attendant at delivery and use of other maternal health services are key strategies for the reduction of maternal mortality. The aim of this study is to test an intervention that enhances knowledge of community for better health care, in which locally selected volunteers build their knowledge and use their potential to enhance knowledge of community about maternal and new born health so that community members particularly women utilize the available maternal health services.

3.1. General Objective:

To assess the effect of community level Behavior Change Communication (BCC) using mothers' groups towards the utilization of maternal health care services in and around Gilgel gibe field research center, Jimma Zone, South west Ethiopia.

3.1.1 Specific objectives:

- To assess the effect of community based intervention using mothers' groups on knowledge of mothers about danger signs of pregnancy and child birth
- To assess the effect of community based intervention using mothers' groups on birth preparedness and complication readiness plan preparation of families
- To assess the effect of community based intervention using mothers' groups on Antenatal care service utilization
- To assess the effect of community based intervention using mothers' groups on institutional delivery service utilization

3.2. Hypothesis

Sustained positive behavior change will lead to increased knowledge about maternal and child health, service uptake for routine antenatal, institutional delivery, postnatal and neonatal care; increased care seeking at appropriate facilities for maternal and neonatal illness; reduced neonatal and maternal morbidity and mortality.

Chapter 4 : METHODS AND MATERIALS

4.1 Study area and settings

The study was conducted in Gilgel Gibe Health and Demographic Surveillance System site (GGHDSSs), Jimma Zone Oromia Regional state, South west Ethiopia. Oromia is one of the nine regional states that constitute the Federal Democratic Republic of Ethiopia. It extends from 30 40'N to 10035'N and from 34005'E to 43011'E. The study area lies between latitudes 7°42'50"N and 07°53'50"N and between longitudes 37°11'22"E and 37°20'36"E, at an altitude of 1,734–1,864 m above sea level. The main socio-economic activities of the local communities are mixed farming involving the cultivation of staple crops (maize, teff and sorghum), and cattle and small stock rising.

All the communities residing in the study villages belong to the Oromo ethnic group, which is one of the largest ethnic groups in Ethiopia. [60]

The health and demographic Surveillance system site was identified by Jimma University as a field research and learning setting for Community Based Education (CBE) by considering South-West Ethiopia's physical features, bio-social factors and the newly built dam. It is located in Jimma Zone of the Oromia Region about 260km south west of Addis Ababa and about 55 km north-east of Jimma.

The HDSSs comprises eight rural Kebeles (lowest administration unit) and two small towns which are located around the reservoir of the large hydroelectric dam. These kebeles are found in the four districts which border the dam – Omo-nada, Sekoru, Tiroafta and Kersa.

Since the establishment of the research center, population update and vital events (pregnancy observation and outcome, deaths, in and out migration) were registered by trained resident field enumerators using simple household update and event registration forms

The Population is 53,482, consisting of 10,452 households in the 57 Gotes (sub-divisions of Kebele). Each Gote is divided into smaller units called Geres (which consisted of on average 25 households).

In the field research center there are three health centers and eleven health posts which provide basic preventive and curative services.

The study was carried out in eight selected kebeles from the total eleven kebeles, with estimated total population of 43,427.

Each Health Post (HP) is staffed with two HEWs, and is responsible for a population of 3-5,000 persons. The HEWs are expected to spend less than 20% of their time in health posts, and more than 80% of their time is meant to be spent on community outreach programme visits to households, especially mothers and children. The HEWs provide 96 hours of training to households on the selected packages of HEP and follow the household's practices before certification and graduation of the household. HEWs also provide selected health care services, including family planning, EPI, OTP, clean delivery and essential newborn care services, diagnosis and treatment of malaria, diagnose and treatment of pneumonia, and management of diarrhoea and dehydration using ORS.

A HC has an average of 20 staff. It provides both preventive and curative services. It also serves as a referral centre and practical training institution for HEWs. The HC has an inpatient capacity of five beds. Rural HCs serve populations up to 25,000 persons; urban HCs serve up to 40,000 persons.([1])
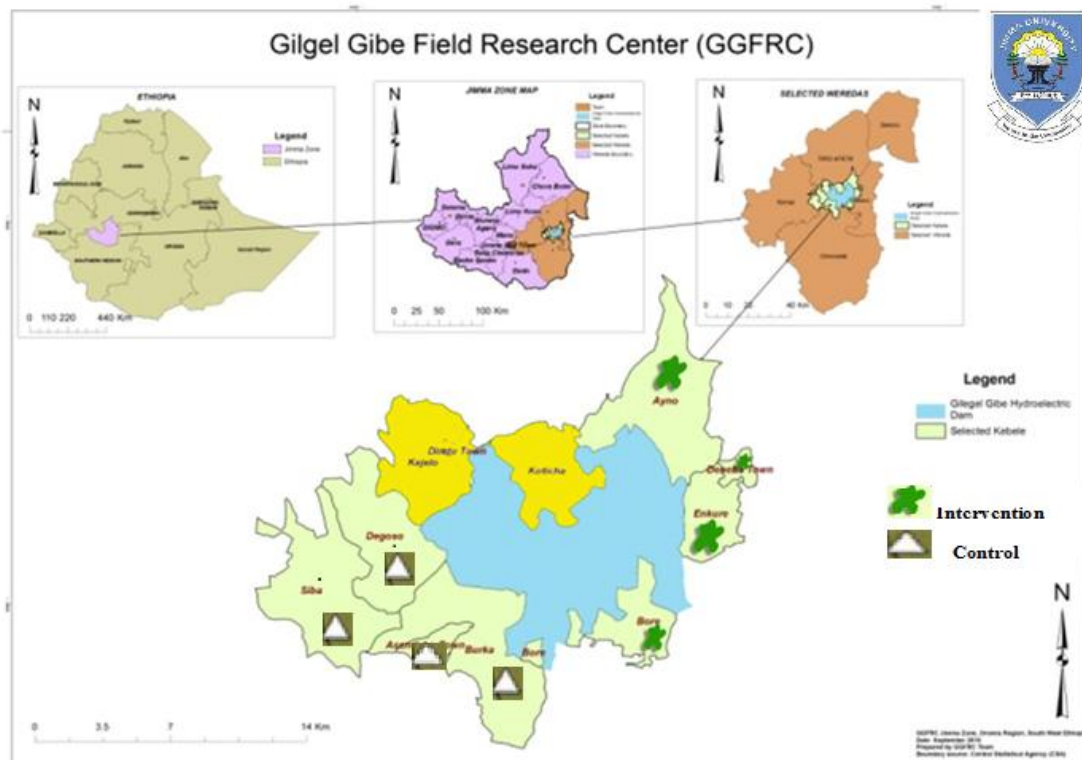
Figure 4-1Map of study Area

4.2. Research design

This quasi-experimental study, designed as pre-post comparison to see the effect of community level mothers group intervention on maternal health service utilization, knowledge about danger signs during pregnancy and childbirth and also birth preparedness plan.

Quasi experimental design is a type of evaluation which aims to determine whether a program or intervention has the intended effect on a study's participants. Quasi-experimental studies take on many forms. While a true experiment includes (i*)* pre-post test design, (ii) *a* treatment group and *a* control group, and (iii) random assignment of study participants, quasi-experimental studies lack one or more of these design elements.([61]). The main difference between a quasi-experimental study and a true experimental study is that in an experimental study, the participants are assigned to a treatment group or a control group by random assignment. While doing so will allow the research to get the best evidence of whether or not the intervention had the intended causal effect, However, random assignment is not always a practical step to take in the real world. In this particular study if adjacent kebeles assigned to intervention and control groups information contamination could not be control since they share common public place like market area. Since the most common form of a quasi-experimental study includes a pre-post test design with both a treatment group and a control group, quasi-experimental studies are often an impact evaluation that assigns members to the treatment group and control group by a method other than random assignment. In this particular study we used pre-post test design with control group.

4.2.1. Allocation of group to study arm

In the first stage eight kebeles selected. In the second stage, these kebeles were stratified into North and South according to the geographic direction and proximity to each other. One of the directions was selected as intervention site by simple random sampling technique.
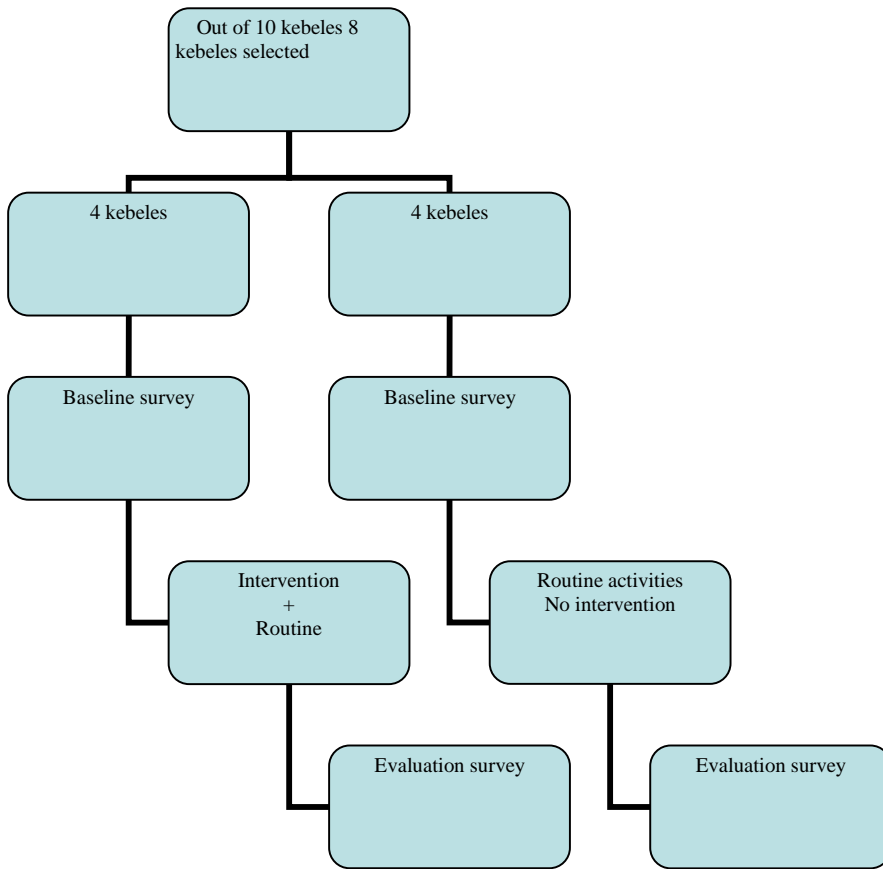
Figure 4-2 allocation of intervention

4.2.2. Reducing contamination

Contamination may occur when people from one kebele contact with people from another. In the rural villages there are many opportunities for social mixing. Friends, relatives or neighbours may mix socially, or contact may be made through travel or migration between intervention and control kebeles. There might be direct participation of residents from control areas in intervention activities, or more likely, informal discussion of ideas arising from intervention activities – control area residents may gain some benefit from hearing health messages received by intervention participants. The usual effect of this kind of contamination would be 'dilution' of the differences between treatment arms. To reduce information contamination the following measures were taken. Buffer zone created by the two kebeles which were not included in the study with 10, 053 total population and 25 km distance between the intervention and control sites. In the North direction the buffer zone created by the hydroelectric dam with a total area 62Km2. ([60])

4.3. Sampling and sampling techniques

Sample size: - the sample size for the study was calculated using STATCAL of EPI info software

Based on the following formula

$$n \text{ (for each group)} = [(Z_\alpha + Z_\beta)^2 * (P_1 (1 - P_1) + P_2 (1 - P_2)) /(P_2 - P_1)^2]$$

Where

- n = the number of individuals in each group needed for the evaluation survey
- P1= Proportion of mothers who delivered in health institution (9.2% from last 10K project Oromia region report, 2009) in the control group.
- P2= Proportion of health institution delivery was expected to increase by 75% in the intervention kebeles,
- Zα = the standard normal value at 5% level of significance and
- Z1-β = the standard normal value at 85% power

Based on the above parameters assumption, the sample size for each group was 589 women. Considering a 10% non-response rate the final sample size was calculated to be 648 in each group. A list of women in the age group of 15-49 years who had had at least one delivery was prepared from the census data of Gilgel Gibe field research center. A simple random sampling method was employed to obtain the desired number of individuals in each group.

4.4. Data collection methods

The study went through the following three phases: Preparatory; intervention and evaluation phase.

Preparatory phase: In this phase, baseline survey was carried out in the intervention and control group from July - September2011. The baseline survey included assessment of:

- Socio-economic status,
- Knowledge about danger signs during pregnancy and child birth,
- Birth preparedness and complication readiness plan,
- Utilization of maternal health services (ANC, delivery, PNC) and
- Health seeking behavior for maternal and neonatal health problems.

For the quantitative method, Affan Oromo (local language) version of structured questionnaire was used to interview women of child bearing age by trained enumerators. The data collectors are

employees of Jimma University who are collecting vital events in the study area. The questionnaire was adopted from other survey instruments such as Demographic and Health Survey of Ethiopia and conducted in the south east([11], [62])

Intervention phase: The intervention phase was carried out for 1 year and three months (from December 2011 to March 2013). The activities in this phase include:

Volunteers from the community had been recruited at first the following selection criteria were applied :- volunteers had to be female and married, they had to be able to read and write and are volunteers to do the work. The selection process was carried out with community members in a meeting. After recruitment intensive training was given for one week on the following topics,

Normal pregnancy, complications and danger signs (during pregnancy, birth, and the post natal period) birth preparedness, and the objective of antenatal care as well as the importance of skilled delivery care.

Post-training (intervention) activities

Female facilitators convened groups and help them to explore maternal health issues. Groups held monthly meeting to share experiences, discuss the issues raised. Pregnant women were especially encouraged to attend the women's groups, but the groups were open to all interested person in the community.

On group meeting key messages about danger signs of pregnancy and delivery, birth preparedness and complication readiness plan was given. Other activities performed by female facilitators

Motivating women and their families for early ANC attendance and to have birth plans. They promoted skilled birth attendants to be present at deliveries.

Evaluation phase:

Evaluation was carried out in intervention and control group from April to June 2013.The survey design was similar for the baseline and follow-up surveys. Interviewer administered survey question with the following areas was used: **Socio-demographic factors** (Age, Educational level, Marital status, Religion, Occupation, income, residence, husband's educational level, access to mass media). **Institutional factors** (cost of the service, accessibility, perceived quality). **Individual factors** (knowledge of dangers health problems related to pregnancy and delivery, attitude towards pregnancy,) . **Past obstetric History** (gravidity, parity, previous obstetric problem). **Service utilization** (ANC, place of delivery and postnatal care). Any illnesses during pregnancy, delivery or

the postpartum period; type of birth attendant; and, in case of an obstetric complication, was the woman referred to the district hospital. Information about the above listed variables was asked by the data collectors and recorded on the questionnaire.

4.5. Data management and statistical analysis

After data collection, each questionnaire was checked for completeness, cleaned, coded and entered in to a computer using EpiData 3.1. Final analysis was done using SPSS for windows version 16.0 statistical software packages and STATA version 10. Computer frequencies were used to check for missed variables and errors; any error identified at this time was corrected by revision of the original questionnaire. Frequencies and measures of variation were used to describe the study population in relation to socio-demographic and other relevant variables.

The primary outcomes measured in this evaluation are 1) knowledge of obstetric danger signs, 2) birth preparedness, and 3) use of antenatal services 4) use of delivery services and 5) birth outcome.

Knowledge of obstetric danger signs was measured by using women's unprompted responses to the questions, "Do you know any danger sign for a woman who is pregnant, who has begun labor and delivery, in the first week after delivery? If yes, which danger signs do you know?" Danger signs listed on the questionnaires. Those who mentioned three or more signs labeled as knowledgeable otherwise not.

Birth preparedness was measured by coding women's unprompted responses to the question, "Did you or your family make any preparations for the delivery and potential complications before your most recent birth? If yes, what type of preparations did you make?" The woman was coded as having made birth preparations if the women mentioned at least two of the following types of preparations: 1) identifying the nearest health care facility to which she could go if there were problems, 2) finding out how to arrange transportation if necessary to go to a health care facility, 3) saving money to pay for transportation and/or medical care, 4) decided who would go along to donate blood in case of complications.

Key indicators for use of ANC included any use of ANC services, timing of the first ANC visit, and total number of ANC visits during pregnancy. The location of the birth (home vs health facility) was used as an indicator of skilled birth attendance.

The wealth index was constructed using household assets and principal component analysis. Assets information was collected using structured questionnaire during the survey and covers information on household ownership of number of items ranging from television, radio, bicycle, motorbike, phone, refrigerator, and the possession of a farm. Wealth index was constructed into five quintiles, the lowest, second, middle, high and higher. These indicate the socio economic status the lowest, second, middle, high and higher respectively.

Statistical significance was assessed using the chi-square test, odds ratios and 95% confidence intervals, p values less than 0.05 used as cut off point for statistical significance. A logistic regression with Generalized Estimating Equation (GEE) model with an exchangeable correlation structure (that controlled for within-Kebele clustering) was used to estimate the effect of intervention on maternal health service use. The analysis included the following independent variables: time of survey (baseline/ final), group status(intervention/ control), interaction between time and intervention status. The model also controls for socio-economic and demographic characteristics of mothers, including: age, mother's education, residence and wealth status.

. In addition, the following covariates were included in the regression model: household socioeconomic status, women's age, parity, education, and residence. These variables were selected to be included to the model based on the previous studies.

4.6. Ethical considerations:

Ethical clearance was obtained from Jimma University college of Public Health and medical sciences Ethical committee. The protocol also granted ethical waiver by the LMU Ethical Commission. The respondents were informed about the objective and purpose of the study and consent was taken from each respondents. Also they were informed about their right of not to participate in the study or with drawing at the middle. Confidentiality of the information assured and collected anonymously.

.

Chapter 5 : FINDINGS

5.1. Demographic and socio-economic characteristics of respondents

Between July - September2011 baseline survey was conducted and a total of 1651 women were interviewed in both group (intervention=764 and control=887), except age at interview in which about 50% of women interviewed in the control group were less 30years statistically significant at p =0.002, most demographic characteristics were similar in both groups. The mean age of women in the study population was 29.6yrs with ($\pm$ SD 4.8yrs). Majority women were married, had no education and were housewife.. At the final assessment in 2013 a total of 1204 women were interviewed in both group (intervention=567 and control=637), except place of residence, where more women in the intervention area were from rural kebeles (80.1% Vs 72.2, p < 0.001). Other socio-demographic variables were similar in both groups. (Table 5.1). Given these differences, we adjusted for women's age, and residence in the final analyses.

Table 5-1: Socio-demographic Characteristics of Interviewed Women at Baseline and final , 2011 , 2013

Variables		Baseline			Post intervention		
		Control (N= 887)	Intervention (N=764)	P value	Control (N = 637)	Intervention (N=567)	P value
		%	%		%	%	
Age at interview	< 30 yrs	49,3	41,5	0.002	60.8	62.3	0.592
	>= 30yrs	50,7	58,5		39.2	37.7	
	Mean age	29 +4 yrs	30 +4,8 yrs		27.5+ 5.5 yrs	27.5 +5.2 yrs	
Educational status	Illiterate	83,9	83,8	0.409	74.4	79.4	0.116
	primary	13,5	14,5		19.8	16.4	
	secondary and above	2,6	1,7		5.8	4.2	
Occupational status	housewife	95,6	95,2		96.1	95.9	0.014
	others	4,4	4,8	0.666	3.9	4.1	
Mean household size			6,7				
Residential place	rural	77,0	79,8	0.162	72.2	80.1	0.001
	urban	23,0	20,2		27.8	19.9	
current marital status	in marital union	97,7	97,3	0.520	98.4	97.5	0.265
	not in marital union	2,3	2,7		1.6	2.5	

28

5.1.1. Principal Components Analysis for socioeconomic status

Principal components analysis of household assets was used to generate socioeconomic scores for each household in the study area at baseline. The distribution of these scores is shown in Figure 5.1 As can be seen in the figure, most values were clustered together in the lower range of scores.
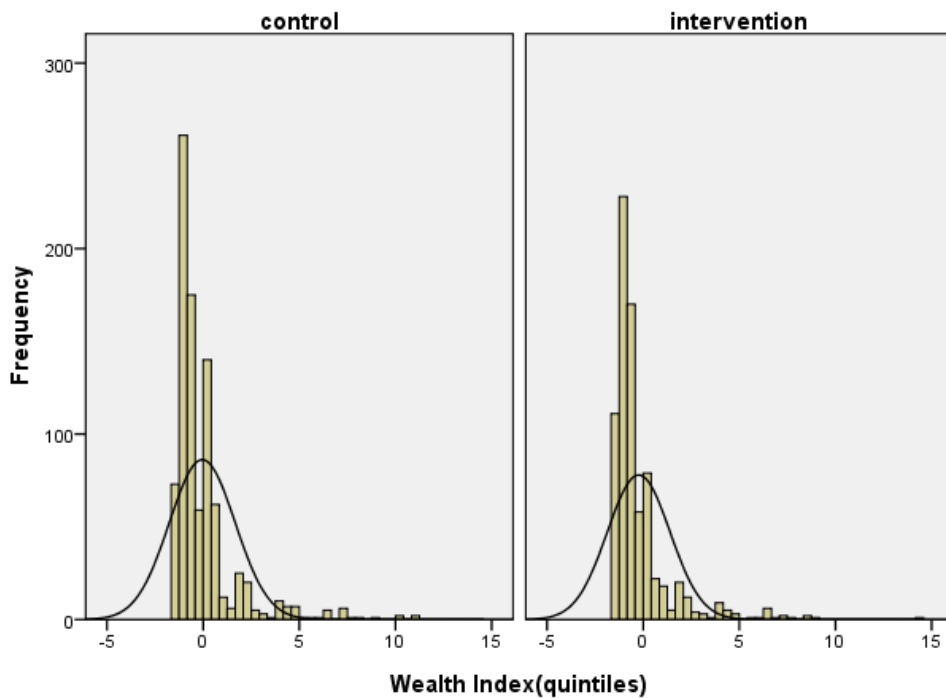
Figure 5-1: household socioeconomic scores by treatment arm, baseline 2011

Comparisons of socioeconomic by intervention allocation are described in Table 5.2, using 'baseline' data (collected between July and September 2011). This gives a picture of the characteristics of respondents in this population before the intervention started. Little difference was apparent between intervention and control areas at baseline. The mean household socioeconomic score was slightly higher in the control group as compared to intervention areas. In both groups, the median was a lot lower than the mean, reflecting the skewed nature of the data described earlier (Figure 5.1). Looking at the quintiles of socioeconomic scores, there were a slightly higher proportion of households in the poorest quintiles in the intervention group, whereas higher proportion of households in least poor quintiles found in the control area. The difference is statically significant at p value 0.001.

Table 5-2 Comparison of socioeconomic characteristics by intervention allocation for respondents at the baseline, Sep 2011

		Baseline		P value
		control	intervention	
		n(%)	n(%)	
Household socioeconomic score	Mean ($\pm$ SD)	-0.05($\pm$ 1.7)	-0.24($\pm$ 1.6)	
	Median	-0.53	-0.61	
Household socioeconomic quintiles	1 poorest	192 (21.6)	217 (28.4)	<0.001
	2	161 (18.2)	140 (18.3)	
	3	173 (19.5)	175 (22.9)	
	4	186 (21.0)	115 (15.1)	
	5 least poor	175 (19.7)	117 (15.3)	

5.2. Past obstetric history

Nearly three fourth, 916 (76.3%) of the respondents were married before the age of 18 years (398(70.4%) in the intervention and 518 (81.3%) in the control group. Most 991(82.3%) women had their first birth below the age of twenty years. No significant difference was observed between the groups. More than one-third 507(42.1%) of women were grand multi para.

Twenty-three (1.9%) of women had history of abortion 1.2% in the intervention and 2.5% in the control group. Eighty five (7.1%) of the respondent had a history of neonatal death 6% in the intervention and (7.8%) in the control group). Even though there is no statistical significant difference history of abortion and neonatal death were higher in the control area.(table 5.3)

Table 5-3: Past reproductive history of respondents by intervention arm, baseline and post intervention 2011 and 2013

Variables		Baseline			Post intervention		
		Control (N= 887)	Intervention (N= 764)	P-value	Control (N=637)	Intervention (N=567)	P value
		(%)	(%)		(%)	(%)	
Age at marriage	$\leq$ 18yrs	83.9	78.6		81.3	70.4	< 0.001
	> 18Yrs	16.1	21.4	0.01	18.7	29.6	
Age at first birth	$\leq$ 20yrs	85.3	82.2	0.08	82.6	82.0	
	> 20yrs	14.7	17.8		17.4	18.0	
parity	1- 4	43.1	38.4		58.9	56.7	
	5 & above	56.9	61.6	0.05	41.1	43.3	0.45
abortion experienced	Yes	3.2	5.9	0.007	2.5	1.2	0.11
	No	96.8	94.1		7.5	98.8	
any neonatal death experience	Yes	7.1	9.0		7.8	6.2	
	No	92.9	91.0	0.15	92.2	93.8	0.26

5.3. Knowledge about obstetric danger sings

Respondents in both surveys were asked whether they know any danger signs during pregnancy, labour and in the first postpartum week. And their spontaneous responses were recorded. Accordingly at baseline 36.4 and 28.3 percent of interviewed women in the control and intervention groups were knowledgeable about obstetric danger signs, respectively. In the final assessment as shown in fig 5.2, 58.6% of interviewed women in the intervention site and 44.4% in the control group were able to mention three and more signs that can occur during the three maternity periods(prenatal, natal and postpartum). Commonly mentioned danger signs were vaginal bleeding, severe headache and persistent vomiting from the prenatal period, heavy vaginal bleeding and prolonged labour from the natal period and high grade fever, heavy vaginal bleeding and offensive vaginal discharge from the post natal period.

Even though the two study areas were similar on most socio-demographic characteristics, we found that knowledge related to obstetric danger signs were significantly higher in the comparison, at the final assessment knowledge of obstetric danger signs was improved in both groups however. In the intervention area, there was significant change.
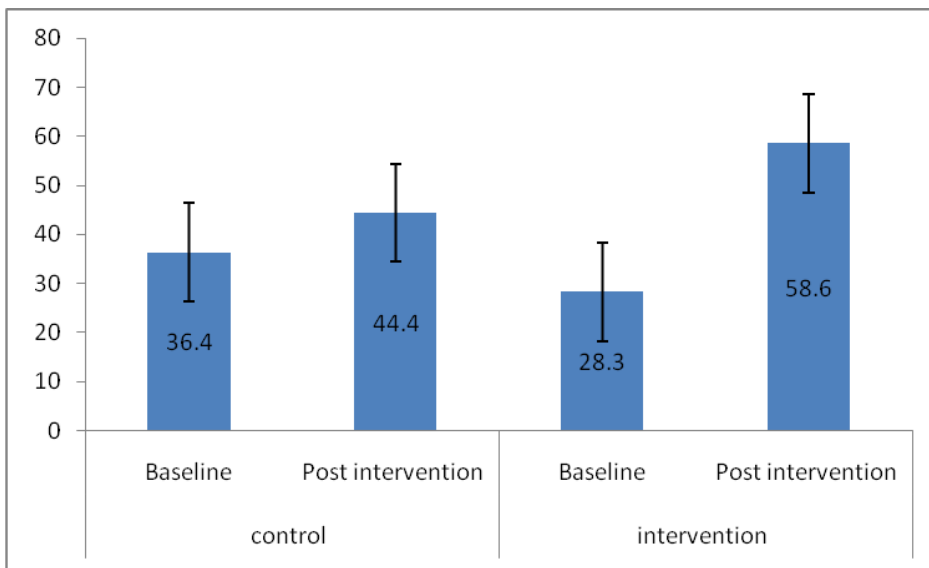
Figure 5-2: Proportion of women who were knowledgeable on obstetric danger signs, baseline and post
intervention 2011 and 2013

5.4. Birth preparedness and complication readiness plan

The percentages of women who reported making two or more of the specified birth preparations increased greatly in both areas over the study period (from 3.0% to 15.5% in the intervention area and from 2.8% to 13.7% in the control area). Arranging means of transport and setting aside some money were the most common practices among respondents (table 5.4).

Table 5-4: Birth preparedness and complication readiness practices baseline and post intervention

Variables		Baseline			Post intervention		
		Control (N=887)	Intervention (N=764)	P value	Control (N=637)	Intervention (N=567)	P value
		%	%		%	%	
Arranging transport	Yes	2.5	3.0	0.509	19.3	16.8	0.251
Set aside money	Yes	56.4	35.	0.001	34.4	44.3	0.001
Identify blood donor	Yes	1.0	0.5	0.260	4.6	3.5	0.369
identify skilled birth attendant	yes	2.0	1.7	0.625	13.8	14.6	0.683
Birth preparedness*	better prepared	2.8	3.0	0.817	13.7	15.5	0.360

* Those who mentioned 2 or more practices labeled as well prepared

5.5 Antenatal service utilization

In the baseline survey, the percentage of women who had a prenatal visit was 23.0% in the intervention group and 27.8% in the control group. After the intervention the percentage was increased to 41.4% in the intervention and 35.8% in the control. On the other hand, the percentage of women who had a prenatal visit during the first trimester was 20.5% in the intervention and 27.8% in the control group in 2011. In 2013, this percentage was increased to 31.1% in the intervention group and in the control group it reduced to 14% (P < 0.001). (Table 5.5)

5.6 Birth in the health facilities

In 2011, 9.6 percent of respondent gave birth at the health facility in the control group, which was significantly higher than the intervention group (4.6%) (P < 0.001). Then in 2013, survey institutional delivery increased in both groups. Around twelve percent and 15% of respondents in the intervention and control group respectively, delivered their last child in the health Facilities. Concerning birth attendants for home deliveries 96,6 % in the intervention group and 87,9% in the control group were attended by untrained birth attendants including neighbors and relatives.(table 5.5)

Table 5-5: Maternity care utilization in intervention and control groups GGHDSS Sep 2013.

Variables		Baseline			Post intervention		
		Control (N=887)	Intervention (N=764)	P value	Control (N=637)	Intervention (N=567)	P value
		%			%	%	
ANC follow up	Yes	27.7	23.0	.029	35.8	41.4	0.044
	No	72.3	77.0		64.2	58.6	
ANC Visit started	Early	27.8	20.5	.093	14.0	31.1	0.001
	Late	72.2	79.5		85.9	68.9	
place of delivery	Home	90.4	95.4	0.001	85.4	88.5	0.108
	Health Facility	9.6	4.6		14.6	11.5	

5.7. Reasons for not utilizing maternal health services

5.7.1 Reasons for not using Antenatal care

Fig 5.3 presents percentage distribution of women who did not seek maternal health care by various reasons. As can be seen not encountered health problems and lack of awareness appears to be the most important factors for not seeking ANC. Sixty three percent of women in the control and 32 percent in the intervention group thought that ANC is not necessary if health problems not encountered, 42.1 percent in the control and 23 percent in the intervention group reasoned to unawareness. Distance to health facility (16 and 13.2 percent in control and intervention group), no time to go (12 and 4 percent control and intervention group in) were also other reasons cited for not using ANC.
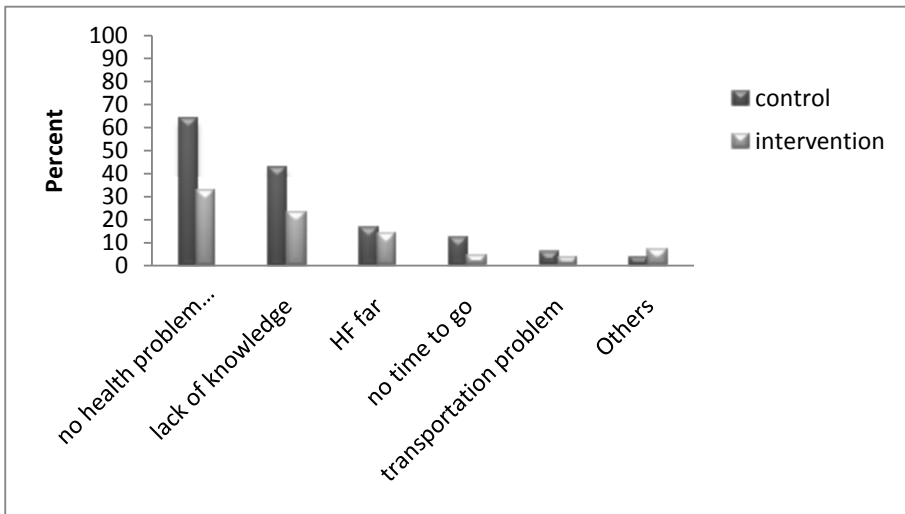
Figure 5-3: Reasons for not utilizing Antenatal care service GGHDSSs, Sep 2013

5.7.2. Reasons for not using Institutional delivery

In case of institutional delivery, 76 and 87 percent in the control and intervention group respectively reported that the labor was too short to go to health facilities. Other reasons mentioned were want to deliver with relatives nearby (17.8 percent in control and 8.8 percent in the intervention group), husband did not allow (16.4 percent in control and 14.3 percent in the intervention group).(fig 5.4)
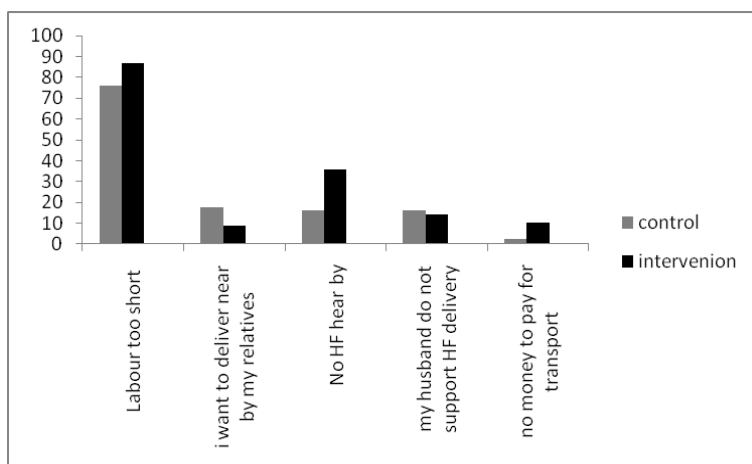
Figure 5-4: Reasons for Home delivery in GGHDSSs, Sep 2013

5.8. Impact of intervention on major outcome variables

A logistic regression with Generalized Estimating Equation (GEE) model with an exchangeable correlation structure (that controlled for within-Kebele clustering) was used to estimate the effect of intervention on maternal health service use. The analysis included the following independent variables: time of survey (baseline/ final), group status(intervention/ control), interaction between time and intervention status. The model also controls for socio-economic and demographic characteristics of mothers, including: age, mother's education, residence and wealth status.

The results demonstrate a statistically significant effect of the intervention on antenatal care utilization over time (OR (95% CI) = 1.69(1.27- 2.26)). Women in the intervention group were 30 percent more likely to utilize ANC service than the control group.

No statistically significant difference was observed over time between intervention and control groups regarding institutional delivery utilization (OR(95% CI) = 1.7(0.9, 3.2)) as well as birth preparedness and complication readiness plan (OR(95% CI) = 2.7(2.1, 3.7)) (Table 5.7).

The same trend was observed for women's knowledge about obstetric danger signs, over time the proportion of women who are knowledgeable about obstetric danger signs increases faster for the intervention group than for the control group (OR(95% CI) = 2.79(2.07, 3.7)). Significant increases in the indicators of the above variables over time in the intervention area persisted after statistically controlling the data for women's age, education, and residential area.(Table 5.6)

Table 5-6: logistic regression using GEE model for the impact of intervention on health service use

Variables	ANC visit (Yes)		place of delivery (HF)	
	OR	95% CI for OR	OR	95% CI for OR
Difference at baseline(treatment)	1.03	(0.19, 5.51)	0.53	(0.10, 2.77)
Change over time in control (time)	1.27	(1.05, 1.54)	1.44	(1.04, 1.99)
Additional change over time in intervention group (time*intervention)	**1.69**	**(1.27, 2.26)**	1.72	(0.91, 3.25)
correlation within cluster	0.2976		0.0901	

The OR "treatment" describes the difference between both groups at baseline. The OR related to "time" describes the change in Outcome between baseline and end of study for the control group. The OR related to "time*intervention" describes the excess of change in the intervention group compared to the control group regarding the change in outcome between baseline and end of study.

Table 5-7: The impact of intervention on mothers' birth preparedness and knowledge about danger sign

Variables	Well prepared for birth		Knowledgeable about obstetric danger sign	
	OR	95% CI for OR	OR	95% CI for OR
Treatment	0.92	(0.19, 4.50)	0.72	(0.27, 1.89)
Time	4.99	(2.53, 9.81)	1.27	(1.04, 1.55)
Time * intervention	1.28	(0.46, 3.53)	**2.79**	**(2.07, 3.76)**
Correlation within cluster	0.0311		0.1011	

The OR "treatment" describes the difference between both groups at baseline. The OR related to "time" describes the change in Outcome between baseline and end of study for the control group. The OR related to "time*intervention" describes the excess of change in the intervention group compared to the control group regarding the change in outcome between baseline and end of study.

Chapter 6 DISCUSSIONS

The fundamental question addressed in this thesis is whether community level behavioural change communication using women's group had an impact on maternal health care utilization, knowledge about danger signs, birth preparedness and complication readiness. And also whether the groups were primarily responsible for any differences observed between intervention and control areas, or whether other factors may have caused variability between study arms. This chapter will review the evidence for the first possibility, as well as exploring other explanatory factors.

The quasi experimental results demonstrated that the women's group intervention led to significant improvement in antenatal care attendance and knowledge about danger signs. However, no significant difference is observed between intervention and control groups with regards to delivery service utilization and birth preparedness.

The intervention had positive effects on mothers' knowledge about danger signs during pregnancy and childbirth; Awareness about health issues surrounding pregnancy can empower women to improve their health [63]. Approximately 15% of pregnant women who experience complications are at risk of developing poor, yet preventable, pregnancy outcomes [64] Enabling pregnant women to recognize early signs and symptoms of pregnancy complication is a primary step toward seeking timely obstetric care before the lives of mothers or their foetuses are endangered [65]–[67]. In this study women in the intervention group were three times more likely to be knowledgeable about obstetrics danger signs than their counter parts in the control group. The most key danger signs mention by women in both groups were vaginal bleeding, prolonged labour, high grade fever and offensive vaginal discharge. Within intervention group younger mothers, educated and urban residents were more knowledge than their counter parts. The finding of the study is similar with community based studies done in Mexico and Burma [68], [69]. In this study there were also improvements in knowledge about danger signs in the control area during the study period. These improvements may be due to safe motherhood campaigns of the Ethiopian Ministry of Health. The government of Ethiopia doing different intervention to achieve millennium development goals by reduce maternal mortality and improve the life of mothers.

The other maternal health indicator that showed a significant change in the intervention area was use of ANC services.

Antenatal care is one of the main pillars of the Safe Motherhood package [5], even though the exact margin of reduction in maternal mortality after antenatal care is not known, and a WHO systematic review of antenatal care trials found no evidence of reductions in perinatal mortality [70]. Some of the most important components of antenatal care are tetanus toxoid vaccination, iron-folate supplementation, detection and management of existing health problems like syphilis and malaria. The evidence is mixed, but a review of the components of antenatal care suggests that quality antenatal care within a functional health system can reduce the risk of maternal mortality and adverse pregnancy outcomes.[71]

At the final assessment when compared to the baseline assessment; the finding showed a significant change in use of any ANC accordingly 41.4 % women in the intervention group and 36% women in the control group had at least one ANC visit for their last pregnancy. The significant increases in ANC utilization over time in the intervention area persisted after statistically controlling for women's education, age, residence and occupation, in which women in the intervention area two times more likely to utilize the service than their counterparts. Other ANC indicators like first visits earlier in pregnancy also increased from 20.5% to 31.1% in the intervention area. This finding is almost similar with the finding of studies done in Eritrea and Bangladesh which used trained maternal health volunteers in rural community to test its effect on promotion of safe motherhood.[72], [73]

Antenatal care is more beneficial in preventing adverse pregnancy outcomes when received early in the pregnancy and continued through delivery. Early detection of problems in pregnancy leads to more timely referrals for women in high-risk categories or with complications. In this study about 14 % of women in the control and 31% of women in the intervention group started ANC follow up in the first trimester of their last pregnancy.

Use of health facility delivery service was one of the maternal health services assessed in this study, even though there was no statistically significant difference between intervention and control groups the proportion of women who used institutional delivery services for their last delivery has increased in both areas from 9.6% to 14.6% in the control area and 4.6% to 11.5% in the intervention area.

In Ethiopia about 10% of women delivered in health facilities, there is an increase in health facilities delivery from 5% in 2000 to 10% in 2011 with marked variation among regions ranging from 6% in Southern Nations Nationalities and Peoples' to 82% percent in Addis Ababa[11].

As compared to antennal care utilization institutional delivery service utilization is very low in most developing countries including Ethiopia. Reasons for not utilizing the service are multidimensional, Sudden onset of labour combined with absent transport facility or lack of money for transportation cost are very important factors contribution to low institutional delivery. Low decision making power of the women is also associated with lack of financial resources or income in the rural mothers which leaves them to the decision of their husbands or relatives, similar conditions are also observed in other regions of the country and other countries [11], [74]–[76] In Ethiopia social interactions are very close and important especially around child birth, so it is not an easy thing to ignore community members' opinion and this may require continuous interventions to change.

Birth-preparedness and complication readiness is a comprehensive strategy aimed at promoting the timely utilization of skilled maternal and neonatal health care. It helps ensure that women can reach professional care when labour begins and reduces the delay that occurs when women experience obstetric complications. [77]. In this particular study we have tried to assess birth preparedness and complication readiness practices among the respondents accordingly 15% women in the intervention and 13% in the control group reported that they have made some preparation before their most recent deliver. Even though the difference is not statistically significant the change is much higher in both groups from the baseline.

In Ethiopia many women prefer delivering at home in the company of known and trusted relatives and friends, where customs and traditions can be observed. Even though communities are aware of the dangers around childbirth, contingencies for potential complications are rarely discussed or made, such that most families hope or pray that things will turn out well. When things go wrong precious time is lost in finding resources and manpower to assist in the transfer to a health facility.

6.2. Strengths and limitations of the study
6.2.1 Strength

An important strength of this study is the use of a quasi-experimental study design that included a comparison area and pre- and post-intervention assessments to identify temporal relationship. Quasi experiments are studies that aim to evaluate interventions but that do not use randomization. Like randomized trials, quasi experiments aim to demonstrate causality between an intervention and an outcome.

When considering what type of design to employ in a study, it is important to consider both validity and practicality. In general, quasi experimental research is more feasible, to avoid information contamination as well as the typical time and logistical constraints. At the surface level, an easily identifiable weakness of employing quasi experimental research, in contrast to a true experiment, is the lack of random assignment. Without random assignment, internal validity is reduced, and causal claims become quite difficult to make[78].

On the other side, quasi experimental designs tend to present the situation under investigation in real-world conditions, increasing the external validity. In this particular study the use of control group and the pre and post intervention measurements provides a strong picture of the outcomes of interest.

In the assessment of intervention impact we used multiple data analysis approaches, generalized estimation equations analysis and logistic regression model to control for possible confounders.

Adequately large sample size was used during the pre and post intervention assessment which helped to maintain the statistical power in the analysis.

6.2.2. Limitations

Recall of behaviours such as number of visit or signs of illness may be particularly prone to error. The fact that neither women interviewed nor data collectors were blind to the study allocation meant that there was a possibility of 'best behaviour bias' or 'interviewer preference', where answers may have been influenced by knowledge of which study group the respondent was in. In order to reduce this, interviewers were instructed not to read out lists of possible answers, but wait for respondents to answer spontaneously. They also asked women to bring their health card, if available, which

contained information recorded by health workers at antenatal, delivery and postnatal visits, as well as visits for vaccinations.

In this study one has to also consider time because time is an important factor for an intervention to bring a change. This evaluation is done after one and half year of intervention which may contribute for small effect on some outcome variables and non for the others.

Chapter 7 : CONCLUSION

As described in chapter one in section 1.4, maternal mortality rate is high in Ethiopia (EDHS 2011). Some progress has been made in recent years in improving the survival of mothers and children, but greater efforts will need to be made to reach the Millennium Development Goal target of reducing maternal mortality by three quarters between 1990 and 2015. Women's groups in rural areas, that mobilised communities to tackle maternal and neonatal health problems, were chosen as a means to tackle maternal and child health issues at the point of greatest potential impact.

Since the 1970s, there has been increasing international recognition that communities can make deep and lasting contributions to their own health and well-being, and participatory community programs have been shown to result in significant improvements in maternal and newborn health in diverse settings around the world. Community participation and developing the capacity of women, their families, and communities to better care for themselves has been identified as a key strategy by the World Health Organization Making Pregnancy Safer Department

The findings in this study highlights that tailored community based intervention can successfully increased health behaviours that are known to prevent maternal mortality and birth complications. Women in the intervention area gained knowledge about birth danger signs, more than 50% of women in the intervention group were able to mention vaginal bleeding and severe headache as a key danger signs during prenatal period and about two third were able to mention prolonged labour and retained placenta as a key danger sign during labour and delivery.

As to the birth preparedness practice saving money and arranging means of transport were the most common practices reported by the respondents. Use of ANC services especially early ANC visits which gives ANC service providers more opportunities to counsel women about danger signs, increase birth preparedness, and encourage delivery with a skilled attendant, as well as identify risk factors like screening for sexually transmitted infection including HIV, and increased their use of skilled attendants for delivery, was the other important indicator measured in this evaluation and which showed greater improvement in the intervention area. In this evaluation study use of delivery service in the health institution did not show significant difference between intervention and control group even though the utilization rate increased from baseline to the final evaluation in both group.

The possible reason for this finding may be one thing the duration of intervention is very short in order to change behaviour especially culture practice around birth. Secondly infrastructure problem like lack of transportation plays a great role in utilization of delivery services. In most rural area people has to carry the labouring mother in order to reach a health facility this may not be practice unless a women faced a big problem during labour. This indicates the need to address road infrastructure problems in the long run and expanding maternity waiting homes near to where the women live.

This community based intervention tried to address the first delay in care seeking through local facilitators with women group. The intervention can be scaled up to the rest of the area. Additional including men groups as a key agent for the improvement of maternal health also need to be considered.

REFERENCES

[1] Ministry of Health Ethiopia, "Health sector Development Program (HSDP IV). MoH,." 2010.

[2] "Transitional Government of Ethiopia (TGE). National health policy, 1993. MoH, Addis Ababa." .

[3] MoFED, "Growth and Transformation Plan (GTP) 2010/11-2014/15." The Federal Democratic Republic of Ethiopia, 2010.

[4] UN, "women and Health." [Online]. Available: http://www.un.org/womenwatch/directory/women_and_health_3003.htm. [Accessed: 17-Apr-2014].

[5] "WHO | Mother-Baby Package: Implementing safe motherhood in countries," *WHO*. [Online]. Available: http://www.who.int/maternal_child_adolescent/documents/who_dhe_msm_9411/en/ . [Accessed: 06-Apr-2014].

[6] UN, "Programme of Action of the International Conference on Population and Development." [Online]. Available: http://www.un.org/popin/icpd/conference/offeng/poa.html. [Accessed: 17-Apr-2014].

[7] "Millennium Development Goals Report 2012," 2012. .

[8] "United Nations Rio+20 The Future We Want." [Online]. Available: http://www.un.org/en/sustainablefuture/. [Accessed: 17-Apr-2014].

[9] "WHO | Trends in maternal mortality: 1990 to 2013," *WHO*. [Online]. Available: http://www.who.int/reproductivehealth/publications/monitoring/9789241503631/en/ . [Accessed: 17-Apr-2014].

[10] WHO, "World health statistics 2014." 2014.

[11] Central Statistical Agency [Ethiopia] and ICF International, "Ethiopia Demographic and Health Survey 2011." Central Statistical Agency and ICF International., 2012.

[12] Ministry of Health Ethiopia (MoH)., "Health and Health related indicators. MoH, Planning and programming department, Addis Ababa." 2013.

[13] Andersen R.M, "Revisiting the Behavioral Model and Access to Health Care: does it Matter?," *J. Health Soc. Behav.*, vol. 36, no. 1, pp. 1–10, 1995.

[14] "Behavior Change Communication — MEASURE Evaluation." [Online]. Available: http://www.cpc.unc.edu/measure/prh/rh_indicators/crosscutting/bcc. [Accessed: 05-Mar-2015].

[15] Johns Hopkins center for communication program, "Social and Behavior Change Communication." health communication capacity collaborative.

[16] "WHO | The World Health Report 2005 - make every mother and child count," *WHO*. [Online]. Available: http://www.who.int/whr/2005/en/. [Accessed: 17-Apr-2014].

[17] "UNICEF - UNICEF Publications - Progress for Children: A World Fit for Children Statistical Review (No. 6)," *UNICEF*. [Online]. Available: http://www.unicef.org/publications/index_42117.html. [Accessed: 17-Apr-2014].

[18] "WHO | Neonatal mortality," *WHO*. [Online]. Available: http://www.who.int/gho/child_health/mortality/neonatal_text/en/. [Accessed: 17-Apr-2014].

[19] V. Combs Thorsen, J. Sundby, and A. Malata, "Piecing Together the Maternal Death Puzzle through Narratives: The Three Delays Model Revisited," *PLoS ONE*, vol. 7, no. 12, p. e52090, Dec. 2012.

[20] JHPIEGO., "Maternal and Neonatal health (MNH) Program: Birth preparedness and complication readiness. A matrix of shared responsibilities. Maternal and Neonatal Health." 2001.

[21] World Health Organization (WHO, "Birth and Emergency Preparedness in Antenatal Care: Integrated Management of Pregnancy and Childbirth (IMPAC). Geneva, Swaziland: WHO Department of Making Pregnancy Safer; 2006. OpenURL." .

[22] WHO, "WHO | Maternal mortality: Fact sheet N°348," *WHO*, May-2014. [Online]. Available: http://www.who.int/mediacentre/factsheets/fs348/en/. [Accessed: 04-Mar-2015].

[23] Coverage of mateWorld Health Organization. Division of Family and Reproductive Health, "Coverage of maternity care : a listing of available information." Geneva : World Health Organization, 1997.

[24] UNFPA, "Measuring access to reproductive health services. Summary Report of WHO/UNFPA Technical Consultation, Department of Reproductive Health and Research." World Health Organization, 2004, Geneva.

[25] C. Hanlon, G. Medhin, A. Alem, M. Araya, A. Abdulahi, M. Tomlinson, M. Hughes, V. Patel, M. Dewey, and M. Prince, "Sociocultural practices in Ethiopia: association with onset and persistence of postnatal common mental disorders," *Br. J. Psychiatry*, vol. 197, no. 6, pp. 468–475, Dec. 2010.

[26] M. A. Magadi, N. J. Madise, and R. N. Rodrigues, "Frequency and timing of antenatal care in Kenya: explaining the variations between women of different communities," *Soc. Sci. Med. 1982*, vol. 51, no. 4, pp. 551–561, Aug. 2000.

[27] T. R. Jat, N. Ng, and M. San Sebastian, "Factors affecting the use of maternal health services in Madhya Pradesh state of India: a multilevel analysis," *Int. J. Equity Health*, vol. 10, p. 59, Dec. 2011.

[28] K. Birmeta, Y. Dibaba, and D. Woldeyohannes, "Determinants of maternal health care utilization in Holeta town, central Ethiopia," *BMC Health Serv. Res.*, vol. 13, no. 1, p. 256, 2013.

[29] Y. Mekonnen and A. Mekonnen, "Factors influencing the use of maternal healthcare services in Ethiopia.," 2003.

[30] M. Kabir, Z. Iliyasu, I. S. Abubakar, and A. A. Sani, "Determinants of utilization of antenatal care services in Kumbotso village, Northern Nigeria," *Trop. Doct.*, vol. 35, no. 2, pp. 110–110, Apr. 2005.

[31] B. Simkhada, E. R. van Teijlingen, M. Porter, and P. Simkhada, "Factors affecting the utilization of antenatal care in developing countries: systematic review of the literature," *J. Adv. Nurs.*, vol. 61, no. 3, pp. 244–260, Feb. 2008.

[32] P. K. Singh, R. K. Rai, M. Alagarajan, and L. Singh, "Determinants of maternity care services utilization among married adolescents in rural India," *PloS One*, vol. 7, no. 2, p. e31666, 2012.

[33] Y. Mekonnen and A. Mekonnen, "Utilization of maternal health care services in Ethiopia.," 2002.

[34] D. A. Glei, N. Goldman, and G. Rodríguez, "Utilization of care during pregnancy in rural Guatemala: does obstetrical need matter?," *Soc. Sci. Med.*, vol. 57, no. 12, pp. 2447–2463, 2003.

[35] Y. Mekonnen and A. Mekonnen, "Utilization of maternal health care services in Ethiopia.," 2002.

[36] C. Phoxay, J. Okumura, Y. Nakamura, and S. Wakai, "Influence of women's knowledge on maternal health care utilization in southern Laos," *Asia. Pac. J. Public Health*, vol. 13, no. 1, pp. 13–19, 2001.

[37] Bahilu Tewodros, Abebe G/Mariam, and Yohannes Dibaba, "FACTORS AFFECTING ANTENATAL CARE UTILIZATION IN YEM SPECIAL WOREDA, SOUTHWESTERN ETHIOPIA," *Ethiop. J. Health Sci.*, vol. 19, no. 1, 2009.

[38] I. Addai, "Demographic and sociocultural factors influencing use of maternal health services in Ghana," *Afr. J. Reprod. Health*, vol. 2, no. 1, pp. 73–80, Apr. 1998.

[39] J. MacLeod and R. Rhode, "Retrospective follow-up of maternal deaths and their associated risk factors in a rural district of Tanzania," *Trop. Med. Int. Health*, vol. 3, no. 2, pp. 130–137, Feb. 1998.

[40] Charlotte Warren, "Care seeking for maternal health: challenges remain for poor women," *Ethiop J Health Dev*, vol. 24 Special Issue 1:100–104], no. Special issue 1, pp. 100 – 104, 2010.

[41] T. K. Sundari, "The Untold Story: How the Health Care Systems in Developing Countries Contribute to Maternal Mortality," *Int. J. Health Serv.*, vol. 22, no. 3, pp. 513–528, Jan. 1992.

[42] B. R. Ganatra, K. J. Coyaji, and V. N. Rao, "Too far, too little, too late: a community-based case-control study of maternal mortality in rural west Maharashtra, India.," *Bull. World Health Organ.*, vol. 76, no. 6, pp. 591–598, 1998.

[43] C. AbouZahr and T. Wardlaw, *Antenatal care in developing countries: promises, achievements and missed opportunities-an analysis of trends, levels and differentials, 1990-2001*. World Health Organization, 2003.

[44] A. K. Draper, G. Hewitt, and S. Rifkin, "Chasing the dragon: developing indicators for the assessment of community participation in health programmes," *Soc. Sci. Med.*, vol. 71, no. 6, pp. 1102–1109, 2010.

[45] WHO and UNICEF, "Primary health care: report of the International Conference on Primary Health Care, Alma-Ata, USSR, 6-12 September 1978/jointly sponsored by the World Health Organization and the United Nations Children's Fund," 1978.

[46] "WHO | The Ottawa Charter for Health Promotion," *WHO*. [Online]. Available: http://www.who.int/healthpromotion/conferences/previous/ottawa/en/. [Accessed: 24-Apr-2014].

[47] "WHO | 'Primary Health Care: Now More Than Ever,'" *WHO*. [Online]. Available: http://www.who.int/whr/2008/summary/en/. [Accessed: 24-Apr-2014].

[48] "WHO | Rio Political Declaration on Social Determinants of Health," *WHO*. [Online]. Available: http://www.who.int/sdhconference/declaration/en/. [Accessed: 24-Apr-2014].

[49] E. Kidney, H. R. Winter, K. S. Khan, A. M. Gülmezoglu, C. A. Meads, J. J. Deeks, and C. MacArthur, "Systematic review of effect of community-level interventions to reduce maternal mortality," *BMC Pregnancy Childbirth*, vol. 9, no. 1, p. 2, 2009.

[50] P. Tripathy, N. Nair, S. Barnett, R. Mahapatra, J. Borghi, S. Rath, S. Rath, R. Gope, D. Mahto, and R. Sinha, "Effect of a participatory intervention with women's groups on birth outcomes and maternal depression in Jharkhand and Orissa, India: a cluster-randomised controlled trial," *The Lancet*, vol. 375, no. 9721, pp. 1182–1192, 2010.

[51] D. S. Manandhar, D. Osrin, B. P. Shrestha, N. Mesko, J. Morrison, K. M. Tumbahangphe, S. Tamang, S. Thapa, D. Shrestha, B. Thapa, J. R. Shrestha, A. Wade, J. Borghi, H. Standing, M. Manandhar, A. M. de L. Costello, and Members of the MIRA Makwanpur trial team, "Effect of a participatory intervention with women's groups on birth outcomes in Nepal: cluster-randomised controlled trial," *Lancet*, vol. 364, no. 9438, pp. 970–979, Sep. 2004.

[52] V. Kumar, S. Mohanty, A. Kumar, R. P. Misra, M. Santosham, S. Awasthi, A. H. Baqui, P. Singh, V. Singh, R. C. Ahuja, J. V. Singh, G. K. Malik, S. Ahmed, R. E. Black, M. Bhandari, G. L. Darmstadt, and Saksham Study Group, "Effect of community-based behaviour change management on neonatal mortality in Shivgarh, Uttar Pradesh, India: a cluster-randomised controlled trial," *Lancet*, vol. 372, no. 9644, pp. 1151–1162, Sep. 2008.

[53] G. Kidane and R. H. Morrow, "Teaching mothers to provide home treatment of malaria in Tigray, Ethiopia: a randomised trial," *The lancet*, vol. 356, no. 9229, pp. 550–555, 2000.

[54] K. O'Rourke, L. Howard-Grabman, and G. Seoane, "Impact of community organization of women on perinatal outcomes in rural Bolivia," *Rev. Panam. Salud Pública*, vol. 3, no. 1, pp. 9–14, 1998.

[55] A. T. Bang, R. A. Bang, S. B. Baitule, M. H. Reddy, and M. D. Deshmukh, "Effect of home-based neonatal care and management of sepsis on neonatal mortality: field trial in rural India," *The Lancet*, vol. 354, no. 9194, pp. 1955–1961, 1999.

[56] A. H. Baqui, S. El-Arifeen, G. L. Darmstadt, S. Ahmed, E. K. Williams, H. R. Seraji, I. Mannan, S. M. Rahman, R. Shah, and S. K. Saha, "Effect of community-based newborn-care intervention package implemented through two service-delivery strategies in Sylhet district, Bangladesh: a cluster-randomised controlled trial," *The Lancet*, vol. 371, no. 9628, pp. 1936–1944, 2008.

[57] M. Ali, T. Asefaw, P. Byass, H. Beyene, and F. K. Pedersen, "Helping northern Ethiopian communities reduce childhood mortality: population-based intervention trial," *Bull. World Health Organ.*, vol. 83, no. 1, pp. 27–33, 2005.

[58] S. Thaddeus and D. Maine, "Too far to walk: maternal mortality in context," *Soc. Sci. Med.*, vol. 38, no. 8, pp. 1091–1110, 1994.

[59] L. Weil, J. C. Javet, A. Rebold, and F. Donnay, "Maternal mortality update 2002: a focus on emergency obstetric care.," 2003.

[60] D. Yewhalaw, W. Legesse, W. V. Bortel, S. Gebre-Selassie, H. Kloos, L. Duchateau, and N. Speybroeck, "Malaria and water resource development: the case of Gilgel-Gibe hydroelectric dam in Ethiopia," *Malar. J.*, vol. 8, no. 1, p. 21, Jan. 2009.

[61] "Quasi-Experimental Study." .

[62] M. Abera, A. Gebremariam, and T. Belachew, "Predictors of Safe Delivery Service Utilization in Arsi Zone, South-East Ethiopia," *Ethiop. J. Health Sci.*, vol. 21, no. Suppl 1, pp. 95–106, Aug. 2011.

[63] Q. Zhao, A. Kulane, Y. Gao, and B. Xu, "Knowledge and attitude on maternal health care among rural-to-urban migrant women in Shanghai, China," *BMC Womens Health*, vol. 9, no. 1, p. 5, Mar. 2009.

[64] F. W. J. Anderson, S. I. Naik, S. A. Feresu, B. Gebrian, M. Karki, and S. D. Harlow, "Perceptions of pregnancy complications in Haiti," *Int. J. Gynaecol. Obstet. Off. Organ Int. Fed. Gynaecol. Obstet.*, vol. 100, no. 2, pp. 116–123, Feb. 2008.

[65] A. L. Nelson and A. Rezvan, "A pilot study of women's knowledge of pregnancy health risks: implications for contraception," *Contraception*, vol. 85, no. 1, pp. 78–82, Jan. 2012.

[66] K. M. Perreira, P. E. Bailey, E. de Bocaletti, E. Hurtado, S. Recinos de Villagrán, and J. Matute, "Increasing awareness of danger signs in pregnancy through community- and clinic-based education in Guatemala," *Matern. Child Health J.*, vol. 6, no. 1, pp. 19–28, Mar. 2002.

[67] A. B. Pembe, D. P. Urassa, A. Carlstedt, G. Lindmark, L. Nystrom, and E. Darj, "Rural Tanzanian women's awareness of danger signs of obstetric complications," *BMC Pregnancy Childbirth*, vol. 9, p. 12, Mar. 2009.

[68] L. C. Mullany, T. J. Lee, L. Yone, C. I. Lee, K. C. Teela, P. Paw, E. K. Shwe Oo, C. Maung, H. Kuiper, N. F. Masenior, and C. Beyrer, "Impact of Community-Based Maternal Health Workers on Coverage of Essential Maternal Health Interventions among Internally Displaced Communities in Eastern Burma: The MOM Project," *PLoS Med*, vol. 7, no. 8, p. e1000317, Aug. 2010.

[69] E. Rodríguez-Angulo, G. Andueza-Pech, L. Rosado-Alcocer, E. Ortiz-Panozo, and B. Hernández-Prado, "[Effect of a community-based intervention to improve the knowledge on the warning signs of maternal complications among Mayan women from Yucatan randomized controlled trial]," *Rev. Investig. Clínica Organo Hosp. Enfermedades Nutr.*, vol. 64, no. 2, pp. 154–163, Apr. 2012.

[70] G. Carroli, J. Villar, G. Piaggio, D. Khan-Neelofur, M. Gülmezoglu, M. Mugford, P. Lumbiganon, U. Farnot, P. Bersgjø, and WHO Antenatal Care Trial Research Group, "WHO systematic review of randomised controlled trials of routine antenatal care," *Lancet*, vol. 357, no. 9268, pp. 1565–1570, May 2001.

[71] M. McDonagh, "Is antenatal care effective in reducing maternal morbidity and mortality?," *Health Policy Plan.*, vol. 11, no. 1, pp. 1–15, 1996.

[72] J. M. Turan, M. Tesfagiorghis, and M. L. Polan, "Evaluation of a community intervention for promotion of safe motherhood in Eritrea," *J. Midwifery Womens Health*, vol. 56, no. 1, pp. 8–17, Feb. 2011.

[73] Z. Quayyum, M. N. U. Khan, T. Quayyum, H. E. Nasreen, M. Chowdhury, and T. Ensor, "'Can community level interventions have an impact on equity and utilization of maternal health care'–Evidence from rural Bangladesh," *Int. J. Equity Health*, vol. 12, no. 1, p. 22, 2013.

[74] A. Amano, A. Gebeyehu, and Z. Birhanu, "Institutional delivery service utilization in Munisa Woreda, South East Ethiopia: a community based cross-sectional study," *BMC Pregnancy Childbirth*, vol. 12, no. 1, p. 105, Oct. 2012.

[75] A. A. Fikre and M. Demissie, "Prevalence of institutional delivery and associated factors in Dodota Woreda (district), Oromia regional state, Ethiopia," *Reprod. Health*, vol. 9, no. 1, p. 33, Dec. 2012.

[76] S. Hounton, G. Chapman, J. Menten, V. De Brouwere, T. Ensor, I. Sombié, N. Meda, and C. Ronsmans, "Accessibility and utilisation of delivery care within a Skilled Care Initiative in rural Burkina Faso," *Trop. Med. Int. Health*, vol. 13, pp. 44–52, Jul. 2008.

[77] R. C. Del Barco, "Monitoring birth preparedness and complication readiness. Tools and indicators for maternal and newborn health.," 2004.

[78] J. M. Prater, "An Analysis of Selected Statistical Techniques Utilized in Quasi-Experimental Designs.," Nov. 1983.

Annex 1: Ethical clearance

Ref. No RPGc|495|2011

Date 16|02|2011

To: Muluemebet Abera

College of Public Health and Medical Sciences

Subject: *Outcome of Ethical Review of Your Research Plan*

This is to acknowledge that the research proposal entitled *"The Effect of Community Level Behavior Change Communication on Maternal Health Care Utilization in Southwest Ethiopia: Randomized Cluster Controlled Trial"* has been reviewed by the ethical clearance board of JimmaUniversity.

According to the standardized principle and a procedure which is designed in line with the national and **WHO** guidelines.

With pleasure we inform you that the project is ethically approved and thus you are requested to implement the research plan as per the approved protocol.

Sincerely,

Dr. Beyene Wondafrash

Health Research and Post Graduate

Coordinator

CC:
- Ethical Review Board
  Jimma University

Annex 2: Informed Consent

Project title: The effect of Community level Behavior Change Communication on Maternal Health care utilization in Southwest Ethiopia:

This informed consent has two parts:

Informed sheet, and Certificate of Consent

Read and give a copy of the full informed consent form to the respondent.

Part I – Statement

Introduction:

Hello! My name is _____and I am working at Jimma University. We are doing a study to see the effect of community level information provision on the utilization of maternal health services in your community.

Purpose of the research

Maternal mortality is a major public health issue. Use of skilled birth attendant at delivery and use of other maternal health services are key strategies for the reduction of maternal mortality. The aim of this study is to test an intervention that enhances knowledge of community for better health care. The study will be carried out for 3 years. After this survey, selected women in some villages will be trained about maternal health issues.

In the final year, we will check how well the training has helped to increase maternal health services utilization in your community by comparing to other community that did not receive training. The information obtained in this survey will be useful to prepare the training about maternal health issues

Procedures

We invite you to help us with the study by taking part in this survey as the information you provide us will contribute a lot in preventing maternal and child mortality and morbidity. If you are willing to participate in the study, I will proceed with the interview and administer questions that help to answer the study questions. If you do not wish to answer any of the questions included in the study, you may skip them and move to next question. You have the right not to participate or withdraw from the study anytime. The recorded information will be kept confidential and no one else other than investigators could access it.

Risks and Discomfort

There might be slight discomfort to share some personal information. However, we do not wish this to happen and you may refuse to answer any of the questions if you feel uncomfortable.

Benefits

Your participation will help us to find out more about maternal and new born health issue in the community and to give training to mothers in your villages. If our study shows that the training is helpful in improving maternal and new born health by increasing proper use of maternal health services, we will be able to better improve maternal health in other villages in this area and other part of the country.

Incentives

We will not pay you for taking part in this study. However, we will thank you for your participation.

Confidentiality

The information that we collect in this study will be kept confidential. Any paper containing your name which will need to be kept for us to contact you will be kept under lock and will not be given to anyone except the investigators.

Right to refuse or withdraw

You do not have to take part in this research if you do not wish to do so, and refusing to participate will not affect your future treatment at the health facility or elsewhere in any way. You may stop participating in the interview at any time.

Who to contact

If you have any questions you may ask now or later. If you wish to ask questions later, you may contact: Muluemebet Abera, Jimma University, Telephone: 0913398880.

Part II – Certificate of consent for respondents participating in household survey

I have been requested to take part in the research and read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions I have been asked have been answered to my satisfaction. I consent voluntarily to be a participant in this study and understand that I have the right to withdraw from the interview at any time without in anyway affecting my right.

Print name of data collector, date and signature of Data collector

_____, ____/____/____ (dd/mm/yy)

Annex 3: household   Survey Questionnaire

developed to collect baseline data for the project entitled effect of community level

behavior change communication using volunteers on the utilization of maternal

health services in south west Ethiopia: cluster randomized control trial

PART I: General Information

01. Name of Woreda: _____

02.Name of Kebele: _____

03. Name of Gote _____

04. Name of Gere _____

05. House number _____

06**.** Family Id _____

07. Individual Id _____

08. Date of interview: _____time interview started _____ ended at _____

09. Respondent available on: 1. 1st visit.

                                    2. 2nd visit.

                                    3.   3rd visit.

10. Status of interview: 1. Completed. 2. Partially completed (refused in the middle).

                            3. Refused: 4. Candidate was absent in 3 visits:

11. Interviewer's name: _____ Signature: _____

12. Supervisor who checked questionnaire for completeness and accuracy:

  Name: _____ Signature: _____ Date: _____

PART I: SOCIO-DEMOGRAPHIC CHARACTERISTICS OF RESPONDENT

Ser.No.	Questions	Responses	Skip to	Coding
101	Age in complete year	_____ Years		
102	What is your ethnicity?	1.Oromo　　　　　2.Amhara 3. Gurage　　　　　4. Tigrie 5.Other (specify)_____		
103	What is your religion?	1.Orthodox　　　　　2.Muslim 3.Catholic　　　　　4.Protestant 5.Other (specify) _____		
104	What is the highest education level you have attained?	1.Illiterate　　2.Only read and write (no formal education) 3.Grade 1-4　　4. grade 5-8 5. Grade 9-10　　6. 11 – 12 grade 7. Above 12th grade		
105	What is your occupation?	1. Housewife　　　　　2. Farmer 3. Governmental employee　　4. Merchant 5. Housemaid　　　　6.Other (specify)		
106	What is your marital status?	1.Not ever married 2. Married 3.Divorced 4.Separated 5.Widowed 6.Other (specify) _____	Q 110	
107	Your husband's age in complete years	_____		
108	Your husband's occupation	1. Governmental employee　　2. Merchant 3. Farmer　　　　　　4. Other (specify)		
109	Your husband's educational status	1.Illiterate　　　2.Only read and write (no formal education) 3.Grade 1-4　　4.grade 5-8 5. Grade 9-10　　6. Above 10 – 12 grade 7.above 12th grade		
110	Family size	_____		
111	Do you have radio/TV in your house?	1. Yes 2. No	201	
112	If yes to Q 114, do you listen to the radio?	1. Yes 2. No		
113	Do you have other thing other than listed above to listen health information	1. Yes 2. No		

PART II: REPRODUCTIVE HISTORY OF RESPONDENT

Ser. No.	Questions	Responses	skip	Coding
	Now I would like to ask you some questions about your reproductive life.			
201	What was your age when you were first married?	1. _____ Yrs 2. I don't remember		
202	What was your age at your first pregnancy?	1. _____ Yrs 2. I don't remember		
203	Number of pregnancies			
204	Number of children born alive	Female _____ male _____		
205	Number of still birth	Female _____ male _____		
206	Number of abortion			
207	How many of them were delivered at home?	1. Live birth number_____ 2. Still birth number ____		
208	How many of them were delivered in health institution?	1. Live birth number_____ 2. Still birth number _____		
209	Have you experienced death of neonate (age less than seven days)?	1. Yes 2. No 3. I don't remember		
210	If yes to Q, 210 how many times?	_____		
211	If yes to Q 210, where was the neonate born?	1. Home 2. Health institution 3. Other (specify) _____		
212	How many times have you given birth to a child in the past five years?	_____		
213	When was your last child born?	_____/_____ Month year		
214	Where does the last baby belong in you birth order?	_____		

PART III MATERNAL HEALTH SERVICE UTILIZATION

Ser. No.	Questions	Response	Skip to	Coding
301	Is your last pregnancy planned?	1. Yes 2. No		
301.1	If not planned	1. Do not want at all 2. Wanted after ---------- yrs		
302	What was your feeling when you recognized your last pregnancy?	1. Happiness 2. Sadness 3. Nothing Other (specify)_____		
303	Did you face any health problem in the last pregnancy	1. Yes 2. No		
304	If yes to Q 303, what were they? (*Do not read the choices*)	1. Vaginal bleeding 2. Sever head ache 3. Face/ hand swelling 4. Persistent vomiting 5. Hypertension 6. Fit Other (specify)_____		
305	Did you visit a health facility during the last pregnancy?	1. Yes 2. No		
306	If yes to Q305, reason for visit	1. Pregnancy related health problem 2. Health problems not related to pregnancy 3. For antenatal care Other (specify) --------------------------		
307	Did you receive any antenatal care during the last pregnancy?	1. Yes 2. No ⟶	323	
308	If you did not attend antenatal care, can you tell me the reasons? (Multiple answer is possible) **(Do not read the choice)**	1. No or little Knowledge about ANC 2. No health problem encountered 3. Health institution is too far from my home 4. Expense to ANC is unaffordable. 5. long waiting time 6. Poor handling by health care providers 7. Lack of transportation 8. Lack of time to go to health institution 9. Other (specify)----------------------		
309	If yes to Q 307, at what gestational age did you start pregnancy check up?	1. One to three months 2. Four to six months 3. Seven to nine months 4. I don't remember		
310	How many times did you go for pregnancy check up?	1. One time 2. Two times 3. Three times 4. More than three times 5. Don't remember		
311	To which institution did you go for Antenatal care service?	1. Hospital 2. Health center 3. Health station 4. Other (specify) _____		
312	Why did you prefer this institution?	1. Close to my house 2. Competent health worker 3. Fair price Other (specify) _____		
313	Who provided you antenatal care in the last pregnancy?	1. Trained traditional birth attendant 2. Untrained traditional birth attendant 3. Health professional 4. Other (specify)_____		

Part III continued				
Ser. No.	**Questions**	**Response**	**Skip to**	**Coding**
314	Was health education given during each visit?	1. Yes, always 2. Yes, sometimes 3. Not at all 4. Don't remember		
315	If yes to Q 313, were you informed about danger signs related to pregnancy	1.Yes 2. No 3. Don't remember		
316	If Yes to Q 314, Which danger signs were you informed about? (Don't read the choices)	1. Vaginal bleeding 2. Sever head ache 3. Face/ hand swelling 4. Persistent vomiting 5. Hypertension 6. Other (specify)_____		
317	Were you informed where to during these problems	1. Yes 2. No 3. Do not remember		
318	Where you informed about where to deliver your baby?	1. Yes 2. No		
319	If yes to Q 318, where were you recommended to deliver?	1. Home 2. Health facility 3. Other (specify) _____		
320	Were you informed about who should attend you during delivery?	1. Yes 2. No	322	
321	If yes to Q 320, who was recommended to attend your delivery?	1. Trained traditional birth attendant 2. Relative 3. Health professional 4. Other (specify)_____		
322	Were you informed to prepare the following items before your delivery date	1. Transport 2. Save money 3. Identify blood donor 4. nothing		
323	Were you given an injection in the arm to prevent you getting tetanus (USE LOCAL TERM FOR TETANUS)?	1. Yes 2. No ⎯⎯⎯⎯⎯⎯⎯	►326	
324	If yes to Q 323, how many times?	_____		

325	Do you have the card
	(From the card register date of injection)
		1. TT_1 ____/____/_____
		    Date month year
		2. TT_2 ____/____/_____
		    Date month year
		3. TT_3 ____/____/_____
		    Date month year
		4. TT_4 ____/____/_____
		    Date month year
		5. TT_5 ____/____/_____
		    Date month year		

325.1	Reasons for not taking TT vaccination			

Part III continued				
Ser. No.	**Questions**	**Response**	**Skip to**	**Coding**
326	Where did you deliver your last child?	1. Home 2. Hospital 3. Health center 4. Health station Other specify _____		
326.1	Did you plan to deliver in this place	1. Yes 2. No 3. Do not remember		
326.2	If no for Q326.1 where did you plan to deliver			
	Before your date of delivery did you or your family prepare the following?	1. Transport 2. Save money 3. Identify blood donor 4. identify skilled attendant 5. nothing		
327	Who assisted you in the last delivery?	1. Trained traditional birth attendant 2. Untrained traditional birth attendant 3. Neighbor, 4. Relative 5. Health professional 6. Other (specify)_____		
328	For how long were you in labor during the last delivery?	1. Less than 12 Hrs 2. 12- 24Hrs 3. 25- 36 Hrs 4. 37 – 48 Hrs 5. More than 48 Hrs		
329	If your last delivery is in health institution, when did you go to the health institution?	1. At the beginning of labor 2. 6-12 hours after the beginning of labor 3. 13-18 hours after the beginning of labor 4. 19-24 hours after the beginning of labor 5. Other specify _____		
330	If your last delivery is in health institution, what was the mode of delivery?	1. Spontaneous vaginal delivery 2. Instrumental delivery 3. Caesarian section 4. Other (specify) _____		
331	What was the condition of the baby at birth in the last delivery?	1. Born alive 2. Still birth (born Died) 3. Born alive but died immediately		
332	If you had delivered your last pregnancy at home, why did you prefer to deliver at home? (Don't read the choice)	1. The labor was short 2. No near by health facility 3. The service is not available in the near by health facility 4. Lack of money for service 5. Lack of money for transport 6. Poor handling by health professionals 7. Prefer to deliver in the presence of relatives 8. Fear of manipulation (like episiotomy) 9. Lack of privacy in the health institutions 10. I didn't know the importance of health facility delivery 11. Opinions of (husband, neighbors, other community members) 11. Other (specify) _____		

	Part III continued			
Ser. No.	**Questions**	**Response**	**Skip to**	**Coding**
333	Have you encountered any health problems during labor in the last delivery?	1. Yes 2. No 3. I don't remember		
334	If yes to Q 333, what were the problems?	1. Massive vaginal bleeding 2. Prolonged labor more than 12 hrs 3. Unconsciousness 4. Other (specify) _____		
335	Have you encountered any health problems during delivery when you deliver your last child?	1. Yes 2. No 3. I don't remember		
336	If yes to Q 335, what were the problems?	1. Massive vaginal bleeding 2. Retained placenta (more than 30 min) 3. Birth canal laceration 4. Unconsciousness 5. Other (specify) _____		
337	If yes to Q 331, what measure did you take to alleviate the problem?	1. taken to the HF 2. took traditional medicine 3. treated by TBAs 4. nothing 5. other specify_____		
338	What problem did you face during the 1st one-week after your last delivery?	1. Nothing 2. Severe vaginal bleeding 3. High grade fever 4. Offensive vaginal discharge 5. Other (specify) ------------------ 6. Don't remember		
339	If yes to Q 338, what measure did you take to alleviate the problem?	1. taken to the HF 2. took traditional medicine 3. treated by TBAs 4. nothing 5. other specify_____		
340	Did you get medical check up after your last delivery within 42days?	1. Yes 2. No 3. I don't remember		
341	If yes to Q340 when did you get it for the first time after delivery	1. After _____ hrs 2. After _____ days 3. After _____ weeks		
342	Where did you get the checkup for the first time?	1. Home 2. Hospital 3. HC 4. Health post 5. Others specify_____		
343	What additional services did you get?	1. Child vaccination 2. Family planning methods 3. Counseling about breast feeding 4. Others specify _____		
344	What was your husband's attitude towards institutional delivery?	1. Positive 2. Negative 3. Don't know		

345	Who is the decision maker in your household to seek care from modern health institution?	1. Both of us 2. My husband 3. My self 4. Other (specify) _____		

PART IV: RESPONDENT KNOWLEDGE AND ATTITUDE TO WARDS SAFE DELIVERY UTILIZATION

S. No	Question	Responses	Skip to	Coding
	A. Knowledge questions			
401a	Do you know any health problems related to pregnancy?	1. Yes 2. No		
402a	If yes to Q 401, can you mention some of the problems?	1. Vaginal bleeding 2. Severe headache 3. Hypertension 4. Fit 5. Persistent vomiting 6. Swollen hands/face 7. Other (specify)		
403a	In your opinion, could a woman die due to the mentioned problems?	1. Yes 2. No 3. Don't Know		
404a	Do you know any problems related to labor and delivery?	1. Yes 2. No 3. Don't know		
405a	If yes to Q 404, can you mention some of the problems?	1. Severe vaginal bleeding 2. Hypertension 3. Prolonged labor (>12 hours) 4. Placenta not delivered 30 minutes after baby (Retained placenta) 5. Other (specify)-----------------------		
406a	In your opinion, could a woman die due to the mentioned problems?	1. Yes 2. No 3. Don't Know		
407a	Do you know any problems that can occur during the 1st week after delivery?	1. Yes 2. No		
408a	If yes to Q 407, can you mention some of these problems?	1. Severe vaginal bleeding 2. Hypertension 3. Fit 4. Swollen hands/face 5. High fever 6. Offensive vaginal discharge 7. Other (specify)---------------------		
409a	In your opinion, could a woman die due to the mentioned problems?	1. Yes 2. No 3. Don't Know		
410a	Do you think every pregnant woman need a skilled attendant at delivery?	1. Yes 2. No 3. Don't Know		
411a	If yes to Q 410, what is the advantages of having a skilled attendant at delivery	1. Prevention of delivery complications 2. Better care for new born 3. To get health information 4. Other (specify) -----------------------		
412a	If No to Q 410, why?			

Part IV continued				
S. No	Question	Responses	Skip to	Coding
	B. Attitude statement			
413b	Some people believe that any pregnant woman can develop delivery complication	1. Agree 2. Disagree 3. Indifferent		
414b	Some people feel that delivery complications can be dangerous to the health of a woman	1. Agree 2. Disagree 3. Indifferent		
415b	It is believed that delivery complications can't be dangerous to the health of the new born	1. Agree 2. Disagree 3. Indifferent		
416b	According to some people's belief a woman should plan ahead of time where she will give birth to her baby.	1. Agree 2. Disagree 3. Indifferent		
417b	Some women feel that they shouldn't plan ahead of time how they will get to the place where they will give birth.	1. Agree 2. Disagree 3. Indifferent		
418b	Some women feel that every pregnant woman need a skilled care at delivery	1. Agree 2. Disagree 3. Indifferent		
419b	Few women feel that being attended by male health personnel during delivery is unethical and shame	1. Agree 2. Disagree 3. Indifferent		
420b	According to the feeling of some pregnant women it is very shameful to deliver on delivery bed in labor ward	1. Agree 2. Disagree 3. Indifferent		
421b	Many women believe that women do not go to a health facility for delivery, mainly because it is too expensive.	1. Agree 2. Disagree 3. Indifferent		
422b	Many women believe that women do not go to a health facility for delivery because health personnel do not treat them respectfully.	1. Agree 2. Disagree 3. Indifferent		

Part V: Traditional Harmful Practices Related to pregnancy, Labor and Child Birth

S.no	Question	Response category	Skip	Code
501	During labor in the last birth did you faced messaging of your abdomen	1. Yes 2. No	 503	
502	If yes what was the reason	1. To correct the position of the fetus 2. To facilitate labor 3. To stop bleeding 4. It is our culture/tradition 88. Other, specify _____		
503	If you delivered your last child at home what material is used to cut	1. New blade(packed) 2. Boiled blade/scissors		

Ser. No.	Questions	Response	Skip	Coding
	the umbilicus	3. un-boiled blade/scissors 4. Sharp Stone 5. bamboo 88. Other, specify --------		
504	If you delivered your last child at home what material is used to tie the umbilicus	. 1.boiled thread 2. String (fiber) 3. Un-boiled thread 4. We did not tie 88. Other, specify		
505	If you delivered your last child at home what material did you apply on the umbilical stump?	1. nothing 2. soil 3. dung 4. Butter 5. Traditional medicine 6.GV/Alchol 88. Other, specify --------		
506	If you delivered your last child at home when did you wash your baby	Immediately After _____ hrs After _____ days Other specify _____		
507	For your last child What did you give immediately after birth	Butter Cow milk Water Breast milk Other specify _____		
508	For your last child when did you start beast feeding?	Immediately After _____ hrs After _____ days Other specify _____		
509	For how long did you give only breast milk for your last child	For _____ days For _____ months For _____ years		

PART VI: - FACTORS RELATED TO HEALTH INSTITUTION

. Ser. No.	Questions	Response	Skip	Coding
For those who deliver in the health facility				
601	Is there health facility in your area?	1. Yes 2. No 3. Don't know		
602	If yes to Q 501, how far is it from your house?	_____ minute		
603	If yes to Q 501, are there skilled health professionals who provide delivery service?	1. Yes 2. No 3. Don't know		
604	If yes to Q 503, have you received delivery service from this institution?	1.Yes 2.No		
606	Did you pay for the service you received from health institution?	1. Yes 2. No		
606	If yes to Q 505, how do you see the amount	1. Too expensive		

	you paid for the service?	2. Fair 3. Cheap 4. I didn't remember		
607	What form of transport did you use to get to the health facility you delivered in?	1. Walking 2. Animal back 3. Taxi 4. Other (specify) _____		
408	Did you pay for the transportation?	1.Yes 2.No		
609	If yes to Q 508, how did you see the amount you paid for the transportation?	1. Too expensive 2. Fair 3. Cheap 4. I didn't remember		
610	Did you experience long waiting time to receive the delivery service?	1.Yes 2.No		
611	Do you have confidence on the delivery service provided at the health unit?	1.Yes 2.No		
612	Were the health workers respectful?	1.Yes 2.No 3. I don't know		
613	Were there measures taken to assure your privacy during the procedures?	1.Yes 2.No 3. I don't know		
614	Were you satisfied by the care given to you in the health institution?	1.Yes 2.No		

PART -VII QUESTIONS ON INCOME OF THE RESPONDENT

Ser. No.	Questions	Response	Skip	Coding
701	What is your average monthly income (if applicable)	_____ Birr		
702	Do you have farming land?	1. Yes 2. No		
703	If yes how many hectare	_____ hectar		
704	Annual harvest of each crop in quintal	1. Pepper _____ 2. Coffee _____ 3. Maize _____ 4. Bean _____ 5. Sorghum_____ 6. Teff _____ 7. Other specify_____		
705	Do you have domestic animals?	1.Yes 2.No		
706	If yes to Q 603, how many?	1. Cow _____ 2. Ox _____ 3. Sheep_____ 4. Goat_____ 5. Horse _____ 6. Donkey_____ 7. Other (specify) _____		
707	Do you or your family have the following items	1. Radio amount _____ 2. TV amount _____ 3. Refrigerator amount _____ 4. Mobile phone amount _____ 5. Fixed phone _____		

Thank you!

Annex 4: professional CV of PhD candidate

Muluemebet Abera
Nationality: Ethiopian
Town/City: Jimma, Ethiopia
Muluemebet.abera@ju.edu.et, P.O.Box: 5093   : +251-913398880

WORK/PROFESSIONAL EXPERIENCES		
Date	Job title	Place of Work
09/2012 -to-date	Instructor	Jimma University
08/2006 – 09/ 2012	Head of population and family health dep't	Jimma University
04/2002- 08/2004	Tutor &Clinical instructor	Asella School of Nursing
09/ 2000- 03/2002	Public health practitioner	Asella Health center
11/ 1993 – 07/ 1997	MCH and EPI coordinator	Asella Hospital

EDUCATION		
Year	Name and address	Title of Degree
2004 - 2006	Jimma University	Master of public health in RH
1997- 2000	Jimma University	Bachelor of Science in PH
1989 - 1992	Black lion school of Nursing	Diploma in Comprehensive Nursing

SPECIAL TRAINING, SEMINAR, WORKSHOP

iSHARE 2 training workshop Dubai, UAE Feb 28th to March 7th 2014.

Second Global Congress on Verbal Autopsy, Athens Greece October 2013 (Presented a paper)

Maternal and Newborn Research Workshop HO, Ghana 12th - 15th July, 2013

Immunity and Infection workshop Mbeya, Tanzania, July 25 to 30, 2011

Longitudinal data management and analysis training, Addis Ababa, Ethiopia April 2- 11, 2011

DSS project planning & Administration training Addis Ababa Ethiopia Jan .2009

PLP Leadership Teaching Capacity training Ambo Ethiopia May 4-8, 2008

STATA statistical Soft ware Application training Jimma Ethiopia Nov. 5-9, 2007

Quality Assurance & Leader ship workshop, Kigali, Rwanda, August 27-31, 2007

Achieving the MDGs: Poverty reduction, RH and Health sector Reform, Addis Ababa Ethiopia, April 10-20, 2007

Reproductive health and development certificate Addis Ababa, Ethiopia, Jan. 9-18, 2007

 Knowledge and skill standardization workshop on HIV/AIDS prevention, care and treatment, Nazareth, Ethiopia, Jan. , 2007

Event History Analysis Training, Jimma, Ethiopia, June 2005

TOT teaching methodology course (certificate), Asella, Ethiopia July to September 2002

LANGUAGE SKILLS

Amharic (native),   Affan Oromo (fluent)   English (fluent)

Publications

Awol Seid, Abebe Gebremariam, **Muluemebet Abera**: Integration of Family Planning Services within Post Abortion Care at Health Facilities in Dessie –North East Ethiopia.
Science, Technology & Arts Research Journal ; Jan-March 2012, 1(1): 38-46

*Samuel Yohannes, MMekitie Wondafrash, **Muluemebet Abera**, Eshetu Girma: Duration and determinants of birth interval among women of child bearing age in Southern Ethiopia; BMC pregnancy and child birth 2011,**11**:38*

Tadesse Alemu Zerfu**;, Mulumebet Abera**, Tizita Tilahun, Henok Tadesse;
Traditional Fertility Regulation Methods among Remote Ethiopian Communities: The Case of Hamer District *Journal of Family and Reproductive Health Vol. 5, No. 3, September 2011*

Abera M, G/Mariam A, Belachew T. Predictors Of Safe Delivery Service Utilization Among Women Of Child Bearing Age In Arsi Zone, Oromiya National Regional State, South-East Ethiopia; Ethiop J Health Sci. Aug. 2011; Vol 21(Special issue) PP 95-106

*Menberu Getachew, Fessehaye Alemseged, Amare Deribew, **Muluemebet Abera:** Factors affecting fertility decision of married men and women living with HIV in south Wollo Zone Northeast Ethiopia; Ethiop. J. Health Dev. 2010; 24(3):214-220*

Demissie A, Derbew A. Abera M. "Determinants of acceptance of voluntary HIV testing among antenatal clinic attendees at Dil Chora Hospital, Dire Dawa, East Ethiopia"
Ethiopian Journal of Health Development 2009: 23(2): 141 – 147