

**FACTORS ASSOCIATED WITH CHILDBIRTH  
COMPLICATIONS AMONG WOMEN OF  
REPRODUCTIVE AGE (15-49 YEARS) IN MOGADISHU,  
SOMALIA**

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**Factors Associated with Childbirth Complications among Women of  
Reproductive Age (15-49 Years) in Mogadishu, Somalia**

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## DECLARATION

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

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## **DEDICATION**

This thesis is dedicated to my wonderful parents; Prof. Elmi and Mrs. Sadia whose endless love, care, support and encouragement made me get to this stage. Thank you for giving me a chance to prove and improve myself through all my walks of life. I love you.

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## **ABBREVIATIONS AND ACRONYMS**

<b>ANC</b>	Antenatal care
<b>CI</b>	Confidence Interval
<b>EmOC</b>	Emergency Obstetric Care Services
<b>ERC</b>	Ethical Review Committee
<b>FGM</b>	Female Genital Mutilation
<b>GDM</b>	Gestational Diabetes Mellitus
<b>ICSU</b>	International Council for Science
<b>IDIs</b>	In-depth Interview
<b>IDP</b>	Internally Displaced People.
<b>ISSC</b>	International Social Science Council
<b>JKUAT</b>	Jomo Kenyatta University of Agriculture and Technology
<b>KEMRI</b>	Kenya Medical Research Institute
<b>KI</b>	Key Informants
<b>LBW</b>	Low Birth Weight
<b>MMR</b>	Maternal Mortality Rate
<b>MOH</b>	Ministry of Health
<b>OPD</b>	Outpatient Department

<b>OR</b>	Odds Ratio
<b>PE</b>	Pre-Eclampsia
<b>PI</b>	Principal Investigator
<b>PPH</b>	Post-Partum Haemorrhage
<b>PX</b>	Post-Partum Period
<b>SD</b>	Standard deviation
<b>SID</b>	Subject Identification
<b>SSA</b>	Sub-Saharan Africa
<b>SOS</b>	Safe Our Souls
<b>TBA</b>	Traditional Birth Attendance
<b>TT</b>	Tetanus Toxoid
<b>UN</b>	United Nations
<b>UNICEF</b>	United Nations Children's Fund
<b>UoN</b>	University of Nairobi
<b>USDGs</b>	Universal Sustainable Development Goals
<b>VE</b>	Vacuum Extraction
<b>WHO</b>	World Health Organization

## DEFINITION OF OPERATIONAL TERMS

**Childbirth Complications:** are health problems that occur during delivery. They can involve the mother's health, the baby's health, or both.

**Episiotomy:** is also known as **perineotomy**, is a surgical incision of the perineum and the posterior vaginal wall generally done by a midwife or obstetrician during second stage of labor to quickly enlarge the opening for the baby to pass through.

**Forceps delivery:** Is an assisted vaginal delivery, it's used when the baby needs help to be born with instruments that attach to her/his head. Assisted births are often needed when labour has been long and tiring, as it can be about helping the mum as well as the baby.

**Hypertensive disease of pregnancy:** is a group of diseases which includes: **preeclampsia** (is a disorder of pregnancy characterized by high blood pressure it occurs in the third trimester of pregnancy and gets worse over time.), **eclampsia** (is the onset of seizures (convulsions) in a woman with preeclampsia.), gestational hypertension, and chronic hypertension.

**Maternal Mortality Ratio:** the ratio of the number of maternal deaths during a given time period (up to the 42nd day after the birth) per 100,000 live births during the same time-period. The MMR is used as a measure of the quality of a health care system.

**Neonatal Mortality Ratio:** is 40–60% of infant mortality in developing countries, neonatal mortality is newborn death occurring within 28 days postpartum.

**Obstetric fistula** or **vaginal fistula**: is a medical condition in which a fistula (hole) develops between either, the rectum and vagina (rectovaginal fistula) or between the bladder and vagina (vesicovaginal fistula) after severe or failed childbirth, when adequate medical care is not available

**Obstructed labour**: also known as **prolonged labour** is when, the total duration of childbirth is greater than 24 hours. There are two main types, one when the latent phase of labour is greater than 8 hours and the other when the active phase of labour is greater than 12 hours.

**Obstructed labour**: also known as **labour dystocia** is when, even though the uterus is contracting normally, the baby does not exit the pelvis during childbirth due to being physically blocked.

**Post-partum hemorrhage**: is often defined as the loss of more than 500 ml or 1,000 ml of blood within the first 24 hours following childbirth.

**Post-partum period** or **postnatal period**: is the period beginning immediately after the birth of a child and extending for about six weeks.

**Sepsis**: is a whole-body inflammation caused by an infection. Common signs and symptoms include fever, increased heart rate, increased breathing rate, and confusion.

**Vacuum extraction (VE)**: is also known as **vacuum-assisted vaginal delivery**, is a method to assist delivery of a baby using a vacuum device. It is used in the second stage of labour if it has not progressed adequately. It may be an alternative to a forceps delivery and caesarean section.

## ABSTRACT

Somalia has the highest adult lifetime risk of maternal mortality of 1 in 18. About 51% of pregnant women attended 3 antenatal care (ANC) and have access to emergency obstetric care services to detect and handle complications at childbirth. This study sought to determine the factors associated with childbirth complications among women of reproductive age (15-49 years) in two major maternal and child clinics in urban areas of Mogadishu, Somalia. This cross sectional study randomly enrolled 385 eligible women who had attended both Banadir Hospital and SOS Hospital in Mogadishu Somalia. Data were collected using structured questionnaire and in-depth interviews (IDIs) guides to gather information related to individual-level factors associated with child birth complications as well as selected facility level factors associated with childbirth complications. Influential and knowledgeable members of Mogadishu, Somalia were also conducted to gather qualitative data. Data were analyzed using bivariate and multivariable logistic regression to determine factors associated with obstetric complications using STATA version 11 at a significant level at  $p < 0.05$ . The thematic content analysis was used to analyze the qualitative data. A total of 203 out of 385 (52.7%) women had obstetric complications. This included 30% severe bleeding/post-partum hemorrhage, 29.6% obstructed labor, 23.6% hypertensive disorder and 14.3% cases of sepsis. Employment status (OR 0.6, 95% CI 0.4 to 0.9) monthly income (OR 1.7, 95% CI 1.1 to 3.2), antenatal care attendance (OR 0.7, 95% CI 0.5 to 0.9), ANC initiation in the first trimester (OR 0.7, 95% CI 0.5 to 0.9), home delivery assisted by Traditional Birth Attendance (TBA) (OR 1.7, 95% CI 1.7 to 2.4), worsening of past medical condition preceding the current birth (OR 1.6, 95% CI 1.2 to 2.3), current pregnancy termination (OR 1.9, 95% CI 1.1 to 3.4), vaginal delivery (OR 0.5, 95% CI 0.3 to 0.6), delivery assisted by a nurse (OR 0.4, 95% CI 0.3 to 0.6) were associated with obstetric complication. This data demonstrates high levels of obstetric complications among women of reproductive age (15-49 years) in Mogadishu Somalia. Economic status, social-cultural issues and current and past medical status were independently associated with obstetric complications among this population. The high proportion of obstetric complication especially hemorrhage among women in



Mogadishu Somalia, requires that women be monitored closely during pregnancy and during delivery to reduce complications and death, in the absence of medical interventions. Economic empowerment, improved awareness of ANC, training of TBA would be key in reducing the obstetric complication in this region.

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 Background Information**

Although the 3<sup>rd</sup> Universal Sustainable Development Goals (USDGs) advocates for the healthy lives and promotion of well-being for all at all ages by 2030 (International Council for Science [ICSU] & International Social Science Council [ISSC], 2015), Global maternal mortality still remains a challenge. The 2015, World Health Organization (WHO) estimated about 303 000 annual maternal deaths globally, which 830 women of them die from pregnancy- or childbirth-related complications .The developing countries accounted for about 99% of the global maternal deaths which more than half of these occurred in Sub-Saharan Africa (SSA), The maternal mortality ratio in developing countries in 2015 is 239 per 100 000 live births versus 12 per 100 000 live births in developed countries (World Health Organization [WHO], 2015).

Women in Africa because of more number of child birth and the greater risk with each pregnancy, the lifetime risk of dying from pregnancy-related complications or during childbirth are higher than other continent estimated at one in 38 versus only one in 3,700 in the developed world. In the report, Chad and Somalia had the highest adult lifetime risk of maternal mortality of 1 in 15 and 1 in 18, respectively (WHO, 2014).

Maternal deaths have both direct and indirect causes. Direct maternal death is the result of a complication of the pregnancy, delivery, or management of the two, and an indirect maternal death is a pregnancy-related death in a patient with a preexisting (such as anemia, malaria or cardiovascular disease) which is unrelated to pregnancy (Khlat & Ronsmans, 2000).

Other than studies done among Somali immigrants in developed countries which have reported varied outcomes in the rates of anemia, gestational diabetes, hypertension, pre-eclampsia, induction, use of pain relief in labor or epidural use as well as rates of caesarean

section option (Johnson, Reed, Hitti, & Batra, 2004; Robertson, Malmström & Johansson, 2005; Small *et al.*, 2008), no data are available on the cases of obstetric complications and its associated factors.

Many countries, particularly in SSA, still have unsatisfactory levels reproductive health visits (Wang *et al.*, 2011). The Somali women both in Somalia and in other countries have low levels of access to quality reproductive health services (Malin & Gissler, 2009; Råssjö, Byrskog, Samir & Klingberg, 2013). This is particularly worse in Somalia where investment in reproductive health is disproportionately low (Sorbye & Leigh, 2009).

Poverty, underdevelopment, conflict, and internal displacements (Menkhaus *et al.*, 2007; World Bank, 2015), insufficient health hospitals and professionals (Capobianco & Naidu, 2008; Dagne *et al.*, 2009; Sorbye *et al.*, 2009), illiteracy and the low value placed on women's health, and social and cultural norms such as female genital mutilation (Thierfelder, Tanner & Bodiang, 2005) has been associated with obstetric complication in Somalia. Following a fragile, but positive, transition mid-2012, Somalia has a full federal government in Mogadishu committed to inclusiveness, reconciliation and peace, based on a provisional constitution (World Bank, 2015). This study documents cases of childbirth complications and its associated factors from Two Major Urban Maternal and Child Clinics "SOS Hospital and Banadir Hospital" in Mogadishu, Somalia.

## **1.2 Problem statement**

In Africa 30 million women become pregnant annually, and about 250,000 of them die from pregnancy-related causes, approximately 15 percent of all pregnant women have childbirth complications (Pearson, Larsson, Fauveau & Standley, 2012). In SSA 179,000 maternal deaths occur annually which is the highest Maternal mortality ratio globally, In Somalia there is an estimated Maternal mortality ratio of 850 per 100 000 live births (1 in 18) due to pregnancy or childbirth-related causes (United Nations Children's Fund [UNICEF], 2014).

The factors associated with complications of childbirth have the potential to increase the Maternal Mortality Ratio and neonatal deaths. However, there was no research on the prevalence and factors associated with complications of childbirth among women of reproductive age (15-49 years) in Mogadishu, Somalia. Given this account there is need to document scientifically the existing complications of childbirth among women of reproductive age (15-49 years) in Mogadishu, Somalia.

### **1.3 Justification**

There are an increased number of women dying due to pregnancy or childbirth related complications (WHO, 2014), About 800 women die from pregnancy or childbirth related complications around the world every day (WHO, 2006). SSA suffers from the highest maternal mortality ratio 510 maternal deaths per 100,000 live births which is 62% of all maternal deaths per year worldwide. A woman in Somalia has a 1 in 18 chance of dying due to pregnancy or childbirth-related causes during the course of her life (UNICEF, 2014). The antenatal care coverage is 26% and the number of basic emergency obstetric care facilities per 500 000 populations is 0.8, compared with an international standard of 5 (WHO, 2006).

Given the high maternal mortality ratio among women of the reproductive age (15-49 years), there is need to do research on the prevalence and the factors associated with complications of childbirth among women of reproductive age (15-49 years). Although the Maternal mortality ratio has been well documented, there is no documented data on the prevalence and the factors associated with complications of childbirth among women of reproductive age (15-49 years) in Mogadishu, Somalia. This study therefore investigated the prevalence and factors associated with childbirth complications among women of reproductive age (15-49 years) in Mogadishu, Somalia.

## **1.4 Research Questions**

1. What is the prevalence of childbirth complications among women in the reproductive age (15-49 years) in Mogadishu, Somalia?
2. What are the individual level factors associated childbirth complications among women of reproductive age (15-49 years) in Mogadishu, Somalia?
3. What are the health facility level factors associated with childbirth complications among women in the reproductive age (15-49 years) in Mogadishu, Somalia?

## **1.5 Research Objectives**

### **1.5.1 General objective**

To determine the factors associated with childbirth complications among women of reproductive age (15-49 years) in Mogadishu, Somalia.

### **1.5.2 Specific Objectives**

1. To determine the prevalence of childbirth complications among women of reproductive age (15-49 years) in Mogadishu, Somalia.
2. To determine the individual level factors associated childbirth complications among women of reproductive age (15-49 years) in Mogadishu, Somalia.
3. To determine the health facility level factors associated with childbirth complications among women in the reproductive age (15-49 years) in Mogadishu, Somalia.

## **1.6 Significance of the study**

The information generated by this study will be disseminated to relevant authorities in the Ministry of Health (MOH) and Human Services and other relevant agents to help initiation of prevention strategies against childbirth complications. It's expected that the results from the study will be utilized to decrease the childbirth complications, the maternal mortality, neonatal mortality and infant mortality. This will not only apply in Mogadishu

City but has potential for application nationally. In part, it is also expected to serve as baseline information for those who may wish to make further research on the area.

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 Global situation of complications of childbirth

The global maternal mortality ratio is unacceptably high. About 800 women die from pregnancy or childbirth related complications around the world every day. In 2013, 289 000 women died during and following pregnancy and childbirth. 99% of maternal deaths occur in developing countries. More than half of these deaths occur in SSA and almost one third occur in South Asia (WHO, 2014). Globally, an estimated 42% of maternal deaths are intrapartum related, defined as deaths during birth or the first day after delivery. There were an estimated 535 900 maternal deaths worldwide in 2005 (Lawn *et al.*, 2009).

Complications of childbirth are health problems that occur during delivery. They can involve the mother's health, the baby's health, or both. Childbirth is a moment of great risks, but in many situations over half of maternal deaths occur during the postpartum period. Complications of childbirth claims an estimated 529 000 maternal deaths per year, almost all of them in developing countries. Maternal mortalities often occur suddenly and unpredictably. Between 11% and 17% of maternal deaths happen during childbirth itself and between 50% and 71% in the postpartum period (WHO, 2005).

Globally 136 million women give birth each year some 20 million of them experience pregnancy related illness after birth. The list of morbidities is very diverse, ranging from fever to psychosis, for those women who have almost died in childbirth, recovery from organ failure, uterine rupture, fistulas, painful and leave lasting sequelae. The level of maternal mortality depends on whether the complications were dealt adequately and timely. Postpartum bleeding can kill even a healthy woman within two hours, if unattended. It is the quickest of maternal killers (WHO, 2005).

Currently 1.6 million die every year due to Post-partum hemorrhage (PPH). An injection of oxytocin (a hormone to stimulate contractions of the uterus and smooth muscle tissue)

given immediately after childbirth is very effective in reducing the risk of post-partum bleeding. One out of 20 women giving birth develops an infection, which needs prompt treatment so as not to become fatal. Sepsis is the second most frequent cause of mortality among late postpartum deaths, Puerperal sepsis leads to tubal occlusion and infertility in 450 000 women per year (WHO, 2005).

Hypertensive disorders of pregnancy which are associated with high blood pressure and convulsions are the cause of 12% of maternal deaths. They usually occur during pregnancy but also during childbirth. Obstructed labor owing to disproportion between the fetal head and the mother’s pelvis, or to malposition or malpresentation of the fetus during labor, accounts for around 8% of maternal deaths globally, while the baby may be stillborn, suffer asphyxia and brain damage or die soon after birth (WHO, 2005) (Table 2.1).

**Table 2.1: Incidence of major complications of childbirth, globally**

<b>Obstetric Complications</b>	<b>Incidence of Live births (%)</b>	<b>Number of cases per year</b>	<b>Case-fatality rate (%)</b>	<b>Maternal deaths in 2000</b>	<b>Main sequelae for survivors</b>
<b>Post-partum haemorrhage</b>	10.5	13795000	1	132,000	Severe anaemia
<b>Sepsis</b>	4.4	5768000	1.3	79,000	Infertility
<b>Hypertensive disorders</b>	3.2	4152000	1.7	63,000	Not well
<b>Obstructed labour</b>	4.6	6038000	0.7	42,000	Fistula, Incontinence

Source: (WHO, 2005)

## **2.2 Complications of childbirth in Sub-Saharan Africa**

In Africa 30 million women become pregnant annually, and about 250,000 of them die from pregnancy-related causes. One third of nearly one million stillbirths occur during labour, and approximately 280,000 babies die of birth asphyxia soon after birth. Approximately 15 percent of all pregnant women have childbirth complications, an estimated quarter of a million women die of problems related to pregnancy, while nearly half die around the time of childbirth and during the first week after birth, mainly of causes directly related to childbirth (Pearson *et al.*, 2012).



SSA suffers from the highest maternal mortality ratio globally, 510 maternal deaths per 100,000 live births, or 179,000 maternal deaths a year. This is nearly two thirds (62 per cent) of all maternal deaths annually (UNICEF, 2014). In South Africa, 39% of direct maternal deaths and 42% of perinatal deaths are directly intrapartum related, the largest causal group for either maternal deaths or perinatal deaths (Moodley *et al.*, 2003). In a study carried out in Kenya, Kilifi District, it was observed that complications of labour such as hemorrhage, premature rupture of membranes or premature labour, and obstructed labour or malpresentation increased the risk of death between 8- and 62-fold, and 53% of all perinatal 13 deaths were attributable to labor complications (Weiner, Ronsmans, Dorman, Jilo, Muhoro & Shulman, 2003).

### **2.3 Complications of childbirth in Somalia**

Maternal mortality ratio in Somalia is 850 per 100 000 live births. A woman in Somalia has a one in 18 chance of dying due to pregnancy or childbirth-related causes during the course of her life (UNICEF, 2014). Mothers in Somalia die due to lack of access to emergency obstetric care for timely treatment of the main complications of childbirth such as hemorrhage, obstructed labour, eclampsia and infection (WHO, 2006).

### **2.4. Individual level factors associated childbirth complications**

#### **2.4.1 Socio-demographic factors**

Around 150 million children aged 5–14 are currently engaged in child labour, with incidence highest in SSA (UNICEF, 2011). The risk of maternal mortality is highest for adolescent girls under 15 years old and complications in pregnancy and childbirth are the leading cause of death among adolescent girls in developing countries (WHO, 2014). According to Magadi in a study on Pathways of the Determinants of Unfavorable Birth Outcomes in Kenya, it found out that antenatal care is identified as a central link between various socio-demographic or reproductive factors and birth outcomes (Magadi, Diamond, & Madise, 2001).

The rates of stillbirth among mothers aged 35 to 40 were significantly elevated (55/10 000 and 62/10 000 total births respectively) while other cohort study showed (43/10 000 total births). Intrapartum stillbirth occurred in 8.1%, 7.9%, and 13.3% of all stillbirths in age groups 20 to 29, 35 to 40, respectively (Sarka *et al.*, 2010). Pregnancy at extreme advanced maternal age is associated with increased maternal and fetal risk (Yariv *et al.*, 2010). In Latin America, a study shows that girls who give birth before the age of 16 are three to four times more likely to suffer maternal death than women in their twenties (UNICEF, 2011).

Complications linked to pregnancy and childbirth is the second cause of death for 15-19 years old girls globally. Some 11% of all births worldwide are to girls aged 15 to 19 years, and the vast majorities are in low and middle-income countries. Women in developing countries have on average many more pregnancies than women in developed countries, and their lifetime risk of death due to pregnancy is higher. The probability that a 15-year-old woman will eventually die from a maternal cause is 1 in 3700 in developed countries while 1 in 160 is in the developing countries (WHO, 2014).

#### **2.4.2 Socio-economic factors**

In developing countries, pregnancy and childbirth are the leading cause of death among women of reproductive age (15-49 years). Maternal death mainly affects poor, rural women (WHO, 2015). In 2013 maternal mortality ratio was 230 per 100 000 live births versus 16 per 100 000 live births in developed countries. There are large disparities between countries, with few countries having extremely high maternal mortality ratios around 1000 per 100 000 live births. There are also large disparities within countries, between women with high and low income and between women living in rural and urban areas (WHO, 2014).

In Africa every region has advanced, although levels of maternal mortality remain unacceptably high in SSA. Almost all maternal deaths can be prevented, as evidenced by the huge disparities found between the richest and poorest countries. The lifetime risk of

maternal death in industrialized countries is 1 in 4,000, versus 1 in 51 in countries classified as ‘least developed’. For example, in Somalia a woman has a one in 18 chance of dying due to pregnancy or childbirth-related causes during the course of her life due to inadequate antenatal care services (UNICEF, 2014).

And in Niger, a woman has a one in seven risk of dying due to complications of pregnancy and childbirth during her reproductive years. In Sweden, the lifetime risk of dying from these causes is much lower at one in 17 400. More than 60% of newborn deaths occur in just ten developing countries in Africa and Asia (WHO, 2014). A study on women, poverty and adverse maternal outcomes in Nairobi, Kenya found out those urban poor women in Nairobi associate poverty with adverse maternal outcomes (Chimaraoke *et al.*, 2010).

### **2.4.3 Socio-cultural factors**

Each and every mother and each and every newborn needs skilled maternal and neonatal care provided by professionals at and after birth – care that is close to where and how people live, close to their birthing culture, but at the same time safe, with a skilled professional able to act immediately when largely unpredictable complications occur (WHO, 2005).

One hundred million to One hundred and forty million girls and women globally have been undergone to one of the first three types of female genital mutilation (FGM) and more than 3 million girls are at risk to be subjected to some kind of FGM annually. More than 125 million girls and women alive today have had FGM in the 29 countries in Africa and Middle East where FGM is concentrated (WHO, 2014). The prevalence rate of women (15-49years) in Somalia who have undergone FGM is 97.7% which is the highest prevalence of FGM globally (UNICEF, 2011).

Female Genital Mutilation is extremely dangerous, especially when it is common; it takes place in an unsanitary environment. It can do significant long-term damage and heightens

the risk of complications during childbirth for both mother and baby (UNICEF, 2011). Women who have undergone FGM are more likely to get adverse obstetric outcomes than those without FGM. Risks seem to be greater with more extensive FGM type (WHO, 2003).

## **2.5. Health facility level factors associated with childbirth complications**

Timely and adequate antenatal care is generally acknowledged to be an effective method of preventing adverse outcomes in pregnant women and their babies (Alderliesten, Vrijkotte, Van Der Wal & Bonsel, 2007). Early initiation of prenatal care is important to prevent and treat obstetric and medical complications (Ziyo, Matly, Mehemd & Dofany, 2009). Neonatal mortality and maternal mortality are inversely associated with coverage rates of skilled birth attendance, emergency obstetric care, and neonatal intensive care (Lawn, Wilczynska, & Cousens, 2006).

Half of the 2.9 million newborn deaths that occurred in 2012 globally had occurred within the first 24 hours after birth. Many of these deaths occurred in premature babies and low birth weight (LBW) babies, babies with sepsis, or babies asphyxiated around the time of delivery. A study that has been done in a delivery setup shows, among two deliveries the blood loss was not measured but only estimated. In the record reviews only 4% (8/200) had an estimated amount written in the file as there was no place to routinely record it. In all these cases post-partum hemorrhage had occurred and blood loss of >500 ml was written (WHO, 2012).

The postpartum period despite its heavy toll of deaths is often neglected. Within this period, the first week is the most prone to risk. About 45% of postpartum maternal deaths occur during the first 24 hours, and more than two thirds during the first week (WHO, 2005). In Somalia the reproductive health service coverage low. Antenatal care coverage is 26% and the number of basic emergency obstetric care facilities per 500 000 populations is 0.8, compared with an international standard of 5 (WHO, 2014).

The complications leading to maternal death can occur without warning at any time during pregnancy and childbirth. Most maternal deaths can be prevented if births are attended by skilled health personnel; doctors or nurses (midwives) (UNICEF, 2014). Immediate and effective professional care during and after labour and delivery can make the difference between life and death for both women and their newborns; a breakdown of access to skilled care may rapidly lead to an increase of unfavorable outcomes (WHO, 2005).

If a health facility provides the first six signal functions, it is defined as a basic emergency obstetric care facility. If a health facility provides all eight functions, including surgery and blood transfusion, it is a comprehensive emergency obstetric care facility (Table 2.2).

**Table 2.2: Basic and comprehensive emergency obstetric care (EmOC)**

Signals functions for treatment of obstetric complications	Basic EmOC	Comprehensive EmOC
<b>1. Administer parenteral (injection) antibiotics</b>	•	•
<b>2. Administer parental (injection) oxytocics</b>	•	•
<b>3. Administer parenteral anticonvulsants for pre-eclampsia/ eclampsia</b>	•	•
<b>4. Perform manual removal of placenta</b>	•	•
<b>5. Perform removal of retained products, e.g. through manual vacuum aspiration</b>	•	•
<b>6. Perform assisted (instrumental) vaginal births, e.g. vacuum extraction</b>	•	•
<b>7. Perform safe blood transfusions</b>		•
<b>8. Perform surgery (births by caesarean section)</b>		•

Source: (Luwei *et al.*, 2012)

## CHAPTER THREE

### MATERIALS AND METHODS

#### 3.1 Study Area

The study was carried out in Mogadishu (Appendix 4). Mogadishu is known locally as Xamar (English: Hamar), it is the largest city in Somalia and the nation's capital; located in the coastal Banadir region on the Indian Ocean of the Horn of Africa (Appendix 5).

The city has served as an important port for centuries. In 2011, the population was estimated at about 2.5 million and about 200,000 of them were IDPs. The public health care system in Mogadishu has collapsed because of the fighting that was in Mogadishu for two decades. A small number of public health care facilities have been re-established by international non-governmental organizations, to give free health care to patients in the city especially to the internally displaced people (IDPs). Therefore, the majority of the community seeks medical care from the private health sector.

The work was carried out in two maternity and children health facilities namely; “SOS Hospital and Banadir Hospital” located in Mogadishu, Somalia. These locations were chosen because it offers Antenatal care, Intrapartum care, Postnatal care and Child care within the area under study.

**The Banadir Hospital:** (Mother and Child hospital) was established in 1977 and is situated in the center of the Somali’s capital, Mogadishu. After the collapse of the former military government, professional doctors saved the hospital from the destroying militiamen and it is one of the few remaining health and medical infrastructures that are still intact. The Federal Government of Somalia recognized the hospital as the only ‘National Referral Hospital’ in the country. The hospital comprises three main departments: The maternity, pediatric and medical and surgical departments. The facility is a 400 bed capacity and receives an average of 2,000 patients per week. Nearly 400 women deliver every month in the facility.

**The SOS Hospital:** The SOS Medical Centre (Mother and Child Clinic) was established in 1989 in Mogadishu, it consists of 26 sick beds, 19 treatment rooms, a maternity room, operating theatre, a pharmacy, a laboratory and a blood bank. There four gynecologists, 18 midwives and several nurses provide 100 patients with medical treatment each day. An average of 15 babies is born at the clinic each day. The operating theatre is mainly used for caesarean operations but also for other operations. The SOS Medical Centre has a capacity of 30,000 persons per year.

### **3.2 Study design**

A cross sectional study design was adopted in this study. This study design was suitable in describing the prevalence and factors associated with the childbirth complications among women of reproductive age (15-49 years) in Mogadishu, Somalia.

### **3.3 Study population**

The target population comprised of women of reproductive age (15-49 years). The study population was women who had had a recent delivery a month prior the study and has attended the Maternal and Child Clinic at SOS Hospital and Banadir Hospital.

#### **3.3.1 Inclusion criteria**

- Eligible candidates were those who were:
- Mothers of reproductive age (15-49 years)
- Mogadishu Residence more than 1 year
- Mothers who had delivered within the last one month
- Mothers who were willing and consented to participate

#### **3.3.2 Exclusion criteria**

- Mothers less or more than the childbearing age (15-49 years)
- Mogadishu Residence <1year

- Mothers who had not delivered within the last one month
- Mothers who had serious ill health
- Those mothers who refused to consent to participate

### 3.4 Sample size determination

The sample size required was determined using the (Lemeshow *et al.*, 1990) formula for estimating the minimum sample size:  $N = z^2 P (1- P)/d^2$

Where:

Z= standard normal distribution curve value for 95% CI which is 1.96

P= estimation of women with childbirth complications

d= absolute precision (0.05)

Substituting  $n = (1.96)^2 (0.5) (0.5) / (0.05)^2 = 384.16 = 385$   
participants

### 3.5 Sampling

This study used systemic sampling method to recruit and consent participants. Systematic sampling is a type of probability sampling method in which sample members from a larger population are selected according to a random starting point and a fixed, periodic interval. This interval, called the sampling interval, is calculated by dividing the population size by the desired sample size. In this case, the estimated total admission during the study period was 1000 (Hospital records) from each facility and a sample size of 385; the sampling interval was calculated as follows:

$$\frac{1000}{385} = 3$$

Thus every 3<sup>rd</sup> women were included

385



In this study, enumerators were posted at entrance of each of the two clinics. This was done on a daily basis where eligible women were briefed about the study and consented until the desired sample size was achieved.

### **3.6 Dependent variables**

Childbirth Complications

### **3.7 Independent variables**

Individual-level factors and selected facility-level factors

### **3.8 Data collection tools**

Quantitative data were collected from consenting participants using structured questionnaire (Appendix 2), the questionnaire was translated to the local language (Somali Language), and the questionnaire was first pre-tested by administering 39 questionnaires to women who fulfilled the inclusion criteria. The pretesting was done at Medina Hospital.

The in-depth interviews (IDIs) were using indepth interview guide (Appendix 3), IDIs were conducted to confirm and clarify any pending or new issues described in the structured questionnaires. Interview informants have been shown to provide a valuable foundation for a broader understanding of contextual matters relevant to the issues being explored (Bernard *et al.*, 1994). Randomly 12 influential and knowledgeable members in Mogadishu were identified and intermittently interviewed at a place and time most convenient and confidential for the participants. The informants were selected based on their position of leadership, either formal or informal, in the community and their ability and willingness to reflect on the study findings. The informants included health professionals, religious and tribal leaders, and well regarded women who are experienced in reproductive health and are from the community. In addition to being willing to share, reflect upon the findings of the study, informants were those observant, articulate and

available for multiple interviews of varying duration on an assortment of topics related to the study.

### **3.9 Data management**

All subjects were assigned a subject identification number (SID) and all data entered into the study databases were associated with SID in password protected files. All questionnaires were stored in a lockable cabinet throughout the study and accessed only by authorized persons so as to ensure confidentiality and to avoid data loss. After data collection, a double entry of the same data was done for accuracy purposes. The data was stored under passwords. Data was entered using Microsoft Access then exported to STATA version 13 (StataCorp *et al.*, 2013) for analysis. Coding and verification of the data was done for easy manipulation, analysis and presentation. Preliminary analysis of the data was done to ensure that all variables were in a workable form before full analysis.

The tape recorded information from the IDIs were duplicated for back-up and stored in locked cabinets all throughout the study and accessed only by authorized persons so as to ensure confidentiality and to avoid data loss.

### **3.10 Data analysis and presentation**

Descriptive statistics frequency (%), mean, standard deviation and medium (interquartile ranges at 25% and 75%) were used to present the quantitative data. The overall cases of obstetric complications were determined for all participants. In bivariate analyses, odds ratios (OR) and 95% confidence intervals (CI) for the association between obstetric complications and socio-demographic, household demographic, awareness and reproductive health patterns characteristics were calculated using Poisson regression. In multivariate analyses, a manual backward elimination approach was used to reach the most parsimonious model including factors that were associated with obstetric complications among this population at the significance level of  $P \leq 0.05$ . All statistical analyses were performed using STATA version 13.

The qualitative data (IDI) were subjected to a thematic content analysis. This approach entails the categorization of recurrent data collected under thematic areas (Green & Thorogood, 2013). The analysis was done manually using general purpose software tools using Microsoft Word (La Pelle *et al.*, 2004).

### **3.11 Ethical considerations**

A Research Authorization was sought from the Ministry of Health and Human Services of the Somali Federal Republic (Appendix 6) and an Ethical Clearance Certificate was obtained from the Kenyatta National Hospital and University of Nairobi Ethics and Research Committee (Appendix 7).

Research Clearances for data collection were obtained from SOS Hospital (Appendix 8) and Banadir Hospital (Appendix 9). Respondents were assured that their participation was voluntary and that they were free to withdraw from the study at any time, informed consent (Appendix 1) was obtained before administration of questionnaire.

## CHAPTER FOUR

### RESULTS

A total of 385 women of the reproductive age (15-49 years) met the recruitment criteria and were recruited in this cross sectional study. There were nearly equal distributions in participant and hospital of recruitment; 192 (49.9%) from Banadir Hospital versus 193 (50.1%) from SOS Hospital.

#### **4.1 Distribution of socio-demographic characteristics of the study participants**

Table 4.1 illustrates some of the selected socio-demographic characteristics among the study participants. The table shows a significant difference in the frequency of study participants based on age classification ( $P = 0.046$ ) and that the mean age of the participants was 25.46 within the age range of 16 to 45 years, the majority (58.2%) of the participants were aged between 21-30 years. With respect to the level of education majority 57.4% of the participants had no formal education of which 39.2% of them attended Madrasa. There was a significant difference in the frequency of study participants based on education level ( $P = 0.001$ ). Majority (94%) of the participants were married while only 6% were separated/divorced ( $P = 0.001$ ). Most of the study participants were unemployed (88%) with only about 12% in employment ( $P = 0.001$ ). The majority (62.3%) of participants had monthly income less than or equal to 200 USD with only 8.6% of them earning  $\geq 401$  USD ( $P = 0.001$ ). In regard to household population (76.4%) of the participants were from household with  $\geq 5$  persons with a range of 1 to 12 persons ( $P = 0.001$ ).

**Table 4.1: Distribution of socio-demographic characteristics of the study participants**

Variable	Unit	Number	Percentage	$\chi^2$	df	P value
<b>Admitting Hospital</b>	Banadir	192	49.9	0.003	1	0.959
	SOS	193	50.1			
<b>Residency</b>	Eastern	76	19.7	8.008	3	0.001
	Northern	107	27.8			
	Western	111	28.8			
	South Eastern	91	23.6			
<b>Age (Years)</b>	Mean ( $\pm$ SD)	25.46(6.04)		278.034	3	0.046
	Range	26(16-45)				
	15- 20	104	27			
	21-30	224	58.2			
	31-40	53	13.8			
	$\geq$ 41	4	1			
<b>Education level</b>	Primary	102	26.5	160.754	4	0.001
	Secondary	40	10.4			
	Tertiary	22	12.2			
	Non-Formal	221	57.4			
<b>Marrital status</b>	Married	362	94	298.496	1	0.001
	Divorced/Widow	23	6			
<b>Occupation</b>	Employed	21	5.5	550.34	2	0.001
	Self employed	25	6.5			
	Unemployed	339	88			
<b>Family Monthly Income (USD)</b>	None	47	12.2	291.603	3	0.001
	$\leq$ 200	240	62.3			
	201-400	65	16.9			
	$\geq$ 401	33	8.6			
<b>Household population (Persons)</b>	Mean ( $\pm$ SD)	3.4(2.4)		173.117	1	0.001
	Range	11(1-12)				
	1 to 4	91	23.6			
	$\geq$ 5	294	76.4			

USD - USA Dollar; IQR- Interquartile range; SD - Standard deviation;  $\chi^2$ -chi square; df-degrees of freedom; P-Level of significance

#### 4.2 Distribution of the study participants with regards to their obstetric history

As presented in Table 4.2, the age at first delivery for the majority of the study participants (64.9%) was below 20 years versus 35.1% above 21 years ( $P= 0.001$ ). The mean number of pregnancies of the participants was 4.14 (SD = 2.82) ranging from 1 to 17 different pregnancies, with about 50.9% having been pregnant 4 or more times compared to 49.1% who were pregnant 1 to 3 times ( $P= 0.001$ ). The mean number of deliveries was 3.87 (SD = 2.6) ranging from 1 to 12 deliveries with 57.9% having delivered 1 to 3 times compared to 42.1% who delivered 4 or more times ( $P= 0.001$ ). Majority of the study participants (89.9%) carried pregnancies to term with only 6.2% and 3.9% of the participants reporting to have had pre and post term pregnancies, respectively ( $P= 0.001$ ). Almost all the study participants (97.4%) were circumcised with the majority (58.7%) having undergone Firooni (WHO circumcision type 3 and 4) versus 38.7% who had undergone Sunna (WHO circumcision type 1 and 2) ( $P = 0.001$ ).

**Table 4.2: Distribution of the study participants with regards to their obstetric history**

Variable	Unit	Number	Percentage	$\chi^2$	df	P value
Age at first delivery (Years)	<20	250	64.9	284.829	1	0.001
	>21	135	35.1			
Parity	Mean ( $\pm$ SD)	4.14(2.82)		21.286	1	0.001
	Median (IQR)	4(2-6)				
	Range	16(1-17)				
	1 to 3	189	49.1			
	$\geq 4$	196	50.9			
No of deliveries	Mean ( $\pm$ SD)	3.87(2.652)		22.512	1	0.001
	Median (IQR)	3(2-5)				
	Range	11(1-12)				
	1 to 3	223	57.9			
	$\geq 4$	162	42.1			
Gestation period last pregnancy	Pre term	24	6.2	554.094	2	0.001
	Full term	346	89.9			
	Post term	15	3.9			
Type of circumcision	Sunna	149	<b>38.7</b>	261.947	2	0.001
	Firooni	226	58.7			
	Not circumcised	10	2.6			

$\chi^2$ -chi square; df-degrees of freedom; P-Level of significance

### 4.3 Distribution of the study participants with regards to their Antenatal care history

The majority (81.8%) participants attended antenatal care during their last pregnancy versus only 18.2% who did not attend ANC (P= 0.001). About half (50.9%) of participants decided on their own to attend ANC while 25.2% attended ANC through influence from their husbands (P= 0.001). About 39.7% participants started ANC during the first trimester of pregnancy with 24.1% starting during the third trimester (P= 0.001). The majority of the study participants (60.3%) attended ANC in a public clinic while 30.8% attend ANC in a private clinic (P= 0.001). Majority of the participants (81.3%) received tetanus toxoid vaccination during their ANC visits versus 18.7% who did not receive TT vaccine (P= 0.001). About 42.1% of the participants had positive attitude toward the ANC care givers while 6.2% had a negative attitude towards ANC health personnel (P= 0.001). (Table 4.3).

**Table 4.3: Distribution of the study participants with regards to their Antenatal care history**

Variable	Unit	Number	Percentage	$\chi^2$	df	P value																																																																																
ANC Attendance	Yes	315	81.8	155.909	2	0.001																																																																																
	No	70	18.2				ANC attendance decision maker	Self	196	50.9	280.597	3	0.001	Husband	97	25.2	Friend	44	11.4	Others	48	12.5	ANC Type	Public	190	60.3	125.886	2	0.001	Private	97	30.8	TBA/Others	28	8.9	ANC start time	First trimester	125	39.7	12.59	2	0.001	Second trimester	114	36.2	Third trimester	76	24.1	TT vaccination	Yes	313	81.3	150.86	1	0.001	No	72	18.7	Opinion towards ANC personnel	Strongly agree	162	42.1	163.674	3	0.001	Agree	155	40.3	Disagree	44	11.4	Strongly disagree	24	6.2	Opinion towards of ANC facility	Strongly agree	168	43.6	179.499	3	0.001	Agree	155	40.3	Disagree	40
ANC attendance decision maker	Self	196	50.9	280.597	3	0.001																																																																																
	Husband	97	25.2																																																																																			
	Friend	44	11.4																																																																																			
	Others	48	12.5				ANC Type	Public	190	60.3	125.886	2	0.001	Private	97	30.8	TBA/Others	28	8.9	ANC start time	First trimester	125	39.7	12.59	2	0.001	Second trimester	114	36.2	Third trimester	76	24.1	TT vaccination	Yes	313	81.3	150.86	1	0.001	No	72	18.7	Opinion towards ANC personnel	Strongly agree	162	42.1	163.674	3	0.001	Agree	155	40.3	Disagree	44	11.4	Strongly disagree	24	6.2	Opinion towards of ANC facility	Strongly agree	168	43.6	179.499	3	0.001	Agree	155	40.3	Disagree	40	10.4	Strongly disagree	22	5.7												
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	Third trimester	76	24.1				TT vaccination	Yes	313	81.3	150.86	1	0.001	No	72	18.7	Opinion towards ANC personnel	Strongly agree	162	42.1	163.674	3	0.001	Agree	155	40.3	Disagree	44	11.4		Strongly disagree	24	6.2				Opinion towards of ANC facility	Strongly agree	168	43.6	179.499	3	0.001	Agree	155	40.3	Disagree	40	10.4		Strongly disagree	22	5.7																																	
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	Disagree	40	10.4																																																																																			
	Strongly disagree	22	5.7																																																																																			

ANC - antenatal care; TT - Tetanus toxoid vaccination;  $\chi^2$ -chi square; df-degrees of freedom; P-Level of significance

#### **4.4 Informants response on ANC attendance and choice of the place of delivery**

Varied response were gathered on ANC attendance and delivery choice. And on the message given during ANC attendance that makes women deliver at hospital;

*Experienced Mother said “Yes, there are some women who attend the ANC to know their wellbeing and their baby’s wellbeing but again it does not mean that they are planning to deliver that same place because in our country we don’t have the system of following up the pregnant women who have attended the ANC. Mostly mother’s prefers to do checkups (baby wellbeing) and when she comes to deliver she just go to the nearest place not the health facility that she attended before for ANC. The reasons on why mothers attend ANC and they don’t deliver in a hospital is that the hospitals don’t have proper systems they don’t have medical records and they don’t give out any cards at the ANC and there is no regular doctor which follow up the mother. It is just that the mother visits the health facility when she feels unwell while she is pregnant and after that she just goes to the easiest place to deliver there. For me I don’t think that there is a particular message which is given to the mothers at ANC”.*

*Medical Doctor said “Yes, there are women who attend ANC but don’t plan to deliver at the health facility. Yes, we do explain to them the advantage and the importance to deliver at hospital for the mother’s health and the newborn”.*

*Religious Leader said “Yes, some women attend the ANC but do not plan to deliver there, because of socio-economic reasons (expenses), socio-cultural reasons (decision makers don’t allow that women are supposed to deliver in a hospital), and finally due to socio-demographic reasons (women don’t know what to choose and why to choose because of ignorance). There is no particular message at all that is given to the mothers who attend the ANC”.*



Community Leader said *“Yes, there is a quiet number of people who did visit the ANC and yet don’t plan to deliver there. The reasons why women attend ANC and yet they don’t plan to deliver there is that the system here in this country is that most of the ANC centers do not have delivery setup and the only thing that they can do is that they refer you to a hospital or a health center where the mother can deliver in, so most women decide to do checkups and receives TT vaccine then they deliver at home. Yes, the hospitals give messages to the mothers in fact in form of pictures and posters in the entrances and waiting areas for both whom can read and for those whom can’t read”*.

#### 4.5 Distribution of the study participants with regards to their Intrapartum care and previous medical history

As it is noted in Table 4.3, 60.5% of the study participants delivered their children at the hospital while 23.6% delivered at home (P= 0.001). Most of the participants (86%) had vaginal delivery and only 10.6% underwent caesarian section (P= 0.001). Majority (79.5%) of participants were assisted by trained health professionals (65.2% nurses and 14.3% doctors) during their delivery while only 18.7% were assisted by TBA (P= 0.001).

Only 20.8% of the participants reported previous medical complications and 85% of those who had previous medical conditions were worsened but only 20.6% had to terminate pregnancy due to those Previous medical conditions (P= 0.001).

**Table 4.4: Distribution of study participants with regards to their Intrapartum care and previous medical history**

Variable	Unit	Number	Percentage	$\chi^2$	df	P value
<b>INTRAPARTUM CARE</b>						
<b>Place of deliver</b>	Home/TBA	91	23.6	131.553	2	0.001
	Health center	61	15.8			
	Hospital	233	60.5			
<b>Mode of delivery</b>	Vaginal delivery	331	86	483.138	2	0.001
	Assisted vaginal delivery	13	3.4			
	Caesarean section	41	10.6			
<b>Assisted Delivery</b>	None	7	1.8	355.353	3	0.001
	TBA	72	18.7			
	Nurse	251	65.2			
	Doctor	55	14.3			
<b>PAST MEDICAL HISTORY</b>						
<b>Existence of past medical history</b>	Yes	80	20.8	131.494	1	0.001
	No	305	79.2			
<b>Types of past medical condition (n = 80)</b>	Diabetes mellitus	5	6.3	26.2	3	0.001
	Hypertension	21	26.3			
	Cardiac disease	17	21.3			
	Others	37	46.3			
<b>Worsening of medical condition (n = 80)</b>	Yes	68	85	161.042	1	0.001
	No	12	15			
<b>Pregnancy termination during past medical history (n = 68)</b>	Yes	14	20.6	23.529	1	0.001
	No	54	79.4			

TBA - Traditional birth attendance;  $\chi^2$ -chi square; df-degrees of freedom; P-Level of significance

#### **4.6 Informants response on place of delivery**

Concerning the place where majority of women in Mogadishu deliver; all of them concurred that most women deliver at home.

Experienced Mother said *“mostly women deliver at the TBA centers that are located inside the house of the TBAs and TBAs don’t offer the required care and they don’t have enough equipment and training”*.

Medical Doctor said *“most women deliver at home, because of socio-demographic and socio-cultural reasons”*

Religious Leader said *“most women deliver at home as I seen in all my neighborhood and my relatives but I don’t know the reason”*

Community Leader said *“my opinion on where do most women deliver is that most women deliver at home”*

#### **4.7 Informants response on reasons for home deliveries**

Generally reasons for home deliveries that were gathered in this study can be grouped into four socio-ecological units of analysis: client-based factors (awareness, experiences, expectations, income, employment, family); community-based factors (care and support, stigma and discrimination and traditional healing); health facility-based factors (interactions with care providers, availability of care, quality of care, distance, affordability, logistics availability, follow up and service administration); and policy and standards (healthcare financing, service standards, implementation manuals and policy documents) were mentioned. Some of what were said by the informants in support included;

Experienced Mother said *“some families cannot afford to pay the expenses of delivering in a hospital and on another hand she cannot leave her kids behind without any guardian the only time that she can leave them is when she feels that is about to deliver that is when she runs to nearest place and most probably in this country it is only TBA’s whom are located everywhere”*

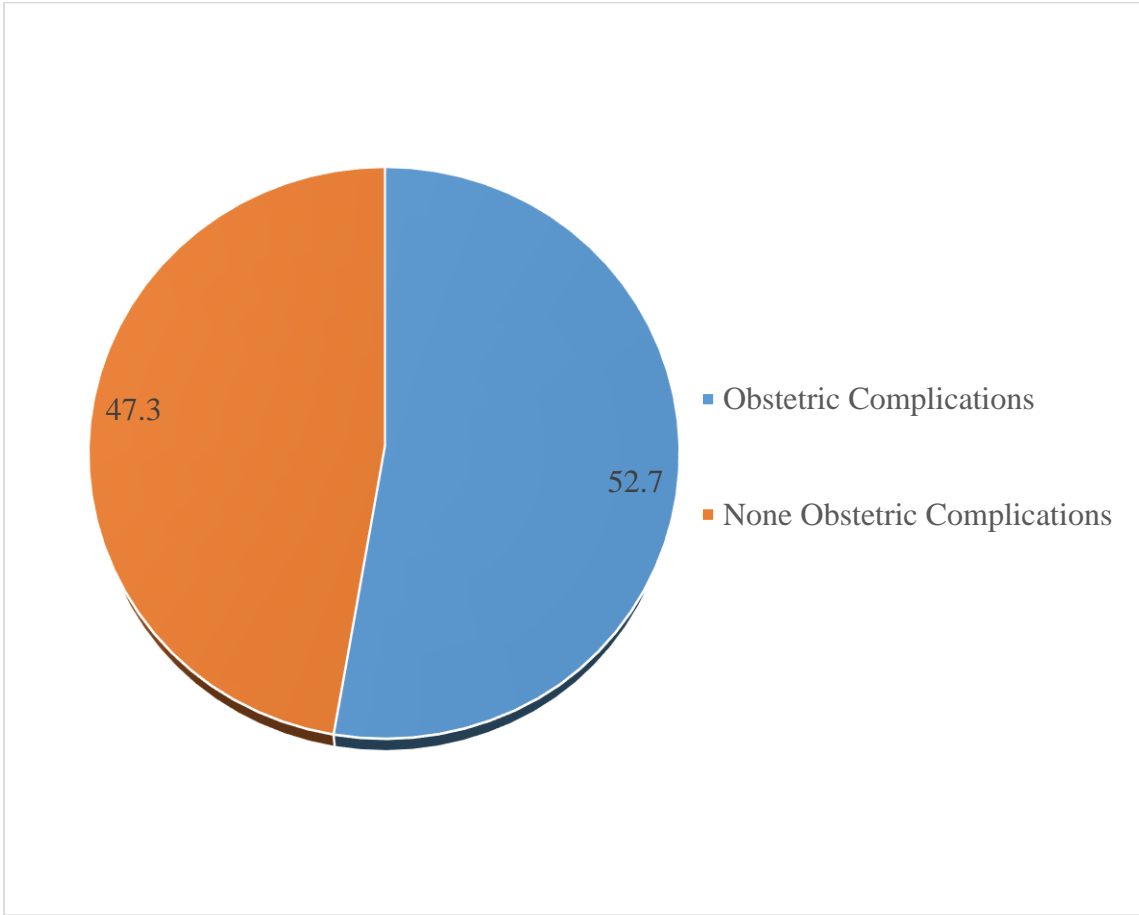
Community leader said *“mother’s residence (urban or rural), her social class (upper, middle or low) and the security decides her place of delivery. I am saying that because in this country there are few public and private health facilities due to the civil war in the last quarter century and it is very difficult that every woman get accessed to a health facility that is why most women deliver at home”*. This participant further stated that *“security and economic is still unstable; there is few public health facilities which are not yet enough to cover the needs of all women whom are delivering and not that every women can afford the charges of the private health facilities, and even for those whom can afford the charges of the private health facilities cant dare access to hospitals at night time due to security related issues that is why most women prefers to deliver at home. And I don’t think there are demographic reasons behind women delivering at home”*.

Medical Doctor said *“the socio-demographic and the socio-cultural reasons that make women deliver at home are; that most women believe on the old midwives who delivers them at home at the same time they believe that if they go to the hospital they may end up with cesarean section and not normal delivery, some of them they believe on their grandmother’s advice on delivering at home not in a hospital, some of the women can’t access the services either there is no transport or no money. Some has another reason which is that there is no guardian whom will take of her other children at home”*

Religious leader said *“the socio-demographic reasons that makes mothers deliver at home is ignorance, there are a big number of mothers who have not gone to school and some of them are too young to think and take decisions”*. Further the participant stated *“On another hand, there are some socio-cultural reasons which make women to deliver at home, for example in some families in-laws don’t allow their daughter in-law to be attended in a hospital. Some other cases are that the husband does not allow to his wife to deliver in a hospital. Thus most women don’t have any rights to choose their place of delivery and that is why they deliver at home”*.

**4.8 Prevalence of Childbirth complications in Mogadishu, Somalia**

From the study a total of 203 out of 385 (52.7%) participants had childbirth complications (Figure 4.1)



**Figure 4.1: Prevalence of Childbirth complications in Mogadishu, Somalia**

#### **4.9 Informants suggestions on how to reduce Childbirth complications**

Varied response were gathered on how mothers can prevent complications of childbirth and to encourage delivering in the hospital.

Experienced Mother said *“I have an advice or a suggestion which is that the whole community close their hands together and enhance the community’s awareness especially for those who work on the women’s affairs. What is needed to be changed in the hospitals is to enhance the prevention strategies. And when the mother visits the hospital the hospital should treat her as if they are responsible from the community not for the sake of their income, I hope that the hospitals petty their community, I know that our community needs awareness we need to tell the mothers that after herself there is someone else who lives inside her and she need to take about those two people. Mothers should know what is good for their health and what is not good and she has to eat nourished food. I don’t think TBAs can work anymore we should help them get new carriers”*.

Medical Doctor said *“Community health workers to educate mothers and pregnant women about complications of childbirth and the disadvantages of delivering at home. The hospital to provide ambulances for emergencies and qualified midwives and doctors. To educate and re-assure the pregnant mother that we don’t operate every mother. To involve the mothers and the grandmothers to the community health workers”*.

Religious Leader said *“My suggestions to prevent complications of childbirth are to leave FGM and to educate the young girls and get free health facilities that can attend any single women whom are willing to deliver and finally we need to promote the awareness of our society and to overcome the challenges that our women are facing all of us as a community. What is needed to be changed in the hospitals is to get mobile teams; ambulances for each hospital assure easy and safe access to the health facilities. The community should be aware of that only a*

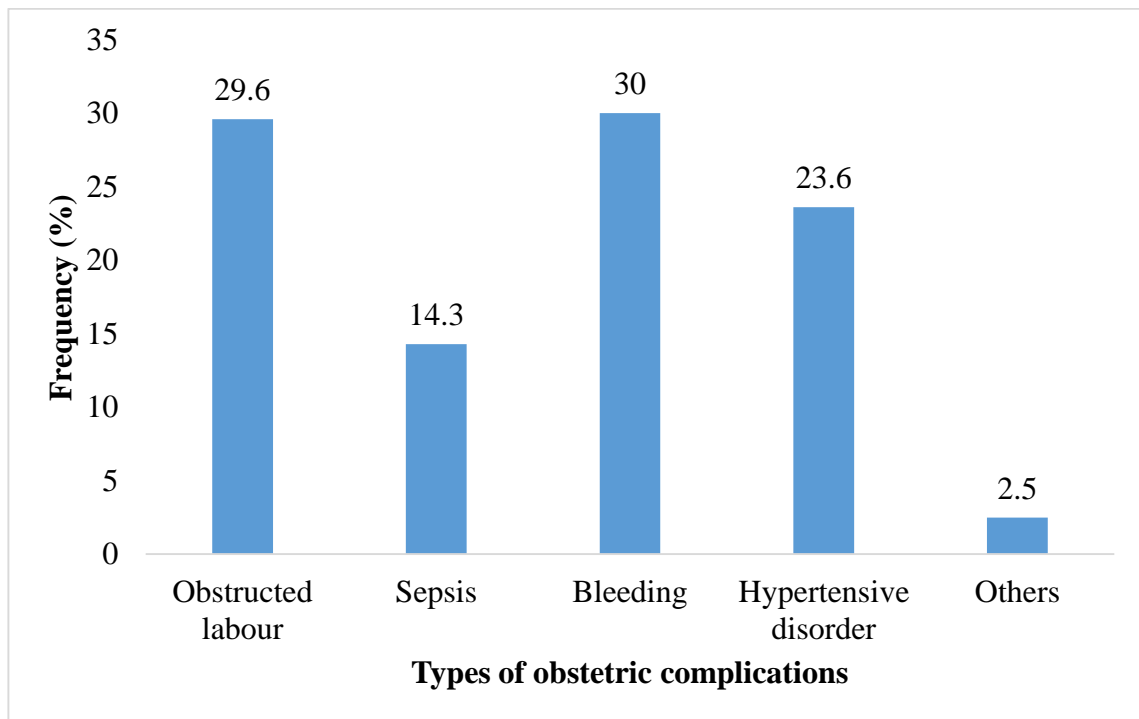
*healthy and an educated mother can give birth and raise a healthy and educated offspring”.*

Community Leader said *“My suggestion is that the government needs to offer free health facilities for both pregnancy and childbirth that is the only way that the mothers can prevent complications of childbirth, and it also encourages the mothers to deliver in a hospital once there is no charges. What are needs to be changed in the hospitals are to get more public hospitals that every woman can get accessed to. In the community they have to change their attitude and educate the young girls and stop FGM to avoid childbirth complications. TBAs are not the less we cannot ignore them but we need to train them so that they also assist the women when they are not able to get accessed to a health facility”.*



#### 4.10 Distribution of the study participants by their type of obstetric complication

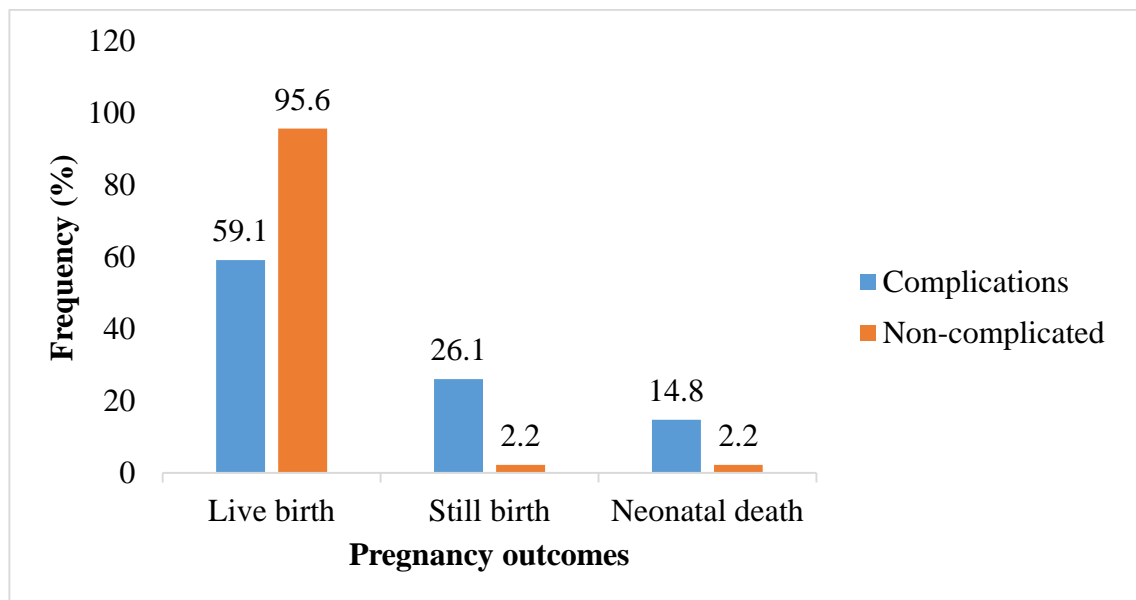
From the survey, a total of 203 out of 385 (52.7%) participants had complications associated with child birth. This included 61/203 (30%) bleeding/post-partum hemorrhage, 60/203 (29.6%) obstructed labor, 48/203 (23.6%) hypertensive disorder, 29/203 (14.3%) sepsis and 5/203 (2.5%) other obstetric complications (Figure 4.2).



**Figure 4.2: Distribution of the study participants by their type of obstetric complications**

#### 4.11 Distribution of the study participant's pregnancy outcomes between obstetric complications versus those with no obstetric complications

Compared to participants who had no obstetric complication, those with complications resulted in more cases of adverse outcomes such 53/203 (26.1%) still births and 30/203 (14.8%) neonatal death. More live births 174/182 (95.6%) occurred in women who had no obstetric complications compared to 120/203 (59.1%) who had complications (Figure 4.3).



**Figure 4.3: Distribution of the study participant's pregnancy outcomes between obstetric complications versus those with no obstetric complication**

#### 4.12 Socio-economic factors associated with childbirth complications

Table 4.5 shows socio-economic factors associated with childbirth complication. In bivariate analysis, participants who were employed were less likely to have obstetric complications (OR 0.6, 95% CI 0.4 to 0.9) compared to those who were unemployed. On the other hand, participants who had no monthly income were more likely to have obstetric complication (OR 1.7, 95% CI 1.1 to 3.2) than those who earned  $\geq 400$  USD. In multivariate analyses, after adjusting only participants who were employed (OR 0.6, 95% CI 0.6 to 0.9) were associated with obstetric complication.

**Table 4.5: Socio-economic factors associated with childbirth complications**

Variable	Sample size	Child Birth complications		P value	Bivariate OR (95% CI)	P value	Multivariate OR (95% CI)
		No	%				
<b>Residency</b>							
Eastern	76	44	57.9	0.586	1.12(0.7-1.7)	0.896	1(0.7-1.6)
Northern	107	47	43.9	0.432	0.9(0.6-1.3)	0.52	0.8(0.6-1.3)
Western	111	65	58.6	0.512	1.1(0.8-1.7)	0.748	1.1(0.7-1.6)
South Eastern	91	47	51.6	Referent	Referent	Referent	Referent
<b>Age grouping</b>							
15- 20	104	62	59.6	0.698	0.8(0.2-2.5)	0.828	1.1(0.6-1.9)
21-30	224	113	50.4	0.498	0.7(0.2-2.1)	0.928	1.1(0.6-1.8)
31-40	53	25	47.2	0.448	0.6(0.2-2)	0.893	0.9(0.6-1.7)
$\geq 41$	4	3	75	Referent	Referent	Referent	Referent
<b>Education level</b>							
Primary	102	54	52.9	1	1(0.7-1.4)	0.876	1.1(0.7-1.4)
Secondary	40	24	60	0.576	1.1(0.7-1.8)	0.653	1.1(0.7-1.8)
Tertiary	22	8	36.4	0.304	0.7(0.3-1.4)	0.415	0.7(0.3-1.6)
Non-Formal	221	117	52.9	Referent	Referent	Referent	Referent
<b>Marrital status</b>							
Married	362	189	52.2	0.58	0.9(0.5-1.5)	0.995	0.9(0.6-1.7)
Divorced/Widow	23	14	60.9	Referent	Referent	Referent	Referent
<b>Occupation</b>							
Employed	21	9	42.9	<b>0.05</b>	<b>0.6(0.4-0.9)</b>	<b>0.05</b>	<b>0.6(0.4-0.9)</b>
Self employed	25	20	80	0.12	0.5(0.4-1.2)	0.437	0.7(0.3-1.6)
Unemployed	339	174	51.3	Referent	Referent	Referent	Referent
<b>Monthly Income (USD)</b>							
No monthly income	47	32	68.1	<b>0.05</b>	<b>1.7(1.1-3.2)</b>	0.165	1.6(0.8-3.2)
$\leq 200$	240	130	54.2	0.274	1.4(0.8-2.4)	0.391	1.3(0.7-2.3)
201-400	65	28	43.1	0.79	1.1(0.6-2.1)	0.819	1.1(0.6-2.1)
$\geq 401$	33	13	39.4	Referent	Referent	Referent	Referent
<b>Household size</b>							
1 to 4	91	77	55.8	0.478	0.8(0.5-1.4)	0.918	0.9(0.5-1.8)
$\geq 5$	294	87	47.8	Referent	Referent	Referent	Referent

No - Number; % - Percentage; OR - Odds ratio; CI - confidence interval

#### 4.13 Obstetric and antenatal factors associated with childbirth complications

Participants who attended ANC were less likely to have obstetric complications than those who did not attend ANC (OR 0.7, 95% CI 0.5 to 0.9). Those participants who attended ANC at a public hospital were less likely to have obstetric complications than those who were attended by a TBA (OR 0.7, 95% CI 0.4 to 0.8). Participants who started ANC in the first trimester were less likely to have obstetric complications compared to those who started ANC during their third trimester (OR 0.7, 95% CI 0.5 to 0.9). In multivariate analysis none of these factors remained associated with obstetric complications (Table 4.6).

**Table 4.6: Obstetric and antenatal factors associated with childbirth complications**

Variable	Sample size	Child Birth complications		P value	Bivariate OR (95% CI)	P value	Multivariate OR (95% CI)
		No	%				
<b>Age at first delivery (Years)</b>							
<20	250	142	56.8	0.135	1.3(0.9-1.7)	0.21	1.2(0.9-1.7)
>21	135	61	45.2	Referent	Referent	Referent	Referent
<b>Parity</b>							
1	76	49	64.5	0.298	1.3(0.8-1.9)	0.868	1.1(0.3-4.3)
2 to 6	237	117	49.4	0.831	0.9(0.7-1.4)	0.621	1.3(0.4-4.1)
≤ 7	72	37	51.4	Referent	Referent	Referent	Referent
<b>No of deliveries</b>							
1	83	54	65.1	0.383	1.2(0.8-1.8)	0.534	0.6(0.1-2.8)
2 to 6	237	114	48.1	0.559	0.9(0.6-1.3)	0.422	0.6(0.2-2.1)
≤ 7	65	35	53.8	Referent	Referent	Referent	Referent
<b>No of alive children</b>							
1	100	68	68	0.227	1.4(0.8-2.2)	0.172	0.172
2 to 6	245	115	46.9	0.794	0.9(0.6-1.5)	0.606	0.606
≤ 7	40	20	50	Referent	Referent	Referent	Referent
<b>Gestation period</b>							
Pre term	24	17	70.8	0.687	1.2(0.5-2.6)	0.771	1.1(0.5-2.6)
Full term	346	177	51.2	0.641	0.9(0.4-1.7)	0.872	0.9(0.5-1.9)
Post term	15	9	60	Referent	Referent	Referent	Referent
<b>Type of circumcision</b>							
Suna	149	80	53.7	0.877	1.1(0.4-2.7)	0.809	1.1(0.4-2.8)
Finori	226	118	52.2	0.924	1.0(0.4-2.6)	0.861	1.1(0.4-2.7)
None	10	5	50	Referent	Referent	Referent	Referent
<b>Attended ANC</b>							
Yes	315	156	49.5	<b>0.05</b>	<b>0.7(0.5-0.9)</b>	0.687	1.2(0.6-2.3)
No	70	47	67.1	Referent	Referent	Referent	Referent
<b>Initiative of ANC attendance</b>							
Self	196	94	48	0.127	0.8(0.6-1.1)	0.879	1.1(0.7-1.6)
Husband	97	52	53.6	0.45	0.9(0.6-1.3)	0.692	1.1(0.7-1.8)
Friends and others	92	53	57.6	Referent	Referent	Referent	Referent
<b>ANC Type</b>							
Public	190	91	47.9	<b>0.5</b>	<b>0.7-0.5-0.9)</b>	0.209	0.7(0.4-1.2)
Private	97	47	48.5	0.114	0.7(0.5-1)	0.299	0.7(0.4-1.3)
TBA/Others	28	18	64.3	Referent	Referent	Referent	Referent
<b>ANC start time</b>							
First trimester	125	56	44.8	<b>0.041</b>	<b>0.7(0.5-0.9)</b>	0.445	0.9(0.6-1.2)
Second trimester	114	57	50	0.135	0.7(0.5-1.1)	0.495	0.9(0.6-1.3)
Third trimester	76	43	56.6	Referent	Referent	Referent	Referent
<b>TT vaccination</b>							
Yes	313	157	50.2	0.149	0.8(0.6-1.1)	0.768	0.94(0.6-1.3)
No	72	46	63.9	Referent	Referent	Referent	Referent

No - Number; % - Percentage; OR - Odds ratio; CI - confidence interval

#### **4.14 Intrapartum care and past medical history factors associated with obstetric complications**

Table 4.7 shows Intrapartum care and past medical history factors associated with obstetric complications. In bivariate analysis, participants who gave birth at home assisted by TBA were more likely to have obstetric complications compared to those who delivered in the hospital (OR 1.7, 95% CI 1.7 to 2.4). Participants those who had worsening of past pre-medical condition preceding the current birth were more likely to have obstetric complications compared to those who had no worsening of previous medical condition (OR 1.6, 95% CI 1.2 to 2.3). Those participants whose current pregnancy were terminated were more likely to have obstetric complications than those who carried pregnancy to full term (OR 1.9, 95% CI 1.1 to 3.4).

On the other hand, participants who had vaginal delivery were less likely to have obstetric complications than those who delivered through caesarian section (OR 0.5, 95% CI 0.3 to 0.6). Those participants who delivery assisted by a nurse were less likely to have obstetric complications compared to those delivered by a doctor (OR 0.4, 95% CI 0.3 to 0.6). Those who gave birth to live children were less likely to have obstetric complications than those who had still births (OR 0.4, 95% CI 0.3 to 0.7).

In multivariate analyses, participants who gave birth at home assisted by TBA (OR 1.6, 95% CI 1.1 to 2.3), those with worsening of past medical condition preceding the current birth (OR 1.5, 95% CI 1.1 to 2.2), those who had vaginal delivery (OR 0.4, 95% CI 0.3 to 0.6) and those who gave birth to live children (OR 0.5, 95% CI 0.4 to 0.7) remained associated with obstetric complications.

**Table 4.7: Intrapartum care and past medical history factors associated with obstetric complications**

Variable	Sample size	Child Birth complications		P value	Bivariate OR (95% CI)	P value	Multivariate OR (95% CI)
		No	%				
<b>Place of delivery</b>							
Home/TBA	91	69	75.8	<b>0.001</b>	<b>1.7(1.7-2.4)</b>	<b>0.007</b>	<b>1.6(1.1-2.3)</b>
Health center	61	32	52.5	372	1.2(0.8-1.8)	0.559	1.1(0.7-1.7)
Hospital	233	102	43.8	Referent	Referent	Referent	Referent
<b>Mode of delivery</b>							
Vaginal delivery	331	149	45	<b>0.001</b>	<b>05(0.3-0.6)</b>	<b>0.001</b>	<b>0.4(0.3-0.6)</b>
Assisted vaginal delivery	13	13	100	1	1(0.5-1.8)	0.453	0.8(0.4-1.5)
Caesarean section	41	41	100	Referent	Referent	Referent	Referent
<b>Delivery Assistance</b>							
None	7	6	85.7	0.994	1(0.4-2.3)	0.795	0.9(0.3-2.8)
TBA	72	55	76.4	0.572	0.9(0.6-1.3)	0.363	0.6(0.2-1.7)
Nurse	251	95	37.8	<b>0.001</b>	<b>0.4(0.3-0.6)</b>	0.55	0.8(0.4-1.6)
Doctor	55	47	85.5	Referent	Referent	Referent	Referent
<b>Current Pregnancy birth outcomes</b>							
Live birth	294	120	40.8	<b>0.001</b>	<b>0.4(0.3-0.6)</b>	<b>0.001</b>	<b>0.5(0.4-0.7)</b>
Neonatal death	34	30	88.2	0.819	0.9(0.6-1.4)	0.453	0.8(0.4-1.5)
Still birth	57	53	93	Referent	Referent	Referent	Referent
<b>Baby birth weight</b>							
Below 2500g	37	21	56.8	0.744	0.9(0.5-1.5)	0.774	1.1(0.7-1.7)
2500-3500g	163	84	51.5	0.317	0.8(0.6-1.2)	0.983	1(0.6-1.7)
Above 3500g	109	51	46.8	0.168	0.8(0.5-1.2)	0.886	1(0.7-1.5)
Don't Know	76	47	61.8	Referent	Referent	0.876	0.9(0.6-1.5)
<b>Past medical history</b>							
Yes	80	51	63.8	0.128	1.3(0.9-1.8)	0.776	1.1(0.7-1.5)
No	305	152	49.8	Referent	Referent	Referent	Referent
<b>Past medical condition</b>							
Diabetes mellitus	5	4	80	0.35	1.6(0.6-4.3)	0.458	1.5(0.5-4.4)
Hypertension	21	11	52.4	0.87	1.1(0.6-1.9)	0.359	0.7(0.3-1.4)
Cardiac disease	17	13	76.5	0.138	1.5(0.9-2.7)	0.505	1.3(0.6-2.5)
Others	37	23	62.2	Referent	Referent	Referent	Referent
<b>Treatment of past medical condition</b>							
Yes	151	80	53	0.956	1(0.8-1.3)	0.93	1.1(0.5-2.1)
No	234	123	52.6	Referent	Referent	Referent	Referent
<b>Duration on treatment during last pregnancy</b>							
Less than 1year	101	49	48.5	0.635	0.9(0.7-1.3)	0.393	0.7(0.4-1.5)
1-5 years	25	17	68	0.32	1.3(0.8-2.1)	0.99	1(0.4-2.3)
6-10 years	11	5	45.5	0.75	0.9(0.4-2.1)	0.584	0.7(0.2-2.2)
More than10years	14	9	64.3	Referent	Referent	Referent	Referent
<b>Worsening of past medical condition</b>							
Yes	68	53	77.9	<b>0.02</b>	<b>1.6(1.2-2.3)</b>	<b>0.05</b>	<b>1.5(1.1-2.2)</b>
No	317	150	47.3	Referent	Referent	Referent	Referent
<b>Pregnancy termination due to past medical condition</b>							
Yes	14	14	100	<b>0.015</b>	<b>1.9(1.1-3.4)</b>	0.218	1.5(0.8-2.8)
No	371	189	50.9	Referent	Referent	Referent	Referent

No - Number; % - Percentage; OR - Odds ratio; CI - confidence interval

#### **4.15 Informants response on Intrapartum care and past medical history factors associated with childbirth complications**

When asked on the occurrence of childbirth complications and what can be its contributing factors, varied response were gathered.

*Experienced Mother said “giving birth has different experiences even in the same mother, the mother can experience differently in different pregnancies. Once the number of pregnancies increases the difficulties might increase, but mostly what transpires during delivery has three stages which the latest stage is giving birth to the baby.*

*If the mother’s health was normal before getting pregnant clean from infections, hypertension, anemia, mostly she will give birth to a healthy baby under normal situation. But if the mother was sick her health condition and her delivery will get complicated, in case the mother experiences bleeding during delivery or her blood pressure raises then she will be suffering.*

*Medical doctor said “pregnant women when it comes for delivery if they are not fully dilated they were told to walk around so the child will come down, up to the delivery time. The baby after born will be upside down to remove the fluids and the secretions and the baby will be slapped from the back. In case of any complication happens they will intervene as appropriately”.*

*Religious Leader said “during delivery women can experience a lot of pain and she might get complicated childbirth after the women deliver she can have bleeding, mothers can either die or survive. Practices that are performed to the newborn babies are many and the once which are very popular are like reading Adhan in the baby’s ears, feeding him/her dates (Islamic tradition) one more practice is painting with kohl on the baby’s eyelids. In case of any complications*

*we do two things one is to take the patient to a hospital or perform ritual sitting and reading Koran on the patient”.*

*Community Leader said “women get a lot of challenges during delivery if the woman had been given good Antenatal care she will be having less or no complications during delivery if the mother was anemic while she was pregnant and she had not given enough care and unfortunately she gets bleeding while she is delivering she will be seriously complicated and she might die do to her weakness. There is some practices that are performed on the newborn baby like; folding on the babies hand something called ‘Malmal” or “Hirsi” on the babies back, and some people they give the mother a metal boot ‘Waran’ or a black knife; for protection from evil caste (Somali culture). In case of any complications they take the mother to the nearest hospital either private or public depending on the families will or some of them send the mother outside the country if her complication is not manageable locally”*



#### 4.16 Health facility level factors associated with obstetric complications

Table 4.8 shows institutional related factors associated with obstetric complications. In bivariate analysis, participants who received care in the health facilities that met their expectations were less likely to have obstetric complications than those whose expectations were not met (OR 0.6, 95% CI 0.47 to 0.78). Further in multivariate analysis women who expectations were met was the only institutional factors that remained associated with obstetric complications (OR 0.4, 95% CI 0.58 to 0.81).

**Table 4.8: Health facility level factors associated with obstetric complications**

Variable	Sample size	Child Birth complications		P value	Bivariate OR (95% CI)	P value	Multivariate OR (95% CI)
		No	%				
<b>Attended a health facility</b>							
Yes	306	156	51	0.214	0.8(0.7 - 1.6)	0.451	0.9(0.7 - 1.6)
No	79	47	59.5	Referent	Referent	Referent	Referent
<b>Health facility attended</b>							
TBA	20	11	55	0.35	1.6(0.6-4.3)	0.458	1.5(0.5-4.4)
Health centre	134	66	49.3	0.87	1.1(0.6-1.9)	0.359	0.7(0.3-1.4)
Public hospital	114	58	50.9	0.138	1.5(0.9-2.7)	0.505	1.3(0.6-2.5)
Private hospital	38	21	55.3	Referent	Referent	Referent	Referent
<b>Scoring of facility staff</b>							
Extremely Good/Good	245	80.1	49	0.817	1.1(0.6-2.1)	0.361	1.6(0.6-4.4)
Fair	40	13.1	80	0.527	1.2(0.7-2.3)	0.22	1.8(0.6-4.7)
Extremely Bad/Bad	21	6.9	51	Referent	Referent	Referent	Referent
<b>Received expectations</b>							
Yes	286	140	49	<b>0.04</b>	<b>0.6(0.47-0.78)</b>	<b>0.04</b>	<b>0.4(0.58-0.81)</b>
No	20	16	80	Referent	Referent	Referent	Referent
<b>Why expectations unmet</b>							
Unavailable	4	3	75	0.287	0.7(0.4-1.3)	0.309	0.6(0.3-1.5)
Lack of staff	3	3	100	0.389	0.8(0.5-1.4)	0.077	0.5(0.2-1.1)
Lack of equipment	7	7	100	0.364	0.7(0.4-1.4)	0.065	0.4(0.1-1.1)
Others	6	3	50	Referent	Referent	Referent	Referent
<b>Distance to ANC (KM)</b>							
<1	89	38	42.7	0.222	0.8(0.5-1.2)	0.878	0.9(0.6-1.4)
1 to 5	164	93	56.7	0.804	1.1(0.7-1.4)	0.48	1.1(0.8-1.6)
>5	132	72	54.5	Referent	Referent	Referent	Referent
<b>Time to ANC</b>							
<30 min	86	47	54.7	0.681	0.9(0.6-1.4)	0.66	1.1(0.7-1.8)
1-2 Hours	156	70	44.9	0.126	0.7(0.5-1.1)	0.459	0.8(0.6-1.3)
> 2 hours	64	33	57.9	Referent	Referent	Referent	Referent

No - Number; % - Percentage; OR - Odds ratio; CI - confidence interval

#### **4.17 Informants response on the obstetric complications and its contributing factors in Mogadishu**

Varied response were gathered on the problems in this community that pregnant women face in accessing delivery services. Several cultural practices that contribute complications of childbirth among women in the reproductive age (15-49 years) in this community were also mentioned. These reasons can also be grouped into four socio-ecological units of analysis: client-based factors (awareness, experiences, expectations, income, employment, family); community-based factors (care and support, stigma and discrimination and traditional healing); health facility-based factors (interactions with care providers, availability of care, quality of care, distance, affordability, logistics availability, follow up and service administration); and policy and standards (healthcare financing, service standards, implementation manuals and policy documents) were mentioned.

*Experienced Mother said “Yes, there are a lot of problems in this community and the biggest problem is the financial problem, the mother doesn’t have money to go and visit the hospital or maybe there is a big distance between her house and the hospital, and may be that she has other kids and she cannot leave them alone and may be due to ignorance the mother doesn’t know why sis she need to visit the doctor and it is one of the serious problem. Most women in their pregnancies they just answer to their needs and she just visits the doctor when she is on pain. Yes, there is a very bad cultural practices that contribute to complications of childbirth and the mothers suffer due to that practice and she might bleed to death due to obstructions that practice is called type III FGM, it is an enemy to the mothers both when she is still a young girl and when she is delivering”.*

*Medical Doctor said “Yes, there is problem in our community that pregnant women face in accessing delivery services. It is difficult to deal with these problem that is why they prefer to stay and deliver at home and traditional midwives comes to see them at home, some of them their family can assist them to reach health facility. Yes, there are; some traditional midwives when the women get tired and*

*cannot push the baby, they try to push it manually and if not successful they don't take them to the hospital fearing of the cesarean section so they wait at home which might lead to still birth, in some cases placenta is retained and yet they don't take her to the hospital which might she bleed to death, in some cases there is uterine rupture and in some other cases if the baby don't cry they cannot resuscitate which leads to birth asphyxia and so many other complications”.*

Religious Leader said *“Yes, there is many problems in our community that pregnant women face in accessing delivery services like distance between the home and the health facility, another problem is taking the decision takes time like the mother has to seek a permission from the husband who might be not around on that time. The other challenge is the transport to be used in this country we don't have enough ambulances everywhere to assist the people whom are in need. They deal with all these problems silently and mostly they end up delivering at home due to delays. Yes, there is a bad culture called FGM specially its 3<sup>rd</sup> type can really contribute prolonged labor that is followed by bleeding in most cases especially in the first delivery”.*

Community Leader said *“The biggest problem in this community that pregnant women face in accessing delivery services is security especially at night time and economic issues knowing that there is only few public health facilities and not that everyone can afford private health facilities. And in case if the mother is poor and had no other option not at less she delivers in. They deal with these problems by delivering at home to avoid any problems and the hospital and transport charges. Yes, there are cultural practices that can contribute complications of childbirth among women in the reproductive age (15-49 years) in this community. One of those practices is called female genital mutilation (FGM); FGM is a very harmful practice which can lead to serious health complications or even death before childbirth and during childbirth, this is a very harmful procedure it causes urine retention before pregnancy and it really complicates the childbirth thus we say*

*please don't do that to your daughters don't close a way that the creator had opened. I want to say two things; first of all this cultural practices are mostly undertaken by women the mother is the one which takes her for circumcision so what I want to say is please don't put your daughter at the same pain that your mother putted you on please spare the young girls there will be a day that they will grow up and become mothers”.*

## CHAPTER FIVE

### DISCUSSION, CONCLUSION AND RECOMMENDATIONS

#### 5.1 Discussion

This study determined the proportion and described the types of obstetric complications among expectant women attending two urban maternal and child clinics in Mogadishu, Somalia in order to identify independent predictors of obstetric complication. Our findings largely support reports in the literature that women of Somali origin both within Somalia and the immigrants in developed countries are at a greater risk of developing child birth complications probably because of poor ANC attendance, poverty, illiteracy, socio-cultural issues (Thierfelder *et al.*, 2005; Malin *et al.*, 2009; Gele, Kumar, Hjelde & Sundby, 2012; Råssjö *et al.*, 2013; Sorbye *et al.*, 2009).

##### 5.1.1 Prevalence of childbirth complications in Mogadishu, Somalia

The current study detected 52.7% participants with childbirth complications. This prevalence was found to be higher than that of studies done in Bangladesh (Sikder *et al.*, 2014), China (Zhu *et al.*, 2016), Tanzania (August, Pembe, Mpembeni, Axemo & Darj, 2015), Ethiopia (Debelew, Afework, & Yalew, 2014) but low compared with study done in South Africa (Allanson, Muller & Pattinson, 2015). The difference in these findings may be that our study participants were recently delivered women while in India were pregnant women and in Uganda were both delivered and pregnant women. Pregnant women may not be able to report complications they have not experienced. This study showed the incidence of bleeding/post-partum hemorrhage (30%), obstructed labor (29.6%), hypertensive disorder (23.6%) and sepsis (14.3%). While a study was done in Bangladesh showed bleeding (12%), obstructed labor (11%), hypertensive disorder (1%) and sepsis (8%) (Sikder *et al.*, 2014). In Ethiopia bleeding (58.4%) and obstructed labor (23.7%) were the most common reported complications (Worku, Yalew & Afework, 2013). In Tanzanian bleeding (12%) and obstructed labor (6%) were reported (Sorensen, Elsass, Nielsen, Massawe, Nyakina & Rasch, 2010). The existence of more cases of

bleeding/post-partum hemorrhage in this and other studies is a major concern because the majority of the complications are unpredictable and the short time interval for postpartum and antepartum hemorrhage complications and death, in the absence of medical interventions (WHO, 2006).

### **5.1.2 Individual level factors associated with childbirth complications in Mogadishu, Somalia**

Economic empowerment through employment and income were important factors in the development of obstetric complications. Reports have shown importance of financial barriers in accessing obstetric care and delays in seeking treating the patient when the complication arises (Borghi, Storeng, & Filippi, 2000; Kabali, Gourbin & De Brouwere, 2011). In the Ivory Coast the need for advance payment of delivery due to lack led to delay in providing hospital care (Gohou *et al.* 2004). Other studies in Bangladesh, Benin, and Morocco also showed that the lack of cash as a determinant of delay in obtaining emergency care and birth complication (Saizonou, Godin, Ouendo, Zerbo & Dujardin, 2006; Pitchforth, Teijlingen, Graham, Dixon & Chowdhury, 2006).

Attendance of antenatal care especially in public hospital and during first trimester of pregnancy was associated with low obstetric complication. The importance of ANC in the maternal service utilizations, like delivery care, and timely care-seeking during obstetric complications has been reported (Rööst, Altamirano, Liljestränd & Essén, 2010; Worku *et al.*, 2013).

More obstetric complications occurred among the women who were attended to by traditional birth attendance which is contrary to a study done in Kenya (Liambila & Kuria, 2014) which showed higher complications among women attended to by skilled providers in health facilities during childbirth. Unlike in Kenya our results probably imply that the TBA lacked the ability to handle complications and are not able to sense the thin line when to refer women they suspect are at a higher risk of developing obstetric complications to health facilities. The association of vaginal delivery, delivery assisted by a nurse and those

who gave birth to live children with less likelihood of obstetric complication confirms further the importance of delivery attended to by skilled personnel. Vaginal delivery and live births probably indicates the lack of complications.

Some other studies among pregnant women have identified other independent factors associated with obstetric complications that we did not either measure or find to be significant in this study, including young age, lack of awareness regarding provision of antenatal care, lack of health education, negligence, financial constraints, environmental and cultural prejudices, male involvement in maternal health care, poor nutritional status of young women (anemia), lack of transport facility, absence of patient counseling prior to planning of mode of delivery particularly in primiparous are the important reasons behind high prevalence rate of these complications (Khan, Wojdyla, Say, Gülmezoglu & Van Look, 2006; Liambila et al., 2014).

### **5.1.3 Health facility level factors associated with childbirth complications in Mogadishu, Somalia**

Finding of the present study is that women who received expected services from the health facilities was an important factor in reducing obstetric complication. This result is consistent with the findings of a study done in Ethiopia where those who had their expectation met from health facilities were more likely to have non complicated birth outcomes (Teferra, Alemu & Woldeyohannes, 2012). This may be because of the information as well as the experiences they have gathered during institutional visits could have positively influenced their decision to deliver in health facilities. Another possible explanation may be that ANC follow up by itself is one of maternal service utilization, so that factors which influence utilization of ANC might have influenced institutional delivery service utilization in a similar manner.

Several limitations of the current study are worth mentioning. First, the main focus of this study was to evaluate the existence of birth complications, valuable clinical information such as possible existence of abortion and medication during pregnancy were not

evaluated. Some health records for some patient such as date of admission and onset of symptoms and accompanying treatment strategies were missing. The cross-sectional nature of this study, inadequate assessment of all pregnancy related history, could partly explain the observed lack of association between obstetric complications with factors identified in other reports stated above.

## **5.2 Conclusion**

- Childbirth complications are high among women in Mogadishu, Somalia especially hemorrhage complications which are known to have short time interval for complications and death, in the absence of medical interventions (WHO, 2006). This calls for the improvement in the awareness and utilization of ANC in which complications are easily identifiable.
- Majority of pregnant women in Mogadishu are young in age, are uneducated, with low family monthly income and mostly are unemployed. Most of them are from large families, with high fertility rates (shown by large numbers of pregnancies). Although the utilization of ANC seems good traditional cultural beliefs such as circumcision and the reliance on the TBAs is still common. ANC initiation in the first trimester, home delivery assisted by TBA, worsening of past medical condition preceding the current birth, current pregnancy termination also played key role in the occurrence of childbirth complications.
- The following factors played key role in the occurrence of obstetric complications in this study: place of delivery, vaginal delivery, deliveries assisted by a nurse, the level of the client's satisfaction and that the few maternal health clinics available are often far from majority of women in this study.



### **5.3 Recommendations**

- The high level of obstetric complication observed in this study is unacceptable and all effort must be put in place to reduce the prevalence. Among other factors improvement in the awareness and utilization of ANC is paramount where complications can be detected early and remedies sought for in time. Further it would be important to conduct a wider larger studies combing wider area using other research designs including observational studies in order to identify the actual magnitude of childbirth complications in a larger are in Mogadishu.
- Mitigating steps such as enforcement of systems that promote acquisition of formal education, women skill empowerment for job creations, also all efforts must be made to reduce the traditional practices that lead to maternal complications such as FGM. Economic empowerment, improved awareness on the importance of ANC, training of TBA would be important in reducing the obstetric complication in this region.
- Developments of more maternal health facilities and that the government and other stake holders to play active role in the advocacy on attendance of modern maternal health facilities.

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## APPENDICES

### Appendix 1: Informed Consent

**Study Title:** Factors Associated with Complications of Childbirth among Women of Reproductive Age (15-49 years) in Mogadishu, Somalia.

#### Principal investigator

Researcher	Institutions	Contacts
Zainab Elmi Duhulo	Jomo Kenyatta University of Agriculture and Technology (JKUAT) Kenya Medical Research Institute (KEMRI)	+252-612-225-553  +254-726-429-464

#### Introduction

You are invited to participate in this study. You have been selected as a possible participant in this study. We ask that we read and explain this form to you as you ask any questions you may have before agreeing to be in this study. The risk of mothers and newborns getting sick and even dying is high during births that occur because of unknown causes. Despite this, complications during childbirth are common in this city and Somalia at large. This study is about the circumstances that contribute complicated childbirth and why this occurs.

#### Purpose of the Study

To find out the reasons and circumstances that complicate childbirth and the factors that can contribute to complicate childbirth among women in the reproductive age (15-49 years) bringing children to the health facilities in Mogadishu, Somalia.

## **Risks of Study Participation**

This study has no known risks. Although your details will be written on paper, no other person will be allowed to read this information except the ones directly involved in this study. There are almost no chances of you getting an injury in the course of our study. Discomfort is not anticipated either as you will complete the questionnaire in absolute privacy.

## **Benefits**

By participating in this study and answering to our questions, you will help to increase our understanding of the reasons and situations that make women experience complications of childbirth, and how to avoid experiencing complications of childbirth. Taking part in this study will not involve any payment.

## **Study Procedures**

If you agree to take part in this study: We shall ask you detailed questions for about 30-45 minutes regarding yourself and circumstances associated with complications of childbirth, whose answers we shall note on paper. The information that you will provide during the study will be kept confidential. Only the interviewer and the researcher will have access to the questionnaires. The information will be destroyed after the study.

## **Confidentiality**

The records of this study will be kept private. The questionnaire will not have your names but codes. The privacy will be enhanced by the use of lockable cabinet. Any publication or presentations arising from this study will not include any information that will make it possible to identify you as a subject. However, this information will only be available to the people who are involved in the study.

### **Voluntary Nature of the Study**

Participation in this study is voluntary. You have the right to refuse to participate or to answer to any question that you feel uncomfortable with. If you change your mind, you have the right to withdraw at any time. If anything is not clear or if you need further information, we shall provide it to you. Your decision whether or not to participate in this study will not affect your current or future relations with this hospital or the other institutions involved. If you decide to participate, you are free to withdraw at any time without affecting those relationships

### **Problems and Questions**

You will be given a copy of this form to take with you. If you have any question or concerns about your rights as a research participant, please contact to:

#### **The Principal;**

College of Health Sciences

Jomo Kenyatta University of Agriculture and Technology

P.O. Box 62200-00200; Nairobi, Kenya

Tel: +254-67-52711/52181-4

director@itromid.jkuat.ac.ke

### **Your Rights as a Study Participant**

This research has been approved by the Ministry of Health of The Federal Government of Somalia. If you have any questions about your right as a research participant you may contact to: The Office of Deputy Minister of Health, Federal Government of Somalia, Tel: +252-615779955 E-mail address: osmandaallo@gmail.com.

**Your statement of Consent and Signature**

If you have read the informed consent, or have had it read and explained to you, and you understand the information and voluntarily agree to join this study, please carefully read the statements below and think about your choice before signing your name:

- I have been given the chance to ask any question I may have and I am content with the answers to all my questions.
- I know that any information I give will kept confidential and that I may leave this study at any time.
- If I leave or refuse to be in the study, I understand that there will be no repercussions.
- The name, phone number and address of whom to contact in case of an emergency has been told to me and has also been given to me in writing.
- I agree to take part in this study as a volunteer, and will be given a copy of this informed consent form to keep.

.....

Participant's name

.....

Participant's Signature and date

.....

Interviewer's name

.....

Interviewer's Signature and date

.....

Researcher's name

.....

Researcher's Signature and date

**Appendix 2: Questionnaire**

<b>STUDY TITLE: FACTORS ASSOCIATED WITH CHILDBIRTH COMPLICATIONS AMONG WOMEN OF REPRODUCTIVE AGE (15-49 YEARS) IN MOGADISHU, SOMALIA</b>		
Questionnaire Serial Identification		
Data collector's name		_____
Date of interview	Day:	_____
	Month:	_____
	Year:	_____
<b>SECTION I: SOCIO-DEMOGRAPHIC DATA</b>		
<b>No</b>	<b>Questions</b>	<b>Coding categories</b>
1.	Residence	_____
2.	How old are you?	Year: _____
3.	How many pregnancies have you had?	_____
4.	How many deliveries have you had?	_____

5.	How many alive children do you have?	_____	
6.	How many weeks of gestation were you while you were delivering your last child	_____	
7.	How old were you while delivered your first baby	_____	
8.	What is the highest of education you attained?	No formal education	1
		Madarasa	2
		Primary	3
		Elementary	4
		Secondary	5
		Higher/university	6
	No response	88	
9.	What is your marital status?	Single	1
		Married	2
		Divorced	3
		Widower	4
		No response	88

<b>SECTION II: SOCIO-ECONOMIC DATA</b>			
<b>No</b>	<b>Questions</b>	<b>Coding Categories</b>	
10.	What is your occupation?	Employed	1
		Self-employed	2
		Unemployed	3

		No response	88
<b>11.</b>	How many people are permanently living in your household?	_____	
<b>12.</b>	What is your total monthly family income?	_____ (SOsh/USD)	

<b>SECTION III: OBSTETRIC HISTORY</b>			
<b>No</b>	<b>Questions</b>	<b>Coding categories</b>	
<b>CIRCUMCISION STATUS</b>			
<b>13.</b>	What is your circumcision status?	Suni (Type1 or Type2)	1
		Firooni (Type3)	2
		Not Circumcised	3
		No response	88
<b>ANTENATAL CARE</b>			
<b>14.</b>	Did you attend a health facility while you were pregnant?	Yes	1
		No	2
		No response	88
<b>15.</b>	If yes, which facility did you attend?	Public facility	1
		Private facility	2
		TBA	3
		Others	77
		_____	
	No response	88	

<b>16.</b>	Who decided on where you will attend the health care while you were pregnant?	Self	1
		Husband	2
		Friend	3
		Others _____	77
		No response	88
<b>17.</b>	When did you start attending the health care while you pregnant?	First trimester	1
		Second trimester	2
		Third trimester	3
		No response	88
<b>18.</b>	Did you receive Tetanus Toxoid injection while you were pregnant?	Yes	1
		No	2
		No response	88
<b>INTRAPARTUM CARE</b>			
<b>19.</b>	Where did you deliver your baby?	Hospital	1
		Health center	2
		Home/TBA	3
		Others _____	77
		Don't know	99
		No response	88
<b>20.</b>	What was the mode of you recent delivery?	Vaginal delivery	1
		Vacuum delivery	2
		Forceps delivery	3
		Caesarean section	4



		Don't know	99
		No response	88
<b>21.</b>	Who assisted you during delivery?	Nurse/Midwife	1
		Doctor	2
		TBA	3
		Alone	4
		Others _____	77
		No response	88
<b>22.</b>	Have you had complicated childbirth	Yes	1
		No	2
		Don't know	99
		No response	88
<b>23.</b>	If Yes, what was the nature?	Obstructed labour	1
		Sepsis	2
		Bleeding/Post-partum hemorrhage	3
		Hypertensive disorders	4
		Others _____	77
		Don't know	99
		No response	88
<b>24.</b>	What was the outcome of your last delivery?	Live birth	1
		Still birth	2
		Neonatal death	3
		Infant death	4
		No response	88
<b>25.</b>	What was the weight of the last baby you delivered at birth?	Below 2500g	1
		2500g-3500g	2

		3500g and above	3
		Don't know	99
		No response	88
<b>PRE-EXISTING CONDITIONS</b>			
<b>26.</b>	Did you have any pre-existing medical conditions in your last pregnancy?	Yes	1
		No	2
		Don't know	99
		No response	88
<b>27.</b>	If Yes, which ones?	Diabetes mellitus	1
		Hypertension	2
		Cardiac disease	3
		HIV/AIDS	4
		Others_____	77
		No response	88
<b>28.</b>	Were you on treatment during the time you had your last pregnancy?	Yes	1
		No	2
		No response	88
<b>29.</b>	If yes, for how long?	Less than one year	1
		1 – 5 years	2
		5 – 10 years	3
		More than 10 years	4
		Others_____	77
		No response	88
<b>30.</b>	Did the condition get worse during the pregnancy?	Yes	1
		No	2

		No response	88
<b>31.</b>	If Yes, did the pregnancy have to be terminated?	Yes	1
		No	2
		No response	88
<b>SECTION IV: INHEALTH FACILITY FACTORS</b>			
<b>No</b>	<b>Questions</b>	<b>Coding categories</b>	
<b>32.</b>	Did you attend health facilities?	Yes	1
		No	2
		No response	88
<b>33.</b>	What type of health Facility did you attend?	Private Hospital	1
		Public Hospital	2
		Health centre	3
		TBA	4
		No response	88
<b>34.</b>	Did you receive all the services you were expecting?	Yes	1
		No	2
		No response	88
<b>35.</b>	If No, why?	Unavailable	1
		Lack of staff	2
		Lack of equipment	3
		Others _____	77
		No response	88
<b>36.</b>	What is the distance from your home to the health facility?	Less than 1KM	1
		1 – 5KM	2
		More than 5KM	3
		No response	88
<b>37.</b>	How long did it take for you to be attended to at the health facility?	Less than 30 minutes	1
		1 – 2 hours	2

		More than two hours	3
		No response	88
<b>38.</b>	What do you think about the health facility staff	Extremely Good/Good	1
		Fair	2
		Extremely Bad/Bad	3
		No Response	88

**Appendix 3: In-Depth Interview Guide**

**STUDY TITLE:** FACTORS ASSOCIATED WITH COMPLICATIONS OF  
CHILDBIRTH AMONG WOMEN OF RERODUCTIVE AGE (15-49 years) IN  
MOGADISHU, SOMALIA

Study site: \_\_\_\_\_ Date: \_\_\_\_\_ Time of the interview: \_\_\_\_\_

Role of the respondent: \_\_\_\_\_

Experience: \_\_\_\_\_

Interviewer's name \_\_\_\_\_

**Interview questions**

1. Where do most women deliver? Why do you think this is so? What are the demographic, social, and cultural reasons for women to deliver at home? Who assists with the deliveries at home?

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2. Kindly explain what transpires during delivery? What about immediately before and after delivery? And what about during delivery and after? What about practices performed on the newborn? Why are these practices performed? What about incase of any complications?

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3. Are there women who attend antenatal clinics (ANC) but do not plan to deliver at the health facility? What are the reasons for this? Is there any particular message given during ANC attendance that makes women deliver at hospital?

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4. Are there problems in this community that pregnant women face in accessing delivery services? How do they deal with these problems? Is there any cultural practices that contribute complications of childbirth among women in the reproductive age (15-49 years) in this community? If there is any, what are they?

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5. Any suggestions on how mothers can prevent complications of childbirth and to encourage delivering in the hospital? What needs to be changed in the hospital? What about in the community? How about the role of TBA's?

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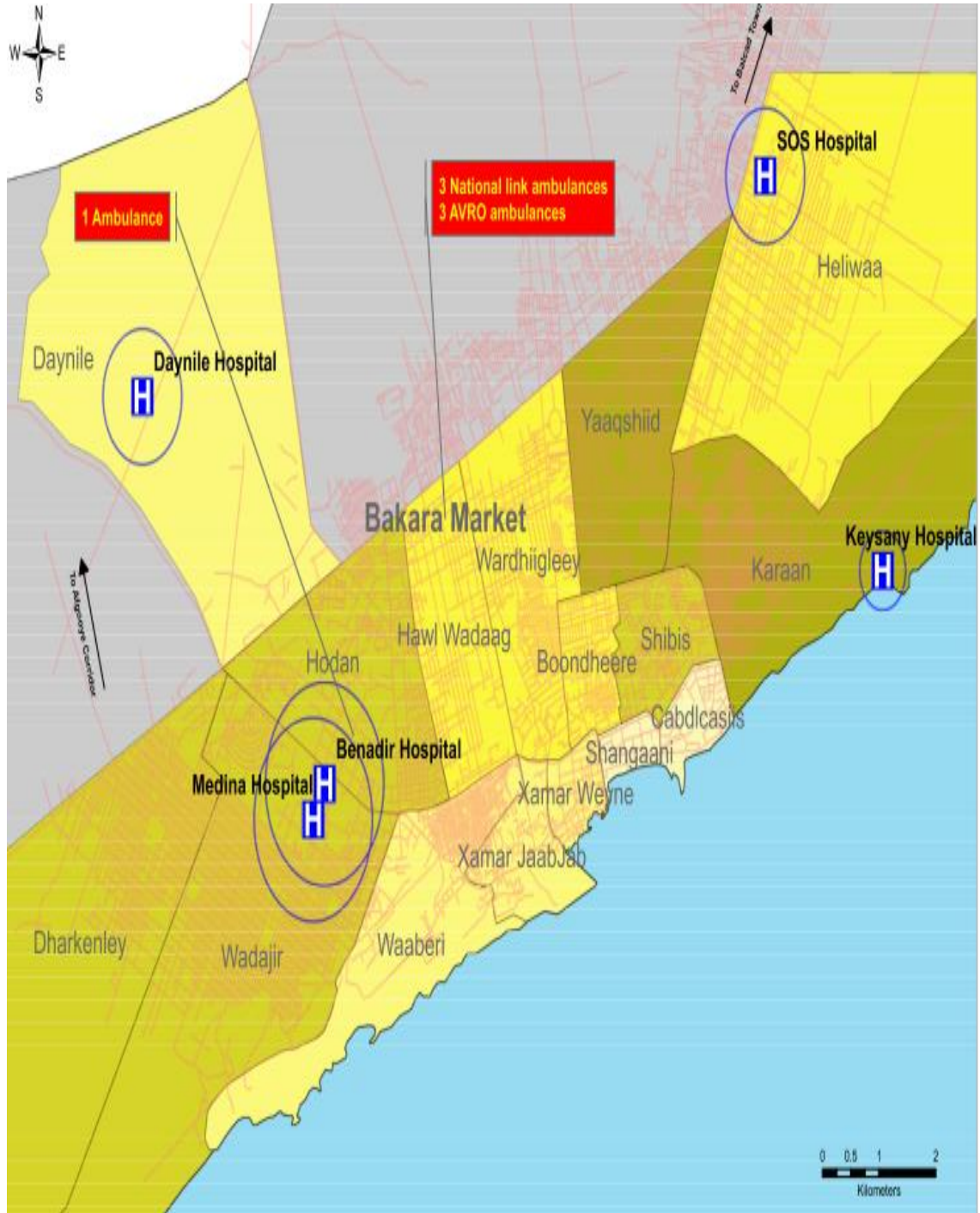
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#### Appendix 4: Map of Mogadishu



Source: Google Maps



## Appendix 5: Map of Somalia



Source: Google Maps

## Appendix 6: Approval Letter by the MOH of the Somali Federal Republic

<p>JAMHUURIYADDA FEDERAL KASOOMAALIYA Wasaaradda Caafimaadka &amp; Daryeelka Bulshada XAFIISKA WASIIRKU XIGEENKA</p>	 <p>Somali Federal Republic Ministry of Health &amp; Human Services Office of Deputy Minister</p>	<p>جمهورية الصومال الفيدرالية وزارة الصحة ورعاية المجتمع مكتب نائب الوزير</p>
--	--	---

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Ref: MOH&HS/DMO/0424/July/2015 21/July/2015/ Mogadishu

**TO: WHOM IT MAY CONCERN**

**Subject: RESEARCH AUTHORIZATION**

Dear **ZAINAB ELMI DUHULO**

Following your application for authority to carry out research on  
"PREVALENCE AND FACTOR ASSOCIATED WITH COMPLICATION OF  
CHILDBIRTH AMONG WOMEN OF REPRODUCTIVE AGE (15-49) IN  
MOGADISHU, SOMALIA.

I am pleased to inform you that you have been authorized to undertake  
the research.

You are advised to report to the Ministry of Health before embarking on the  
research Project.

On completion of research you are expected to submit one hard copy and  
one soft copy of the research report /theses to our office within one month.

Best Regards,

Hon. Osman Abdi Mohamed (Daallo) 

Acting & Deputy Minister of Health, Federal Government of Somalia



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Tel: +252-615779955 E-mail: osmandaallo@gmail.com Mogadishu-Somalia

## Appendix 7: Approval Letter by Ethics & Research Committee – KNH/UoN



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



**KNH-UoN ERC**  
Email: [uonknh\\_erc@uonbi.ac.ke](mailto:uonknh_erc@uonbi.ac.ke)  
Website: <http://www.erc.uonbi.ac.ke>  
Facebook: <https://www.facebook.com/uonknh.erc>  
Twitter: @UONKNH\_ERC [https://twitter.com/UONKNH\\_ERC](https://twitter.com/UONKNH_ERC)



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

Ref: KNH-ERC/A/492

7<sup>th</sup> December, 2015

Zainab Elmi Duhulo  
Reg. No. TM 310- 2073/ 2014  
J.K.U.A.T

Dear Zainab,

**Revised research proposal: Perception and factors associated with complications of childbirth among women of reproductive age (15- 49) in Mogadishu, Somalia (P474/07/2015)**

This is to inform you that the KNH- UoN Ethics & Research Committee (KNH-UoN ERC) has reviewed and **approved** your above proposal. The approval periods are 7<sup>th</sup> December 2015 – 6<sup>th</sup> December 2016.

This approval is subject to compliance with the following requirements:


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

This information will form part of the data base that will be consulted in future when processing related research studies so as to minimize chances of study duplication and/ or plagiarism.

Protect to discover

For more details consult the KNH- UoN ERC website <http://www.erc.uonbi.ac.ke>

Yours sincerely,



**PROF. M.L. CHINDIA**  
**SECRETARY, KNH-UoN ERC**

- c.c. The Principal, College of Health Sciences, UoN  
The Deputy Director, CS, KNH  
The Chair, KNH-UoN ERC  
The Assistant Director, Health Information, KNH  
Supervisors: Prof. Simon Karanja (J.K.U.A.T), Dr. Yeri Kombe (KEMRI)

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## Appendix 8: Research Clearance from SOS Hospital



July 29.2015

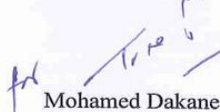
**TO WHOM IT MAY CONCERN**

**Subject: RESEARCH CLEARANCE**

**Zainab Elmi Duhulo (TM 310-2073/2014)**

This is to certify that the above named student researcher from Jomo Kenyatta University of Agriculture and Technology has permitted to carry out filling the questionnaire of the study named **Prevalence and Factors Associated with Complications of Childbirth among Women of Reproductive Age (15 – 49) in Mogadishu, Somalia** from SOS Hospital in Mogadishu, Somalia.

Yours faithfully;

  
Mohamed Dakane

**Medical Director SOS Hospital**



Mother and Child Clinic  
Mogadishu

Westlands, Off Waiyaki Way  
Mahiga Mairu Avenue  
Westcom Point Building  
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00508 Nairobi  
Kenya

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M +254 (0) 728 888 132  
[www.sos-childrensvillages.org](http://www.sos-childrensvillages.org)

A loving home for every child

## Appendix 9: Research Clearance from Banadir Hospital

**Banadir Hospital**

Ministry of Health  
Mogadishu-Somalia



**مستشفى بنادر**

وزارة الصحة

مقديشو- صوماليه

Ref: BH/0062/08/15

Date: August 01, 2015

To: MATERNITY DEPARTMENT

Subject: RESEARCH CLEARANCE

The management hereby requests the head of the above mentioned department that the following student researcher from Jomo Kenyatta University of Agriculture and Technology be allowed to get answers for her questionnaires in partial fulfillment of the requirement for Master of Science in Public Health:

**ZAINAB ELMI DUHULO (TM 310-2073/2014)**

The researcher's topic is **Prevalence And Factors Associated With Complications Of Childbirth Among Women Of Reproductive Age (15-49) In Mogadishu, Somalia.**

Please facilitate the researcher in all her attempts to fill the questionnaires

Thanks

**Abdiwahab A. Elmi**

**Hospital Manager**



Website: [www.banadirhospital.com](http://www.banadirhospital.com) E-mail: [ADMIN@banadirhospital.com](mailto:ADMIN@banadirhospital.com)  
Contacts: +252-612253333 Or +252-62290118

## Appendix 10: Publication

# Journal of Health, Medicine and Nursing

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## Obstetric Complications in Two Major Urban Maternal and Child Clinics in Mogadishu Somalia: A Cross Sectional Study on Prevalence and Associated Factors

Zainab Elmi Duhulo, Yeri Kombe, Simon Karanja

### Abstract

Somalia has the highest adult lifetime risk of maternal mortality of 1 in 18. Few pregnant women visit the antenatal care and have access emergency obstetric care services to detect and handle complications at childbirth. We assessed the cases of obstetric complications and associated factors in two major maternal and child clinic in urban areas of Mogadishu Somalia. This cross sectional study was conducted between 2015 and 2016 among women who had given birth at Banadir Maternity and Children Hospital and SOS Maternal and Child Clinic in Mogadishu Somalia. Participants' information was collected through interviews and health records. Data were analyzed using bivariate and multivariable logistic regression to determine factors associated with being prepared, with statistically significant level at  $p < 0.05$ . A total of 203 out of 385 (52.7%) women had obstetric complications. This included 30% severe bleeding, 29.6% obstructed labor, 23.6% hypertensive disorder and 14.3% cases of sepsis. Employment status (OR 0.6, 95% CI 0.4 to 0.9) monthly income (OR 1.7, 95% CI 1.1 to 3.2), antenatal care attendance (OR 0.7, 95% CI 0.5 to 0.9), ANC initiation in the first trimester (OR 0.7, 95% CI 0.5 to 0.9), home delivery assisted by Traditional Birth Attendance (OR 1.7, 95% CI 1.7 to 2.4), worsening of past medical condition preceding the current birth (OR 1.6, 95% CI 1.2 to 2.3), current pregnancy termination (OR 1.9, 95% CI 1.1 to 3.4), vaginal delivery (OR 0.5, 95% CI 0.3 to 0.6), delivery assisted by a nurse (OR 0.4, 95% CI 0.3 to 0.6) were associated with obstetric complication. The high proportion of obstetric complication especially hemorrhage among women in Mogadishu Somalia, requires that women be monitored closely during pregnancy to reduce complications and death, in the absence of medical interventions. Economic empowerment, improved awareness of ANC, training of TBA would be key in reducing the obstetric complication in this region

**Keywords:** Obstetric complications, prevalence and associated factors, two major urban maternal and child health clinic, Mogadishu Somalia

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## Obstetric Complications in Two Major Urban Maternal and Child Clinics in Mogadishu Somalia: A Cross Sectional Study on Prevalence and Associated Factors

Zainab Elmi Duhulo<sup>1\*</sup> Yeri Kombe<sup>2</sup> Simon Karanja<sup>1</sup>

1.College of Health Sciences, Jomo Kenyatta University of Agriculture and Technology, off Thika Road, P.O. Box 103122 - 00101, Nairobi, Kenya

2.Centre for Public Health Research, Kenya Medical Research Institute (CPHR-KEMRI) Kenyatta National Hospital Complex off Ngong Road, P.O. Box 20752 - 00202, Nairobi, Kenya

### Abstract

Somalia has the highest adult lifetime risk of maternal mortality of 1 in 18. Few pregnant women visit the antenatal care and have access emergency obstetric care services to detect and handle complications at childbirth. We assessed the cases of obstetric complications and associated factors in two major maternal and child clinic in urban areas of Mogadishu Somalia. This cross sectional study was conducted between 2015 and 2016 among women who had given birth at Banadir Maternity and Children Hospital and SOS Maternal and Child Clinic in Mogadishu Somalia. Participants' information was collected through interviews and health records. Data were analyzed using bivariate and multivariable logistic regression to determine factors associated with being prepared, with statistically significant level at  $p < 0.05$ . A total of 203 out of 385 (52.7%) women had obstetric complications. This included 30% severe bleeding, 29.6% obstructed labor, 23.6% hypertensive disorder and 14.3% cases of sepsis. Employment status (OR 0.6, 95% CI 0.4 to 0.9) monthly income (OR 1.7, 95% CI 1.1 to 3.2), antenatal care attendance (OR 0.7, 95% CI 0.5 to 0.9), ANC initiation in the first trimester (OR 0.7, 95% CI 0.5 to 0.9), home delivery assisted by Traditional Birth Attendance (OR 1.7, 95% CI 1.7 to 2.4), worsening of past medical condition preceding the current birth (OR 1.6, 95% CI 1.2 to 2.3), current pregnancy termination (OR 1.9, 95% CI 1.1 to 3.4), vaginal delivery (OR 0.5, 95% CI 0.3 to 0.6), delivery assisted by a nurse (OR 0.4, 95% CI 0.3 to 0.6) were associated with obstetric complication. The high proportion of obstetric complication especially hemorrhage among women in Mogadishu Somalia, requires that women be monitored closely during pregnancy to reduce complications and death, in the absence of medical interventions. Economic empowerment, improved awareness of ANC, training of TBA would be key in reducing the obstetric complication in this region

**Keywords:** Obstetric complications, prevalence and associated factors, two major urban maternal and child health clinic, Mogadishu Somalia.

### Introduction

Although the 3<sup>rd</sup> Universal Sustainable Development Goals (USDG) advocates for the healthy lives and promotion of well-being for all at all ages by 2030 (ICSU, ISSC, 2015), global maternal mortality still remains a challenge with 62% of the global annual maternal deaths reported in Sub Saharan Africa (WHO, 2014). Women in Africa because of more number of child birth and the greater risk with each pregnancy, the lifetime risk of dying from pregnancy-related complications or during childbirth are higher than other continent estimated at one in 38 versus one in 3,700 in the developed world (WHO, 2014; United Nation, 2014). Chad and Somalia are among the countries with the highest adult lifetime risk of maternal mortality of 1 in 15 and 1 in 18, respectively (WHO, 2014). About 80 percent of maternal deaths are due to pregnancy and childbirth related causes such as: unsafe abortion and obstetric complications such as severe bleeding, infection, hypertensive disorders, and obstructed labor (Measure communication, 2000). Other than studies done among Somali immigrants in developed countries which have reported varied outcomes in the rates of anaemia, gestational diabetes, hypertension, (Johnson et al., 2005; Robertson et al., 2005; Small et al., 2008), no data are available on the cases of obstetric complication and associated factors in Somalia.

Many countries, particularly in sub-Saharan Africa, still have unsatisfactory levels of reproductive health visits (Wang et al., 2011). The Somali women both in Somalia and in other countries have low levels of access to quality reproductive health services (Malin & Gissler, 2009; Råssjö et al., 2013; Sorbye & Leigh, 2016). This is particularly worse in Somalia where investment in reproductive health is disproportionately low (Sorbye & Leigh, 2016). Poverty, underdevelopment, conflict, and internal displacements (Menkhaus, 2006; World Bank, 2015), insufficient health hospitals and professionals (Capobianco, 2008; Dagne, 2009; Sorbye & Leigh, 2016), illiteracy and the low value placed on women's health, and social and cultural norms such as female genital mutilation (Thierfelder et al., 2005) has been associated with obstetric complication in Somalia. Following a fragile, but positive, transition mid-2012, Somalia has a full federal government in Mogadishu committed to inclusiveness, reconciliation and peace, based on a provisional constitution (World Bank, 2015). This study documents cases of obstetric complications and associated factors among the two largest reproductive health



clinics in Mogadishu Somalia.

## **METHODS**

### **Study design and Settings**

This cross sectional study conducted between 2015 to 2016, recruited consenting women of reproductive age (15-49 years), had a one-month delivery prior the study and had attended the Banadir Maternity and Children Hospital and SOS Maternal and Child Clinic during their pregnancy. Formula for estimating the population proportion with specified relative precision described by Lemeshow *et al.* (1990) was used to determine the number of participants in this study. Setting  $\alpha$  at 0.05, and a childbirth complication rate of 50%, a total of 385 women were recruited to achieve 0.90 power. Of the 385 women 76 were from Eastern Mogadishu, 107 from Northern, 111 from Western and 91 from Southern Mogadishu.

### **Data collection**

#### **Structured face to face interviews**

Face to face interviews were conducted among the 385 consenting women using structured questionnaires to gather information related to child birth and associated complication. The questionnaires were translated into the local Somali language and were done by trained women of Somali origin. Further, women's health records were accessed while a check-list was used to gather information related to the health facility.

### **Ethical consideration**

The research protocol was approved by ethical review committees of both the Ministry of Health and Human Rights of the Federal Government of Somalia (MOH and HS/DMO/0424/July 2015) and the Kenyatta National Hospital and University of Nairobi, Kenya (KNH-ERC/A/492) prior to commencement of field activities. Permission were obtained from the two participating health facility while written informed consent was obtained from each participant. Confidentiality was maintained by assigning all participants unique identification number. All data were stored in a restricted-access room at the research station. This research adhered to the STROBE guidelines for observational studies as outlined at: <http://www.strobe-statement.org>.

### **Statistical analyses**

Descriptive statistics frequency (%), mean, standard deviation and medium (interquartile ranges at 25% and 75%) were used to present the quantitative data. The overall cases of obstetric complications were determined for all participants. In bivariate analyses, odds ratios (OR) and 95% confidence intervals (CI) for the association between obstetric complications and socio-demographic, household demographic, awareness and reproductive health patterns characteristics were calculated using Poisson regression. In multivariate analyses, a manual backward elimination approach was used to reach the most parsimonious model including factors that were associated with obstetric complications among this population at the significance level of  $P \leq 0.05$ . All statistical analyses were performed using STATA version 13 (StataCorp LP, College Station, TX, USA).

## **RESULTS**

### **Socio demographic characteristics**

In this study, all the 385 recruited participants responded to the face to face interview using structured questionnaire (100% response rate). As shown in Table 1, the mean age was 25.46 (SD  $\pm$  6.04) ranging from 16 to 45 years. About 31.2% participants were aged 25 to 29 years with the least 14.3% aged 30 to 34 years. Slightly over half (57.4%) participants had no formal (such as Madrassa) education type. Majority of women (94%), were currently married, 88% were unemployed and 62.3% had a family monthly income of  $\leq$ 200 USD. The mean household number of occupants was 3.4 (SD  $\pm$ 2.4) ranging from 1 to 12 persons, with about 47.3% participants from household with 6 to 10 persons and 16.9% participants from households with more than 11 persons.

**Table 1: Socio demographic characteristics of participants (n = 385)**

Variable	Unit	Number	Percentage
<b>Admitting Hospital</b>	Banadir	192	49.9
	SOS	193	50.1
<b>Residency</b>	Eastern	76	19.7
	Northern	107	27.8
	Western	111	28.8
	South Eastern	91	23.6
<b>Age (Years)</b>	Mean ( $\pm$ SD)	25.46(6.04)	
	Median (IQR)	25(20-29.5)	
	Range	26(16-45)	
	15- 20	104	27
	21-30	224	58.2
	31-40	53	13.8
<b>Education level</b>	$\geq 41$	4	1
	Primary	102	26.5
	Secondary	40	10.4
	Tertiary	22	12.2
<b>Marrital status</b>	Non-Formal	221	57.4
	Married	362	94
<b>Occupation</b>	Divorced/Widow	23	6
	Employed	21	5.5
	Self employed	25	6.5
<b>Family Monthly Income (USD)</b>	Unemployed	339	88
	None	47	12.2
	$\leq 200$	240	62.3
	201-400	65	16.9
<b>Household population (Persons)</b>	$\geq 401$	33	8.6
	Mean ( $\pm$ SD)	3.4(2.4)	
	Median (IQR)	3(1-5)	
	Range	11(1-12)	
	1 to 4	91	23.6
	$\geq 5$	294	76.4

USD - USA dollar

**Obstetric and antenatal care**

As presented in Table 2, the age at first delivery for majority of participants (64.9%) was below 20 years. The mean number of pregnancies for the participants was 4.14 (SD  $\pm$  2.82) ranging from 1 to 17 different pregnancies. Up to 61.6% of the participants had been pregnant 2 to 6 times. Mean number of deliveries were 3.87 (SD  $\pm$  2.6) ranging from 1 to 12 deliveries with most (89.9%) pregnancies carried to full term. The majority (81.8%) of the women attended antenatal care during their last pregnancy, with 60.3% attending a public ANC clinic. About 39.7% participants started their ANC during their first trimester of pregnancy where a majority 81.3% received tetanus toxoid vaccination.

About 42.1% participants had positive attitude toward the ANC care giver for which 43.6% approved of the quality of the ANC facility. For about 42.6% participants, the ANC facility was within 1 to 5 kilometers away from their residential areas, while 51% spent 1 to 2 hours to reach their ANC facility. The ANC services met the expectation of most (93.5%) participants.

**Table 2: Obstetric and antenatal care**

Variable	Unit	Number	Percentage
<b>OBSTRETIC CARE</b>			
<b>Age at first delivery</b>	≤20 years	250	64.9
	≥20 years	135	35.1
<b>Parity</b>	Mean (± SD)	4.14(2.82)	
	Median (IQR)	4(2-6)	
	Range	16(1-17)	
	1 to 3	189	49.1
<b>No of deliveries</b>	≥4	196	50.9
	Mean (± SD)	3.87(2.652)	
	Median (IQR)	3(2-5)	
	Range	11(1-12)	
	1 to 3	223	57.9
<b>Gestation period last pregnancy</b>	≥4	162	42.1
	Pre term	24	6.2
	Full term	346	89.9
	Post term	15	3.9
	<b>ANTENATAL CARE</b>		
<b>ANC Attendance</b>	Yes	315	81.8
	No	70	18.2
<b>ANC attendance decision maker</b>	Self	196	50.9
	Husband	97	25.2
	Friend	44	11.4
	Others	48	12.5
<b>ANC Type</b>	Public	190	60.3
	Private	97	30.8
	TBA/Others	28	8.9
<b>ANC start time</b>	First trimester	125	39.7
	Second trimester	114	36.2
	Third trimester	76	24.1
<b>TT vaccination</b>	Yes	313	81.3
	No	72	18.7
<b>Opinion towards ANC personnel</b>	Strongly agree	162	42.1
	Agree	155	40.3
	Disagree	44	11.4
	Strongly disagree	24	6.2
<b>Opinion towards of ANC facility</b>	Strongly agree	168	43.6
	Agree	155	40.3
	Disagree	40	10.4
	Strongly disagree	22	5.7
<b>Distance to ANC (KM)</b>	<1	89	23.1
	1to 5	164	42.6
	>5	132	34.3
<b>Time to ANC</b>	<30 min	86	28.1
	1-2 Hours	156	51
	> 2 hours	64	20.9
<b>ANC meets expectation</b>	Yes	286	93.5
	No	20	6.5

ANC - antenatal care; TT - Tetanus toxoid vaccination; KM - kilometers

**Intrapartum care and previous medical history**

As it is noted in Table 3, about 60.5% participants delivered their children at the hospital within their reach, where 86% had normal delivery. About 79.6% participants were assisted by trained health professionals (65.3% nurses and 14.3% doctors).

Only about 20.8% participants reported previous medical complications which included 26.3% hypertension, 21.3% cardiac related diseases and 6.3% diabetes. These previous medical conditions worsened during pregnancy for majority 85% of participants. About 20.6% of the participants terminated their pregnancy due to these conditions

**Table 3: Intrapartum and past medical history**

Variable	Unit	Number	Percentage
<b>INTRAPARTUM CARE</b>			
<b>Place of deliver</b>	Home/TBA	91	23.6
	Health center	61	15.8
	Hospital	233	60.5
<b>Mode of delivery</b>	Vaginal delivery	331	86
	Assisted vaginal delivery	13	3.4
	Caesarean section	41	10.6
<b>Assisted Delivery</b>	None	7	1.8
	TBA	72	18.7
	Nurse	251	65.2
	Doctor	55	14.3
<b>PAST MEDICAL HISTORY</b>			
<b>Existence of past medical history</b>	Yes	80	20.8
	No	305	79.2
<b>Types of past medical condition (n = 80)</b>	Diabetes mellitus	5	6.3
	Hypertension	21	26.3
	Cardiac disease	17	21.3
	Others	37	46.3
<b>Worsening of medical condition (n = 80)</b>	Yes	68	85
	No	12	15
<b>Pregnancy termination during past medical history (n = 68)</b>	Yes	14	20.6
	No	54	79.4

TBA - Traditional birth attendance

**Obstetric (child birth related) complications**

From the survey, a total of 203 out of 385 (52.7%) participants had complications associated with child birth. This included 61/203 (30%) bleeding, 60/203 (29.6%) obstructed labor, 48/203 (23.6%) hypertensive disorder, 29/203 (14.3%) sepsis and 5/203 (2.5%) other obstetric complications (Figure 1).

Compared to participants with no obstetric complication, those with complications resulted in adverse outcomes such 53/203 (26.1%) obstetric cases verses 4/182 (2.2%) non complicated cases and neonatal death 30/203 (14.8%) verse 4/182(2.2%) neonatal death. Live birth occurred more in non-complicated cases verse in obstetric complication cases 174/182 (95.6%) verses 120/203 (59.1%).

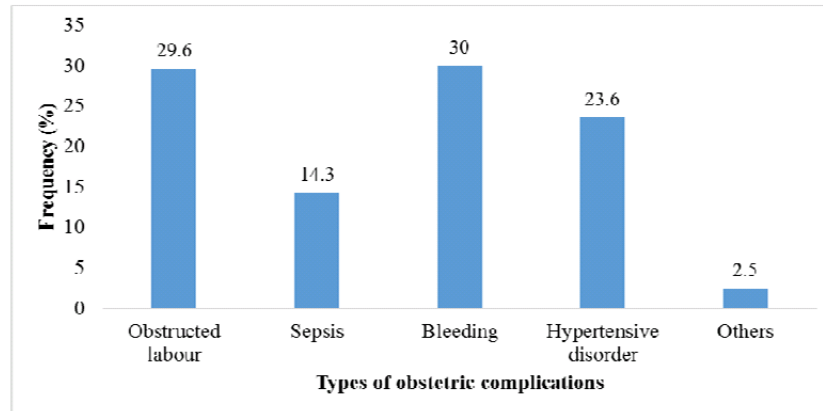


Figure 1: The frequency of obstetric complication by classification

#### Factors associated with child birth complication

Table 4 shows in bivariate analysis that participants who were employed were less likely to have obstetric complications (OR 0.6, 95% CI 0.4 to 0.9). On the other hand, participants who had no monthly income were more likely to have obstetric complication (OR 1.7, 95% CI 1.1 to 3.2). In multivariate analyses, after adjusting for participant's residency, age, education level, marital status, income and household population size only participants who were employed (OR 0.6, 95% CI 0.6 to 0.9) were associated with obstetric complication.

In Table 5 participants who attended antenatal care (OR 0.7, 95% CI 0.5 to 0.9), those who attended public hospital for ANC (OR 0.7, 95% CI 0.4 to 0.8) and those who started antenatal care in first trimester (OR 0.7, 95% CI 0.5 to 0.9) were less likely to have obstetric complications. These factors did not remain significant in multivariate analysis.

In Table 6 participants who gave birth at home assisted by TBA (OR 1.7, 95% CI 1.7 to 2.4), those who had worsening of past medical condition preceding the current birth (OR 1.6, 95% CI 1.2 to 2.3), and those whose current pregnancy were terminated (OR 1.9, 95% CI 1.1 to 3.4) were more likely to have obstetric complications. On the other hand, vaginal delivery (OR 0.5, 95% CI 0.3 to 0.6), delivery assisted by a nurse (OR 0.4, 95% CI 0.3 to 0.6) and those who gave birth to live children (OR 0.4, 95% CI 0.3 to 0.7) were less likely to have obstetric complications. In multivariate analyses, participants who gave birth at home assisted by TBA (OR 1.6, 95% CI 1.1 to 2.3), those with worsening of past medical condition preceding the current birth (OR 1.5, 95% CI 1.1 to 2.2), those who had vaginal delivery (OR 0.4, 95% CI 0.3 to 0.6) and those who gave birth to live children (OR 0.5, 95% CI 0.4 to 0.7) remained associated with obstetric complications.

**Table 4: Socio-economic factors associated with obstetric complications**

Variable	Sample size	Child Birth complications		Bivariate OR (95% CI)	Multivariate OR (95% CI)
		No	%		
<b>Residency</b>					
Eastern	76	44	57.9	1.12(0.7-1.7)	1(0.7-1.6)
Northern	107	47	43.9	0.9(0.6-1.3)	0.8(0.6-1.3)
Western	111	65	58.6	1.1(0.8-1.7)	1.1(0.7-1.6)
South Eastern	91	47	51.6	Referent	Referent
<b>Age grouping</b>					
15- 20	104	62	59.6	0.8(0.2-2.5)	1.1(0.6-1.9)
21-30	224	113	50.4	0.7(0.2-2.1)	1.1(0.6-1.8)
31-40	53	25	47.2	0.6(0.2-2)	0.9(0.6-1.7)
≥41	4	3	75	Referent	Referent
<b>Education level</b>					
Primary	102	54	52.9	1(0.7-1.4)	1.1(0.7-1.4)
Secondary	40	24	60	1.1(0.7-1.8)	1.1(0.7-1.8)
Tertiary	22	8	36.4	0.7(0.3-1.4)	0.7(0.3-1.6)
Non-Formal	221	117	52.9	Referent	Referent
<b>Marrital status</b>					
Married	362	189	52.2	0.9(0.5-1.5)	0.9(0.6-1.7)
Divorced/Widow	23	14	60.9	Referent	Referent
<b>Occupation</b>					
Employed	21	9	42.9	0.6(0.4-0.9)	0.6(0.4-0.9)
Self employed	25	20	80	0.5(0.4-1.2)	0.7(0.3-1.6)
Unemployed	339	174	51.3	Referent	Referent
<b>Monthly Income (USD)</b>					
None	47	32	68.1	1.7(1.1-3.2)	1.6(0.8-3.2)
≤200	240	130	54.2	1.4(0.8-2.4)	1.3(0.7-2.3)
201-400	65	28	43.1	1.1(0.6-2.1)	1.1(0.6-2.1)
≥401	33	13	39.4	Referent	Referent
<b>Household size</b>					
1 to 4	91	77	55.8	0.8(0.5-1.4)	0.9(0.5-1.8)
≥5	294	87	47.8	0.7(0.4-1.2)	0.8(0.4-1.4)
11 to 15	43	24	55.8	0.8(0.4-1.6)	0.9(0.5-1.9)
Above 15	22	15	68.2	Referent	Referent

No - Number; % - Percentage; OR - Odds ratio; CI - confidence interval

**Table 5: Obstetric and antenatal factors associated with obstetric complications**

Variable	Sample size	Child Birth complications		Bivariate OR (95% CI)	Multivariate OR (95% CI)
		No	%		
<b>Age at first delivery (Years)</b>					
<20	250	142	56.8	1.3(0.9-1.7)	1.2(0.9-1.7)
>21	135	61	45.2	Referent	Referent
<b>Parity</b>					
1	76	49	64.5	1.3(0.8-1.9)	1.1(0.3-4.3)
2 to 6	237	117	49.4	0.9(0.7-1.4)	1.3(0.4-4.1)
≤7	72	37	51.4	Referent	Referent
<b>Gestation period</b>					
Pre term	24	17	70.8	1.2(0.5-2.6)	1.1(0.5-2.6)
Full term	346	177	51.2	0.9(0.4-1.7)	0.9(0.5-1.9)
Post term	15	9	60	Referent	Referent
<b>Type of circumcision</b>					
Sunna	149	80	53.7	1.1(0.4-2.7)	1.1(0.4-2.8)
Finori	226	118	52.2	1.0(0.4-2.6)	1.1(0.4-2.7)
None	10	5	50	Referent	Referent
<b>Attended ANC</b>					
Yes	315	156	49.5	0.7(0.5-0.9)	1.2(0.6-2.3)
No	70	47	67.1	Referent	Referent
<b>ANC Type</b>					
Public	190	91	47.9	0.7(0.4-0.8)	0.7(0.4-1.2)
Private	97	47	48.5	0.7(0.5-1)	0.7(0.4-1.3)
TBA/Others	28	18	64.3	Referent	Referent
<b>ANC start time</b>					
First trimester	125	56	44.8	0.7(0.5-0.9)	0.9(0.6-1.2)
Second trimester	114	57	50	0.7(0.5-1.1)	0.9(0.6-1.3)
Third trimester	76	43	56.6	Referent	Referent
<b>TT vaccination</b>					
Yes	313	157	50.2	0.8(0.6-1.1)	0.94(0.6-1.3)
No	72	46	63.9	Referent	Referent
<b>Distance to ANC (KM)</b>					
<1	89	38	42.7	0.8(0.5-1.2)	0.9(0.6-1.4)
1to 5	164	93	56.7	1.1(0.7-1.4)	1.1(0.8-1.6)
>5	132	72	54.5	Referent	Referent
<b>Time to ANC</b>					
<30 min	86	47	54.7	0.9(0.6-1.4)	1.1(0.7-1.8)
1-2 Hours	156	70	44.9	0.7(0.5-1.1)	0.8(0.6-1.3)
> 2 hours	64	33	57.9	Referent	Referent

No - Number; % - Percentage; OR - Odds ratio; CI - confidence interval

**Table 6: Intrapartum care and past medical history factors associated with obstetric complications**

Variable	Sample size	Child Birth complications		Bivariate OR (95% CI)	Multivariate OR (95% CI)
		No	%		
<b>Place of delivery</b>					
Home/TBA	91	69	75.8	1.7(1.7-2.4)	1.6(1.1-2.3)
Health center	61	32	52.5	1.2(0.8-1.8)	1.1(0.7-1.7)
Hospital	233	102	43.8	Referent	Referent
<b>Mode of delivery</b>					
Vaginal delivery	331	149	45	0.5(0.3-0.6)	0.4(0.3-0.6)
Assisted vaginal delivery	13	13	100	1(0.5-1.8)	0.8(0.4-1.5)
Caesarean section	41	41	100	Referent	Referent
<b>Delivery Assistance</b>					
None	7	6	85.7	1(0.4-2.3)	0.9(0.3-2.8)
TBA	72	55	76.4	0.9(0.6-1.3)	0.6(0.2-1.7)
Nurse	251	95	37.8	0.4(0.3-0.6)	0.8(0.4-1.6)
Doctor	55	47	85.5	Referent	Referent
<b>Current Pregnancy birth outcomes</b>					
Live birth	294	120	40.8	0.4(0.3-0.7)	0.5(0.4-0.7)
Neonatal death	34	30	88.2	0.9(0.6-1.4)	0.8(0.4-1.5)
Still birth	57	53	93	Referent	Referent
<b>Baby birth weight</b>					
Below 2500g	37	21	56.8	0.9(0.5-1.5)	1.1(0.7-1.7)
2500-3500g	163	84	51.5	0.8(0.6-1.2)	1(0.6-1.7)
Above 3500g	109	51	46.8	0.8(0.5-1.2)	1(0.7-1.5)
Don't Know	76	47	61.8	Referent	0.9(0.6-1.5)
<b>Past medical history</b>					
Yes	80	51	63.8	1.3(0.9-1.8)	1.1(0.7-1.5)
No	305	152	49.8	Referent	Referent
<b>Past medical condition</b>					
Diabetes mellitus	5	4	80	1.6(0.6-4.3)	1.5(0.5-4.4)
Hypertension	21	11	52.4	1.1(0.6-1.9)	0.7(0.3-1.4)
Cardiac disease	17	13	76.5	1.5(0.9-2.7)	1.3(0.6-2.5)
Others	37	23	62.2	Referent	Referent
<b>Worsening of past medical condition</b>					
Yes	68	53	77.9	1.6(1.2-2.3)	1.5(1.1-2.2)
No	317	150	47.3	Referent	Referent
<b>Pregnancy termination due to past medical condition</b>					
Yes	14	14	100	1.9(1.1-3.4)	1.5(0.8-2.8)
No	371	189	50.9	Referent	Referent

No - Number; % - Percentage; TBA - Traditional birth attendance; OR - Odds ratio; CI - confidence interval



## DISCUSSION

This study determined the prevalence of obstetric complication among expectant women attending two urban maternal and child clinic in Mogadishu Somalia in order to identify independent predictors of obstetric complications. Our findings largely support reports in the literature that women of Somali origin both within Somalia and the immigrants in developed countries are at a greater risk of developing child birth complications probably because of poor ANC attendance, poverty, illiteracy, socio-cultural issues (Thierfelder et al., 2005; Malin & Gissler, 2009; Gele et al., 2012; Råssjö et al., 2013; Sorbye & Leigh, 2016).

The current study established a prevalence of 52.7% obstetric complications, which is higher than that of studies done in India, China, Tanzania, Ethiopia (Sikder et al. 2014; Debelew et al., 2014; August et al., 2015; Zhu et al., 2016) but low compared with study done in South Africa (Allanson et al. 2015). The difference in these findings may be that our study participants were recently delivered women while in India were pregnant women and in Uganda were both delivered and pregnant women. Pregnant women may not able to report complications they have not experienced.

Bleeding (30%), obstructed labor (29.6%), hypertensive disorder (23.6%) and sepsis (14.3%) were reported in our study. In India 12% hemorrhage, 8% sepsis, 11% obstructed labor and 1% eclampsia were reported (Sikder et al. 2014). In Ethiopia bleeding (58.4%) and prolonged labor (23.7%) were the most common reported complications (Worku et al., 2013). In Tanzanian hemorrhage (12%) and obstructed labor (6%) were reported (Sorensen et al., 2010). The existence of more cases of bleeding/hemorrhage complication in this and other studies is a major concern because the majority of the complications are unpredictable and the short time interval for postpartum and antepartum hemorrhage complications and death, in the absence of medical interventions (WHO, 2006).

Economic empowerment through employment and income were important factors in the development of obstetric complications. Reports have shown importance of financial barriers in accessing obstetric care and delays in seeking treating the patient when the complication arises (Borghini et al., 2008; Kabali et al., 2011). In the Ivory Coast the need for advance payment of delivery due to lack led to delay in providing hospital care (Gohou et al. 2004). Other studies in Bangladesh, Benin, and Morocco also showed that the lack of cash as a determinant of delay in obtaining emergency care and birth complication (Saizonou et al., 2006; Pitchforth et al., 2006).

Attendance of antenatal care especially in public hospital and during first trimester of pregnancy was associated with low obstetric complication. The importance of ANC in the maternal service utilizations, like delivery care, and timely care-seeking during obstetric complications has been reported (Rööst et al., 2010; Worku et al., 2013).

More obstetric complications occurred among the women who were attended to by traditional birth attendance which is contrary to a study done in Kenya (Liambila & Kuria, 2014) which showed higher complications among women attended to by skilled providers in health facilities during childbirth. Unlike in Kenya our results probably imply that the TBA lacked the ability to handle complications and are not able to sense the thin line when to refer women they suspect are at a higher risk of developing obstetric complications to health facilities. The association of vaginal delivery, delivery assisted by a nurse and those who gave birth to live children with less likelihood of obstetric complication confirms further the importance of delivery attended to by skilled personnel. Vaginal delivery and live births probably indicates the lack of complications.

Some other studies among pregnant women have identified other independent factors associated with obstetric complications that we did not either measure or find to be significant in this study, including young age, lack of awareness regarding provision of antenatal care, lack of health education, negligence, financial constraints, environmental & cultural prejudices, male involvement in maternal health care, poor nutritional status of young women (anemia), lack of transport facility, absence of patient counseling prior to planning of mode of delivery particularly in primiparous are the important reasons behind high prevalence rate of these complications (Khan et al., 2006; Liambila & Kuria, 2014).

Several limitations of the current study are worth mentioning. First, the main focus of this study was to evaluate the existence of birth complications, valuable clinical information such as possible existence of abortion and medication during pregnancy were not evaluated. Some health records for some patient such as date of admission and onset of symptoms and accompanying treatment strategies were missing. The cross-sectional nature of this study, inadequate assessment of all pregnancy related history, could partly explain the observed lack of association between obstetric complications with factors identified in other reports stated above

## Conclusions

Obstetric complication is high among women in Mogadishu Somali, especially hemorrhage complications which of the short time interval for complications and death, in the absence of medical interventions (WHO, 2006). This calls for the improvement in the awareness and utilization of ANC in which complications are easily identifiable.

Economic empowerment, improved awareness on the importance of ANC, training of TBA would be important in reducing the obstetric complication in this region

#### Competing interests

The authors declare no competing interests.

#### Authors' contributions

This work was part of Master of Science degree for ZED in public health at the Jomo Kenyatta University of Agriculture and Technology. ZED, SK and YK conceived and designed the study. ZED conducted field work, collected data, conducted data analysis and wrote the draft manuscript. SK and YK advised and supervised data analysis and reviewed the manuscript. All authors read and approved the final manuscript.

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