PERINATAL OUTCOMES OF NEWBORNS DELIVERED BY WOMEN WITH MATERNAL COMPLICATIONS- A PAIRED COHORT STUDY AT KITUI COUNTY REFERRAL HOSPITAL

JOSEPH KITHOKOO MULWA

MASTER OF SCIENCE

(Nursing)

JOMO KENYATTA UNIVERSITY OF

AGRICULTURE AND TECHNOLOGY

2022

Perinatal Outcomes of Newborns Delivered by Women with Maternal Complications- A Paired Cohort Study at Kitui County Referral Hospital

Joseph Kithokoo Mulwa

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Science in Nursing (Midwifery and Reproductive Health) of the Jomo Kenyatta University of Agriculture and Technology

2022

DECLARATION

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

Signature……. Date……..

Joseph Kithokoo Mulwa

This thesis has been submitted for examination with our approval as University Supervisors.

Signature……. Date……..

Dr. Drusilla Makworo, PhD

JKUAT Kenya

Signature……. Date……..

Dr. Elijah Githinji Mwangi, PhD

JKUAT Kenya

DEDICATION

I dedicate this thesis to my spouse Millicent Kalulu, Willy Joseph, my Son Lewis Mulwa Joseph and my daughter Lynne Nzambi Joseph.

ACKNOWLEDGEMENT

I thank my supervisors Dr. Drusilla Makworo and Dr. Elijah Mwangi for their valuable guidance and patience throughout the thesis. I sincerely appreciate the support given to me by all the School of Nursing staff from the start of this thesis. I wish to acknowledge the women who participated in this study from Kitui County referral Hospital, the hospital administration and staff at Kitui County referral hospital and finally the research assistants who assisted me throughout this research thesis. May the almighty God bless you all.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATIONS AND ACRONYMS

K.D.H.S	Kenya Demographic Health Survey
NBU	Newborn Unit
NICU	Neonatal Intensive Care Unit
RMNHCAH	Reproductive Maternal Neonatal Child Adolescent Health
UN	United Nations
UNFPA	United Nations Populations Fund
UNICEF	United Nations Children's Fund
W.H.O	World Health Organization

OPERATIONAL DEFINITION OF TERMS

Exposure Maternal complications, both in pregnancy and in labor.

Gestation This is the state of having one or more than one fetus in the uterus: includes singleton and multiple gestations.

Maternal complications in labor They occur in labour from the first stage, second stage, third stage, and fourth stage as per ICD10 classification. They include: preterm labour, failed induction, long labour, obstructed labor, labour complicated by hemorrhage, labor complicated by the umbilical cord, and complications of anesthesia.

Maternal complications in pregnancy They occur during pregnancy as per ICD10 classification. They include high-risk pregnancy, hypertensive disorders, maternal disorders not related to pregnancy, and disorders related to the amniotic cavity.

Non Exposure Absence of maternal complications both in pregnancy and in labor.

Obstetric Factors These are factors that interfere with newborn outcomes or increase the risk for maternal complications. They include parity, gestation, mode of delivery, obstetric history, and contracted pelvis.

Perinatal Newborn Outcomes Outcomes of pregnancies before delivery, at delivery, and up to 28 days post-delivery. They include Live Births, stillborn, Apgar score, birth weight, Maturity at birth, live or dead perinatally, admission to NBU, development of sepsis, convulsions, jaundice, in-ability to

breastfeed, vomiting everything, and changes of level of consciousness.

Women without Complications They presented without maternal complications in their third trimester and did not develop complications until delivery.

ABSTRACT

Maternal complications during pregnancy and labor are the leading cause of maternal and neonatal deaths globally. Despite existing efforts by the Kenyan Government on maternal and newborn health, there have been high mortality rates amounting to 22 neonatal deaths per 1000 live births. These are far too high compared to the global strategy target of 12 deaths per 1000 live births. The Broad Objective was to determine the perinatal outcomes of newborns delivered by women with maternal complications, at Kitui County Referral Hospital. The study design was a prospective Cohort Hospital-Based study. A total of five hundred and ten (510) pregnant women were recruited for the study and followed up to determine the perinatal outcomes of their newborns. One hundred and two (102) were women with complications and 408 were women without complications. Three hundred and ninety six (396) of the women without complications were followed up until 28 days post-delivery out of whom 32 women were allowed to cross-over living a total of 364. One hundred (100) women with complications in pregnancy were followed up until 28 days post-delivery making a total of 132 women with complications both in pregnancy and labor. Hence a total of 496 respondents participated to the end of follow-up, making a 98% response rate. Participants were recruited consecutively to obtain the required number of participants. SPSS version 21.0 was used to analyze the data. Pearson's chi-square was used to determine the association between exposure (having or not having complications) and the perinatal outcomes of newborns. Logistic regression was used to determine the relationship between perinatal outcomes and obstetric factors. Relative risk was used to measure the association of perinatal outcomes between exposed and un-exposed neonates. The risk of having a low APGAR score among neonates born of mothers with maternal complications was eight times those born of mothers without complications (RR: 8.0; 95% CI 3.427, 18.677) P-value < 0.001. The majority (84.4%, n=27) of the newborns by women with complications were born alive while 15.6% (n=5) were born dead and had died before labor. The risk of being born dead, with a low Apgar score, underweight, via cesarean section, developing diseases within twenty-eight days, and dying were the poor perinatal outcomes found after comparing newborns from the exposed and unexposed groups at Kitui County Referral Hospital. Women from Kitui Rural and Kitui East constituencies, women with nursery school and university education, and employed women were likely to present with maternal complications at Kitui County Referral Hospital. Primi-parity, having a history of multiple gestations, having a previous cesarean section scar, and known bad obstetric history were the obstetric factors influencing perinatal outcomes of newborns at Kitui County referral hospital. Refresher courses on the early diagnosis of obstructed labor due to mal-presentation and contracted pelvis to be done frequently through the continuous medical education to the midwives working at Kitui County Referrals Hospital.

CHAPTER ONE

INTRODUCTION

1.1 Background Information

Maternal complications during pregnancy and labor are the leading cause of maternal and neonatal deaths globally. They pause a serious challenge to the achievement of the global strategy for maternal, children, and adolescent health by the year 2030. They have time and again been linked to both economic and socio-demographic factors of the women involved. The socio-demographic factors include a lack of knowledge on danger signs by the women leading to the late seeking of health care services (WHO, 2017). They have also been mentioned as leading to the 18% contribution of the already existing global burden by the developing countries. Serious evaluation of the maternal medical and obstetric history can assist the health care workers in the detection and prompt management of maternal complications early in pregnancy. The global number of stillbirths is approximately eight million and approximately fifty million women experience maternal complications during pregnancy and delivery (Bener, Salameh, Yousafzai, & Saleh, 2012). Maternal complications are life-threatening to both the mother and the unborn fetus. They can occur during pregnancy, labor, and at birth. The world Health Organization has enlisted five life-threatening complications which many countries have adopted and reported every month. They include severe hemorrhage both antepartum and postpartum, severe pre-eclampsia, sepsis inclusive of severe systemic infections, and ruptured uterus. There are other factors classified as contributing since they are not directly part of the chain of events leading to maternal and newborn outcomes. They include conditions like anemia, epilepsy, and immune suppression due to human immunodeficiency virus infection (World Health Organization, 2011).

Maternal and newborn mortality has been very high in the world with about eight hundred and thirty women dying due to complications of pregnancy and childbirth. Most of the deaths reported worldwide originate from low resource settings with Kenya forming part of the low resource countries in the world. Several primary causes of maternal deaths include hemorrhage due to either placenta abruption or

placenta praevia and sometimes postpartum hemorrhage, high blood pressure in pregnancy known as gestational hypertension and eclampsia in which the high pressures are coupled with proteinuria, an infection which includes severe systemic infections in pregnancy and others like chorioamnionitis and indirect causes like anemia in pregnancy. The risk of a woman dying due to complications of pregnancy and childbirth is 33 times higher compared to a woman living in a developed country and that also puts their newborns at risk of poor outcomes before or after delivery (Ray *et al.,* 2015; Shapiro & Kenshole 2015).

Although in the present times, pregnancy, labor, and delivery have become much safer for both the mother and newborn, complications still occur threatening their wellbeing. The complications likely to occur influence the health of the fetus and can interfere with the newborn outcome after delivery. The potential complications likely to affect most women include high blood pressure in pregnancy classified into preeclampsia, eclampsia and gestational hypertension and superimposed, diabetes in pregnancy known as gestational diabetes, anemia in pregnancy, per vaginal bleeding in pregnancy mostly caused by either placenta praevia or placenta abruption, premature labor, premature rupture of membranes, deep venous thrombosis among many other conditions. When these complications occur, they threaten the pregnant woman's life as well as the normal outcome of the newborn after delivery (Bener *et al.*, 2012; Blomberg *et al.*, 2014).

Over seventy percent of all neonatal mortalities globally have been linked to preterm birth commonly due to maternal complications during pregnancy and labor. Gestational diabetes in pregnancy has been associated with complications like preterm labor, sepsis, Poly-hydromnious, and hypertensive disorders all leading to poor neonatal outcomes (Meshdaghinia *et al.,* 2013). In developing countries, maternal conditions that occur in pregnancy, during or immediately after delivery include hemorrhage, sepsis, and prolonged labor due to obstructed labor. They contribute to very high levels of mortality and disability among newborns. Maternal conditions have been found to contribute to twenty-two percent of the global burden of diseases mainly from the Sub-Saharan countries. This is why more effort must be put across all the African countries to realize the global strategy for women, children,

and adolescents *(Iyengar et al.,* 2012). There has been improvement in Kenya's reproductive and child-health outcomes over time as exhibited by the demographic health survey findings. For example, the infant mortality decreased from 52 to 39 per 1000 live births. The emphasis on mosquito net use, antenatal clinic attendance and hospital delivery by skilled attendants have been linked with the evident decrease. The decrease is promising despite that Kenya still has a very long way to go to avert the already existing burden of maternal and neonatal mortality. Kenya has a maternal mortality rate of 362 per 100,000 live births as estimated by the Kenya Demographic Health Survey 2014. This is still high since the Global Strategy for Women, Children and adolescents targets 70 deaths per 100,000 live births by the year 2030. The World Health Organization, UNICEF, UNFPA, and World Bank Group noted poor progress in the country as far as reduction of maternal mortality is concerned. The most crucial indicators which include coverage and utilization indicate that much work needs to be done to achieve universal health coverage in the country. Contraceptive coverage has increased among married women to 58% in 2014 from 46% in 2009 with unmet needs for family planning which the Global strategy targets to have universal access to all reproductive health services. If unwanted pregnancies are prevented through family planning then unwanted complications will not be experienced and hence no bad outcomes for newborns in the country. It was encouraging that two thirds (61%) took place in a health facility and were delivered by a skilled attendant and the postnatal care increased from 42% in 2009 to 51% in 2014 but a lot needs to be done to achieve the remaining percentages (KDHS, 2014).

1.2 Problem Statement

Maternal complications occurring in pregnancy, during labor, and delivery have been associated with increased mortality rates in the world accounting for over a quarter million maternal deaths globally and 2,700,000 newborn deaths. The global strategy aims at reducing neonatal mortality to less than 12 per 1000 live births by 2030 in every country (Strategy, 2016). Kenya has adopted the global strategy because of saving more lives and introduced free maternity care and free care for all children below five years. Despite the existing efforts by the Kenyan Government, there have been high mortality rates amounting to 22 neonatal deaths per 1000 live births of

which 31.6% had birth asphyxia, 24.6% prematurity, 15.8% sepsis with the remaining having congenital abnormalities. The 22 deaths per 1000 live births are far too high compared to the global strategy target for 12 deaths per 1000 live births (UNICEF, 2015).

According to a confidential inquiry into maternal deaths in Kenya, of the 374 who died after childbirth, 33.2% had a stillbirth which means there is still more effort needed to have a better outcome for women with maternal complications. Of the women who had a stillbirth, most of them died of obstetric hemorrhage 54% (67) and hypertensive disorders in pregnancy, childbirth, and the puerperium period 21% (26)(MOH, 2017). This study aims at determining the perinatal outcomes of newborns delivered to women presenting with maternal complications during the third trimester and in labor compared to perinatal outcomes of newborns delivered by women without maternal complications within the same period.

1.3 Study Justification

Maternal complications have been mentioned as leading to the 18% contribution of the already existing global maternal mortality burden by the developing countries. Maternal complications during pregnancy and labor contribute to increased use of the country's budgetary allocation to the health sector that could be used in development. Preventive, reproductive, maternal, neonatal, child and adolescent health (RMNCAH) investments could lower health care costs in the long run as healthier and well-nourished women, children and adolescents require less health care. Unexpected and catastrophic expenses, especially for the poor, would also be lower (MOH, 2016). Kitui County is one of the largest counties in Kenya covering twenty-four thousand square Kilometers and having only three sites where emergency obstetric complications can be handled. Women who suffer complications have to travel long distances seeking specialized services which also lead to delays. Global evidence clearly shows that investing in RMNCAH is a smart buy. For an additional US$1 invested in women's and children's health, there would be US$9 of economic and social benefits (Global Strategy for Women's Children's and Adolescent's Health 2016-2030, UN) (Iyengar *et al*., 2012). A paired Cohort

study would therefore be suitable to assist the researcher in determining the perinatal outcomes of children delivered to women who present with complications in the third trimester of their pregnancy and during labor. The outcomes shall be compared to those of children delivered to women without complications within the same period.

1.4 Significance of the Study

The study will contribute to addition of knowledge in the maternal and neonatal health on the risk of perinatal outcomes and newborn outcomes brought about by complications during pregnancy and labor. The study will be of great help to the policy makers who can utilize the results and review the policies on complications management and client's follow-up. The county health management team can review their existing strategy and policy and re-direct it towards dealing with the maternal complications within the county. The study will contribute to the already existing research gap whereby many researchers have looked at individual conditions and their newborn outcomes since it will concentrate on all women presenting with complications during their third trimester and in labor.

1.5 Study Questions

1. What are the maternal obstetric factors contributing to perinatal outcomes among newborns delivered at Kitui County Referral Hospital?
2. What are the perinatal outcomes of newborns delivered by women presenting with maternal complications in pregnancy at Kitui County Referral Hospital?
3. What are the perinatal outcomes of newborns delivered by women with maternal complications in labor at Kitui County Referral Hospital?
4. What is the difference in the perinatal outcomes of newborns born to women with maternal complications to those born to women without complications at Kitui County Referral Hospital?

1.6 Hypothesis

There is no relationship between perinatal outcomes of the newborn and maternal complications among newborns at Kitui County referral Hospital.

1.7 Study Objectives

1.7.1 Broad Objective

To determine the perinatal Outcomes of newborns delivered by women with maternal Complications at Kitui County Referral Hospital.

1.7.2 Specific Objectives

1. To find out the maternal obstetric factors contributing to perinatal outcomes among newborns delivered at Kitui County Referral Hospital
2. To determine the perinatal outcomes of newborns delivered by women presenting with maternal complications in pregnancy at Kitui County Referral Hospital.
3. To find out the perinatal outcomes of newborns delivered by women with maternal complications in labor at Kitui County Referral Hospital.
4. To assess the difference in the perinatal outcomes of newborns born to women with maternal complications to those born to women without complications at Kitui County Referral Hospital.

1.8 Theoretical Framework

1.8.1 Hildegard Peplau Theory

Peplau's theory defined Nursing as *"The need of help is met by an interpersonal process of therapy interactions between a person who is healthy or needs health services and a specially trained nurse."* It is a *"maturing force and an educative instrument"* involving an interaction between two or more individuals with a common goal.

A midwife is expected to engage in a therapeutic relationship with women/families who present with complications and assist them to make the best choices for better outcomes.

1.9 Assumptions of the Study

Nurse and patient can interact.

Peplau stressed that as a result of the therapeutic interaction both patients and nurses mature.

Communication and interviewing skills remain fundamental nursing tools.

Peplau believed that nurses should understand themselves clearly in order to promote customer growth and prevent the customers' choices being limited to the nurses.

1.10 Conceptual Framework

The independent variables include socio demographic factors that influence the maternal obstetric factors and both have influence on the perinatal outcomes while maternal complications interfere with both of them becoming the intervening factor.

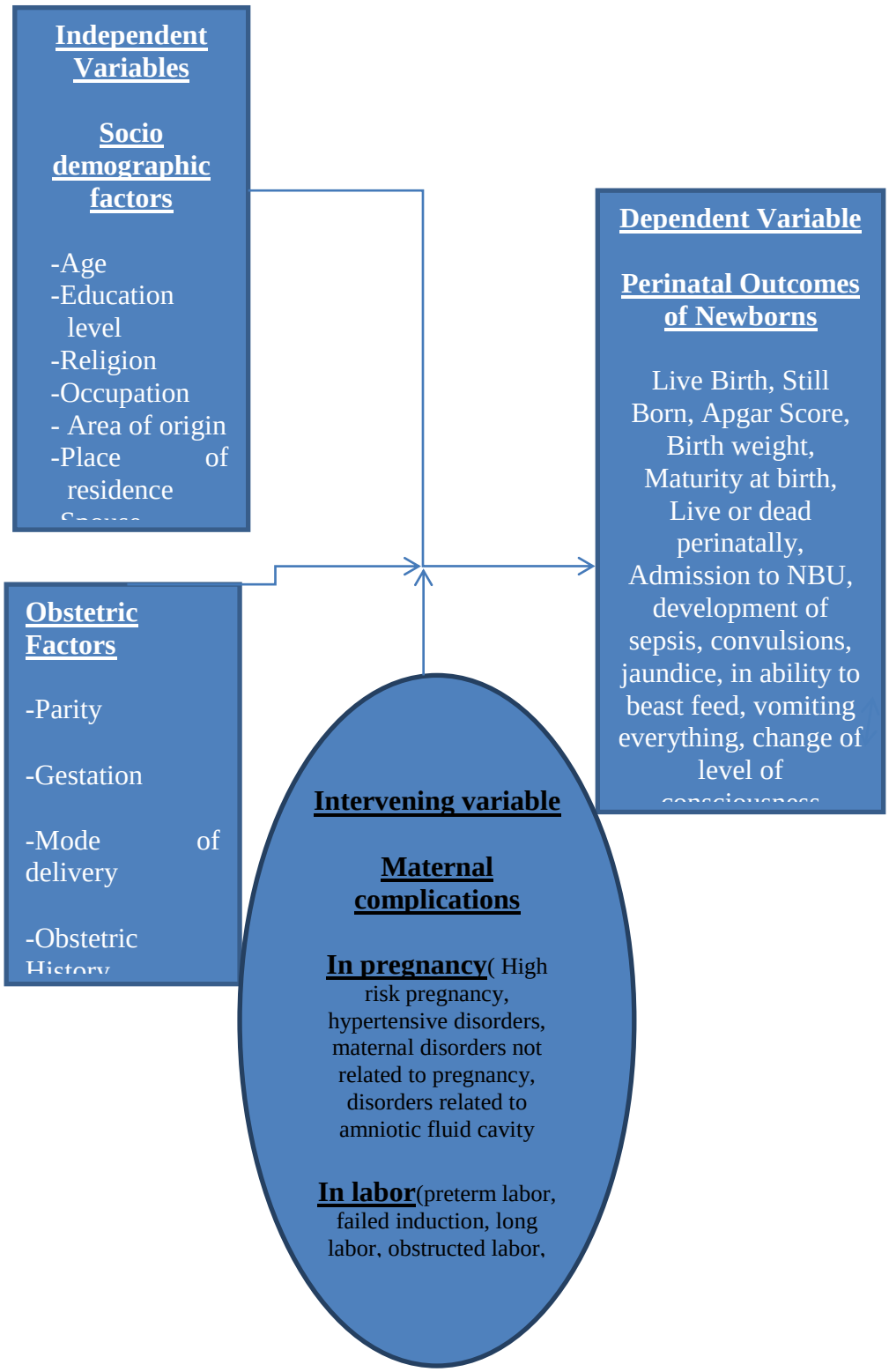


Figure 1.1: Conceptual Framework

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The literature review includes literature on the subject of study as documented by other researchers. The chapter is guided by the study objectives.

2.2 Maternal obstetric factors contributing to perinatal outcomes of the newborn

Obstetric factors influence neonatal outcome. A study among Swedish women established that children born to primiparous teenagers had little likelihood of showing fetal distress and meconium aspiration despite having incidences of Apgar score less than seven in five minutes compared to children born to multiparas women. They were also not more prone to being stillborn or small for gestation compared to the women of the reference group. The neonates born to older women were at a higher risk of being born small for gestation, showing fetal distress after delivery, having an Apgar score less than seven at five minutes, or meconium aspiration and being stillborn. There was also a decrease in the mean birth weight with aggregate motherly age especially after the 30 years of age (Blomberg *et al.,* 2014). Children born to women referred from rural were at higher risk of poor perinatal outcomes following maternal complications (Anggondowati, El-mohandes, Qomariyah, Kiely, Ryon, Gipson, & Wright, 2017).

Studies have shown an increased risk of maternal complications among teenage pregnant women. There has been a focus on adverse obstetrical outcomes in adolescent women. There were high incidences of preterm labor among low birth weight and high incidences of perinatal deaths in teenage mothers. Raatikainen *et al*. as cited by Verma *et al.* (2016), reported no evidence of poor newborn outcomes like preterm delivery, low birth weight, and fetal growth restriction among teenage mothers. There were increased cases among adolescent women of low socio-economic status. There has been an observation of a high risk of poor obstetric

outcomes among women of advanced maternal age. Advanced maternal age has been found to have an increased risk of gestational hypertension, cesarean section, placenta abruption, and low Apgar score in newborns compared to middle-aged women. Advanced maternal age was also associated with antepartum hemorrhage and high incidences of cesarean section (Verma, *et al.,* 2016).

The history of cesarean section is documented to be high among women with pre-gestational diabetes. There was also an increase in the risk of neonatal morbidity among the same group. Ray *et al* as cited by Berner *et al*., (2012) found an increased diagnosis of shoulder dystocia among women with pre-gestational diabetes compared to those who had gestational diabetes. In contrast, there is a decrease in the number of newborns being admitted to NBU among the pre-gestational group compared to women presenting with gestational diabetes (Berner *et al.,* 2012).

2.3 Perinatal outcomes of newborns born by women presenting with maternal complications in pregnancy

Perinatal outcomes are the presence of either of the following; during birth: still birth, low birth weight, preterm birth, admission to neonatal ICU and first minute birth asphyxia.

Newborns by women presenting with pre-gestational diabetes are documented to have high rates of admission to the newborn unit after comparison with newborns by women presenting with Gestational diabetes. Long stay in the neonatal intensive care unit among newborns by women with pre-gestational diabetes compared to newborns by women presenting with gestational diabetes are also reported. Having pre-gestational hypertension is therefore linked to poor neonatal outcomes compared to having gestational hypertension (Berner *et al.,* 2012).

Maternal and neonatal outcomes in pre-gestational and gestational diabetes mellitus, and the influence of maternal obesity and weight gain in Toronto University were studied and it was established that there was a high rate of neonatal intensive care unit admissions among neonates born to women with pre-gestational diabetes mellitus compared to neonates by women with gestational diabetes mellitus. Weight

gain was also considered as a risk for admission in the neonatal intensive care unit especially women who had a body mass index of above thirty per meter squared (Ray *et al.,* 2011). Fatemeh and Nazanin, (2012) found that Preterm labor was the most common fatal complication at 18% in a study on pregnancy complications and outcomes in women with epilepsy at Karaman University Iran, followed by intrauterine growth retardation at 10%. The most common maternal complication included premature rupture of membranes at 28% followed by low-lying placenta at 30%.

Briad *et al.,* as cited by Figuaroa-damian and Arredondo, (2012) considered weight gain as a risk for admission in the neonatal intensive care unit especially women who had a body mass index of above thirty per meter squared. Women with pre-gestational diabetes mellitus were at higher risk of excess weight gain in pregnancy and thus making their neonates at higher risk of admission to the neonatal intensive care unit following complications. There were increased cases of fetal mortality among women with tuberculosis. Jan *et al* as cited by Figuaroa-damian and Arredondo, (2012) reported similar results by finding that there was an increased risk for perinatal deaths, cases of jaundice post-delivery perinatal, small for gestation, and low births weight among newborns to women who presented with tuberculosis compared to those without, however, Shaefer *et al* as cited by Figuaroa-damian and Arredondo, (2012) documented good perinatal outcomes among newborns by mothers presenting with tuberculosis in pregnancy.

2.4 Perinatal outcomes of newborns born to women with maternal complications in labor

Maternal complications during labor lead to unwanted newborn outcomes and sometimes neonatal deaths. This is usually a result of late access to emergency obstetric care.

In Indonesia, several maternal complications were associated with neonatal asphyxia and included prolonged labor, prolonged rupture of membranes, and complications leading to delivery by cesarean sections. Zinner *et al* as cited by Agondowati *et al.,* (2017) found that mal-presentation in labor complications leading to near-miss at any

time, and antepartum hemorrhage were associated with a significant increase in stillbirths (Agondowati *et al.,* 2017). After comparing the women characteristics between those who had still births and those who had live singleton in Malysia, Quomariah *et al*., (2016) found a significant difference. The women had the same percentage of postpartum hemorrhage, bad obstetric history, shoulder dystocia, mal-presentation and delivery via cesarean. They had referred themselves and geographical barriers were found to be interfering with their access to health care services. They were mostly classified as near misses on admission despite having received the recommended four antenatal visits.

Maternal and neonatal mortality was found to be high in women who had undergone intrapartum cesarean section due to complications in labor compared to those who had spontaneous vaginal delivery in Senegal. The same results were demonstrated after low-risk women were evaluated (Briand *et al.,* 2012). Seventy seven point seven percent of the direct maternal deaths causes were found to be due to complications after a confidential enquiry to maternal deaths in Kenya. Thirty-nine point seven percent of direct maternal deaths were due to obstetric hemorrhage. Of the women who had a stillbirth, most of them died of obstetric hemorrhage at 44% and hypertensive disorders in pregnancy (MOH, 2017).

Nair *et al.* (2016) while studying about neonatal outcomes associated with maternal deaths in UK found Neonatal mortality to be increased in women who suffered maternal complications leading to the prolonged second stage of labor. Asphyxia was among the main outcomes of newborns by women who had prolonged labor and those who experienced bleeding in labor. Stillbirths were found to be in all women who were admitted with a ruptured uterus in labor. Quomariah *et al.* (2016) found high neonatal mortality rates among women who had obstructed labor and cord complications in labor. The majority of the pregnant women who had maternal complications in labor were found to have a history of twin pregnancy, shoulder dystocia, hypertensive disorders, fetal compromise, hemorrhage, obstructed labor, and fetal mal-presentations with increased neonatal mortality/ high cases of NICU admissions.

2.5 Difference in Perinatal Outcomes of newborns born to women with maternal complications compared to those without

Maternal complications both in pregnancy and labor contribute to poor newborn outcomes which lead to either death of the fetus or admission to the neonatal intensive care unit. In the United Kingdom, there were higher chances of admission to the neonatal intensive care unit for the children born by women who had died due to complications compared to those who had survived. It was evidenced by the perimortem results of those who had died in which 14% of those who had died 26% had stillborn (Nair *et al*., 2016). At Semmelweis University Hungary, there was an observation of the risk which came along with the Leiyoma in pregnancy and labor. There were increased incidences of pregnancy complications among women with Leiyoma which included: threatened abortions, placental disorders like placenta abruption, and anemia compared to mothers without Leiyoma. There was a higher risk of having fetal complications among newborns from the case group in contrast with the control group. There was an unexpected increase of threatened preterm delivery in both groups which is a rare occurrence in many studies (Banhidy *et al.,* 2010).

The maternal complications in labor pose a great risk to the unborn baby and many times lead to unwanted neonatal outcomes. A prospective study done on maternal attributes and obstetrical difficulties impact on Indonesian neonatal outcomes found the most prevalent complications on admission were: Obstructed and prolonged labor at 26%severe pre-eclampsia/ eclampsia at 11%, postpartum and antepartum hemorrhage, and mal-presentation at 21.6%. A good proportion (41.5%) of the admitted women was delivered by cesarean section, 81.7% of the mothers experienced near-miss and 60% of their children were admitted in the newborn unit with birth asphyxia (Angodowatti *et al.,* 2017). Women with pre-gestational diabetes were at a higher risk of experiencing shoulder dystocia, difficult second stage, and poor Apgar score in one minute. The same study found no relationship between a higher body mass index and complications like shoulder dystocia and cephalo-pelvic disproportion across both groups since neonatal outcomes were tallying in both groups (Ray *et al*., 2011).

The outcomes of the pregnancy among all pregnant women who present with complications are of great importance when documented. While studying Pregnancy complications and outcomes in women with epilepsy at Karaman University in Iran, 18% of the most fetal complications were preterm labor and 10% intra-uterine growth retardation. Premature rupture of membranes was the most common maternal complication with 28% followed by placenta praevia at 30% (Fatemeh & Nazanin, 2012). In East Africa, there were similar results in which very preterm babies born to women with complications were compared to term babies born by women without complications. Babies with low birth weight had a higher risk of death within the first twenty-eight days (RR: 6) compared to the ones with a normal birth weight. The death odds were 6 times higher for babies born moderately preterm in contrast with those who were born term with almost half of them dying in the first 28 days of life. Babies who were born very preterm have a 60 times likelihood of dying within the first 28 days of life and babies born small for gestational age were twice likely to die within twenty-eight days (Marchant *et al.*, 2012).

2.6 Research Gaps

Documented literature mainly focuses on perinatal and newborn outcomes-related studies done in view of a single complication. Again most of the documented studies were done outside African continent. Most of the literature was addressing only the newborn and the neonatal outcomes of newborns by women with maternal complications leaving out perinatal outcomes. It was therefore found necessary to carry out this study in order to address those gaps.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Study Design

Prospective Cohort Hospital-Based study design was adopted in this study in which quantitative method of data collection was utilized. This was done with aim of determining the perinatal outcomes of newborns delivered by women with maternal complications at Kitui County Referral Hospital. Women who presented with complications in pregnancy at their third Trimester and those who presented without complications were followed up to twenty-eight days post-delivery to determine the perinatal outcomes of their newborns.

3.2 Study Area

This study was conducted at the antenatal clinic, antenatal ward, maternity ward, and postnatal ward at Kitui County Referral Hospital situated at Kitui Central Sub County in Kitui County. Kitui County Referral Hospital was built in 1907. The location of the hospital is along the hospital road 1Km from Kitui central business district towards the southern direction and the road stretches from Kitui town past the catholic church, post office, the hospital and continues southwards towards Mutomo district and beyond. It is a teaching and referral hospital and serves the Kitui Central Sub County. It also receives patients as referrals especially women with maternal complications from all other health facilities in the four sub-counties in Kitui County namely; Kitui east, Kitui West, Kitui rural, and Kitui south Sub Counties.

The maternity ward is within the Nyayo building alongside the pediatric ward. From the main gate, then through the inpatient section gate past the female medical ward and male surgical ward ten meters to the entrance. The Kitui County Referral Hospital Maternity has three wards in one comprising of the antenatal ward, Labor ward, and postnatal ward for both post-cesarean and post-spontaneous delivery patients. It has a thirty-two patient's bed capacity with eight beds in each cube. It is composed of sixteen nurse midwives, three medical officers, one gynecologist, one

clinical officer obstetrics specialist, six records officers, and nine casuals. The maternity serves between three hundred and fifty to Five hundred and Seventy patients per month on average. Quite a good percentage is women were referred from other facilities with maternal complications.

3.3 Study Population

The study population comprised pregnant women at Kitui County Referral Hospital.

3.4 Inclusion Criteria

Women with maternal complications in their third trimester of pregnancy presenting at the antenatal clinic and antenatal ward.

Women without maternal complications in their third trimester of pregnancy presenting at the antenatal clinic.

3.5 Exclusion Criteria

Women without maternal complications in their third trimester of pregnancy presenting at the antenatal clinic and antenatal ward.

NB: Pregnant women without complications who developed complications during labor and delivery were allowed to cross over from the group of women without complications.

3.6 Sample Size

3.6.1 Sample size determination

The determination of the size of the sample was done by use of formula for proportions (Hulley, 2007).

$$N = \frac{r+1}{r} \times \left(\frac{Z_{1-\alpha/2} + Z_{1-\beta}}{p_1 - p_2} \right)^2 \times \bar{p} \times (1 - \bar{p})$$
$$= \frac{5}{4} \times \left(\frac{1.96 + 0.84}{0.40 - 0.25} \right)^2 \times 0.37 \times (1 - 0.37)$$
$$= 102$$

N=102 (The number of participants who presented with complications in their third trimester)

r= r was the ratio of women who presented with complications compared to those without complications.

p_1 = 40% was the proportion of newborns who had low Apgar score among women with complications for Kitui County Referral Hospital Statistics.

p_2 = 25%, was the proportion of those children who present with low Apgar score among women without complications.

$$\bar{p} = \left(r \times p_1 + p_2\right) \Big/ r + 1,$$

$$\bar{p} = \left(4 \times 0.40 + 0.25\right) \Big/ 4 + 1$$

$$\bar{p} = 0.37$$

Based on preliminary data from KCRH, approximately 19% of the participants delivering had complications and 81% of the participants did not have complications. (*KCRH statistics 2018).* Thus it appeared that for every single participant presenting with complications, eight participants didn't present with complications. But for statistical feasibility, four participants without complications were sampled for every case presenting with a complication. That is why r was equal to 4 in the formula above.

Given that the number of women presenting with complications was to be **102**. Then the number of women without complications in this study was to be **408** making a total of **510** participants.

The objective of the study was to determine the perinatal outcomes of newborns born by women with maternal complications at Kitui County Referral Hospital. Specifically, the study sought to find out whether newborns delivered by women presenting with maternal complications were at a higher risk of poor perinatal

outcomes compared to those born by women without complications at Kitui County Referral Hospital. To answer this objective there was to estimate a sample size that would be able to help the researcher link the high risk of poor perinatal outcomes to maternal complications with a probability equal to 80% and type I error equal to 5%. The outcomes that were assessed included: Live births, stillbirths, Apgar score, birth weight, Maturity at Birth, Alive or dead after perinatal period. The study focused on one outcome and used the associated estimates from the literature to compute the sample size with the assumption that the obtained sample size was to be sufficient to answer questions related to the other outcomes. It was hypothesized that the risk of low Apgar score among newborns by women with complications was 40% and 25% among those newborns by women without complications (Dupont, 2013). Thus to be 95% sure with a power of 80% this difference was captured to estimate the sample using the formula above.

3.7 Sampling Technique

Participants were grouped based on the presence of complications in pregnancy in their third trimester or absence which was the criteria used to include them in the two groups. At Kitui County Referral Hospital, approximately 570 women gave birth every month.

Women who presented with complications: The researcher used consecutive sampling techniques at both the antenatal clinic and the antenatal ward until the required sample size of 102 is was achieved. Women were recruited after receiving the antenatal clinic services and after being admitted at the antenatal ward. Women recruits were summed daily from both recruitment points until the required number was achieved.

Women without complications: Consecutive sampling technique was used at the antenatal clinic until the required sample size of 408 was achieved. Women were recruited after receiving antenatal services. The recruitment continued until the required sample size was achieved.

In case a client from the group presenting without complications developed complications during the study period, then it was identified and allowed to cross over to the complications group.

3.8 Research Assistants

The selection of two research assistants was based on working experience at the maternity department/ antenatal clinic for six months as registered nurse midwives and they were trained for a day on the mechanisms of administration of research instruments to the respondents. They were expected to have attained a diploma in Kenya Registered Community Health Nursing and be able to identify maternal complications in pregnancy and labor. They were trained for two days on maternal complications as found in the ICD 10 document. This was important to assimilate the assistants with the intent and meaning of the questions, sampling, sampling frame, instrument administration as well as giving them adequate experience.

3.9 Data Collection Tools

A semi-structured questionnaire was used for data collection. The tool had Six sections, **Section A;** demographic characteristics **Section B;** Obstetric history of the respondent's **Section C;** Maternal complications in pregnancy **Section D;** Maternal Complications in labor, **Section E;** newborn outcomes, and **Section F**; Follow-up up to 28 days. It had both closed as well as open-ended questions.

3.10 Pre-testing of the tool

Before starting the actual data collection, a pre-test of the instrument was done at Makueni County Referral Hospital to ensure validity and reliability. Eleven questionnaires were administered to eleven respondents which were 10% of the respondents in the exposed group and forty-one questionnaires for women in the un-exposed group represented 10%. Changes were made on the questionnaire accordingly where the researcher found major difficulties in achieving the set objectives. The assistants also gained enough experience in data collection after the exercise.

3.11 Data Collection Procedure

After recruitment to both groups, the respondents were followed up until delivery and then up to twenty-eight days post-delivery. On recruitment, the demographic data and data on complications during pregnancy and Obstetric History was collected. Contacts for the women were obtained so that they would be followed up until delivery as per their expected dates. They were contacted once every month to know about their pregnancy progress. When they presented in labor, the labor outcomes data was collected and the newborn immediate outcomes documented. If admitted to the newborn unit, they were followed for the days admitted without exceeding twenty-eight days. Those discharged were contacted weekly to know the progress of the newborns until twenty-eight days were over.

3.12 Data Analysis

Data analysis was done using the statistical Package for Social Sciences (SPSS) software Version 21.0. Categorical variables such as marital status, level of education, income level, attending antenatal clinic among others were summarized using frequencies and the corresponding percentages.

Association between the exposure (newborns by women with Complications) and categorical variables were assessed using Pearson's Chi-square test.

The relationship between perinatal outcomes to demographic data and obstetric factors was analyzed using a logistic regression model.

The strength of association between perinatal outcomes and maternal complications was measured using relative risk.

3.13 Ethical Considerations

Permits: Ethical approval to conduct the study was sought from the Institutional Research Ethics Committee (IREC) at Kenyatta National Hospital/the University of Nairobi, on behalf of the National Commission of Science, Technology, and Innovations (NACOSTI Ref No: **646264**).

Consent: Verbal and written informed consent was obtained from all the study participants. There was no coercion to participate.

Participants also had the right to withdraw at any point from participation in the study.

Anonymity: Was ensured through making sure that no respondents names were written on the data collection tools and that all the tools contained only serial numbers as per the order of recruitment.

Confidentiality: Was ensured by making sure no un-authorized persons gained access to the data through making sure only the principal researcher had the computer password in which data was keyed and that all the data collection tools were under key and lock during and after data collection.

Anonymity: Was ensured by making sure no names were written on the questionnaires and that they had only serial numbers as per the time of recruitment.

3.14 Study Limitations

The study was done in Kitui County Referral Hospital Antenatal clinic and maternity ward; hence, the results could not be used as a representation of Kitui County.

3.15 Study Delimitations

This study involved pregnant women who presented at Kitui County referral Hospital with or without complications during the study period hence excluding women presenting with the same at other facilities within the County. A similar study in other facilities within the County was recommended by the researcher for comparison of the results.

CHAPTER FOUR

RESULTS

4.1 Introduction

This section presents an analysis and presentation of the findings of the study as set out in the research objectives. The study aimed at determining the perinatal outcomes of newborns delivered by women with maternal Complications, at Kitui County Referral Hospital.

4.2 Response Rate

A total of five hundred and ten (510) pregnant women were recruited for the study and followed up to determine the perinatal outcomes of their newborns. 102 were women with complications and 408 were women without complications. 396 of the women without complications were followed up until 28 days post-delivery out of whom 32 women were allowed to cross-over living a total of 364. 100 of women with complications in pregnancy were followed up until 28 days post-delivery making a total of 132 women with complications both in pregnancy and labor. Hence a total of 496 respondents participated to the end of follow-up, making a 98% response rate. According to Mugenda and Mugenda (2002), a response rate of 50% is adequate, 60% is good and 70% and above is excellent. Thus a response rate of 98% was excellent for the study.

4.2.1 Social demographic characteristic of respondents

From the findings, 13% (n=17) of the women with complications and 9%, (n=34) of the women without complications were aged between 13 to 19 years, 38% (n=50) of the women with complications, 51% (n= 186) of the women without complications were aged between 20 to 26 Years, 46% (n=61) of the women with complications and 39% (n=142) of the women without complications were aged 27-33 years and the least respondents in both groups, (1.5%, n=1) of the women without complications and (0.27%, n=1) of the women without complications were aged 34 to 40 and 41 to 49.

The findings showed that majority of respondents (59%, n=78) of the women with complications and (76%, n=277) of the women without complications were from Kitui Central, 8%, (n=10) of the women with complications and 11%, (n= 41) of the women without complications were from Kitui West, 14%, (n=18) of the women with complications and 9%, (n=32) of the women without complications were from Kitui Rural, 15%, (n=20) of the women with complications and 3%, (n=11) of the women without complications were from Kitui East and finally, 3%, (n=4) of the women with complications were from Kitui South. There were no women without complications from Kitui South. No women with complications from Mwingi Central, no women without complications from Mwingi North and Mwingi West respectively.

The findings showed that 4%, (n=5) of the women with complications and 2%, (n=1) of the women without complications had nursery school education, 28%, (n=37) of the women with complications and 29%, (n=105) of the women without complications had Primary School education, 29%, (n=38) of the women with complications and 41%, (n=148) of the women without complications had Secondary School education. Twenty seven percent (27%, n=36) of the women with complications and 26%, (n=96) of the women without complications had college education, 10%, (n=13) of the women with complications and 4%, (n=13) of the women without complications had university education. Only 2%, (n=3) of the women with complications had had other education levels specified.

Majority of the respondents (70%, n=93) of the women with complications and (79%, n=287) of women without complications were Married, 28%, (n=37) of the women with complications and 20%, (n=72) of the women without complications were single, 2%, (n=2) of the women with complications and 1%, (n=2) of the women without complications were divorced. A small proportion (1%, n=3) of the women without complications were widowed. There were no women with complications found to be widowed.

The findings depict that majority of the respondents (61%, n=81) of the women with complications and (73%, n=266) of the women without complications were un-employed, (28%, n=37) of the women with complications and 15%, (n=55) of the women without complications were employed, 11%, (n=14) of the women with complications and 12%, (n=43) of the women without complications were self-employed.

The results revealed that, 41%, (n=54) of the women with complications and 39%, (n=143) of the women without complications were employed, 17%, (n=22) of the women with complications and 16%, (n=60) of the women without complications were un-employed and 14%, (n=18) of the women with complications and 24%, (n=88) of the women without complications were self-employed.

Table 4.1: Social demographic characteristic of respondents

		Women with Complications	Women without Complications
		frequency (%)	frequency (%)
Age	13-19 Years	17 (12.88)	34 (9.34)
	20-26 Years	50 (37.88)	186 (51.1)
	27-33 Years	61 (46.21)	142 (39.01)
	34-40Years	2 (1.52)	1 (0.27)
	41-49 Years	2 (1.52)	1 (0.27)
Residence	KITUI Central	78 (59)	277 (76)
	Kitui West	10 (8%)	41 (11)
	Kitui Rural	18 (14)	32 (9)
	Kitui East	20 (15)	11 (3)
	Kitui south	4 (3)	0 (0)
	Mwingi Central	0 (0)	3 (1)
	Mwingi North	1 (0.75)	0 (0)
	Mwingi West	1(0.75)	0 (0)
Education	Nursery	5(3.79)	2(0.55)
	Primary	37(28.03)	105(28.85)
	Secondary	38(28.79)	148(40.66)
	College	36(27.27)	96(26.37)
	University	13(9.85)	13(3.57)
	Others specified	3(2.27)	0(0)
Marital status	Married	93 (70)	287 (79)
	Single	37 (28)	72 (20)
	Divorced	2 (2)	2 (1)
	Widowed	0 (0)	3 (1)
Occupation	Employed	37 (28.03)	55 (15.11)
	Unemployed	81 (61.36)	266 (73.08)
	Self employed	14 (10.61)	43 (11.81)
Spouse occupation	Employed	54 (41)	143 (39)
	Unemployed	22 (17)	60 (16)
	Self employed	18 (14)	88 (24)
	N/A	38 (29)	73 (20)
Religion	Christian	128 (96.97)	353 (96.15)
	Muslim	3 (2.27)	5 (1.37)
	Atheist	0 (0)	4 (1.1)
	Others	1 (0.76)	2 (0.55)

Majority of the respondents from both groups, (97%, n=128) of the women with complications and (96%, n=353) of the women without complications were Christians, (2%, n=3) of the women with complications and (1%, n=5) of the women without complications were Muslims, (1%, n=1) of the women with complications and (1%, n=2) of the women without complications belonged to other religions. There were no atheists among the women with complications while among women without complications there was (1%, n=4).

4.3 Obstetric factors contributing to perinatal outcomes

4.3.1 Parity

As shown in Table 4.2 below, the study determined the parity of the respondents and found that, 46%, (n=61) of the women with complications and 40%, (n=146) of the women without complications were para 0+0. Seventeen percent (17%, n=23) of the women with complications and 28%, (n=103) of the women without complications were para 1+0. Eight percent (8%, n=11) of the women with complications and 12%, (n=42) of the women without complications were para 2+0. The other women with complications were 0+1 and above at 8% (n=11), those with parity of 1+1 and above at 7% (n=9), the others of Above 3+0 at 6% (n=8), and those with parity of above 3+1and above being 3% (n=4). There was no record of respondents with parity of 2+1 and above. Other women without complications were those with parity of Above 3+0, 0+1 and above, 1+1 and above, 2+1 and above, above 3+1and above being 7% (n=27), 6% (n=23), 4% (n=14), 2% (n=7) and 1% (n=2) respectively. On the Chi-square test, the findings showed that there was a statistically significant association between parity and presence or absence of complications (P-value0.03χ2-15.5389).

Table 4.2: Association between parity and Complications

		Parity of Respondents											
		0+0	**0+1 and above**	**1+0**	**1+1 and above**	**2+0**	**2+1 and above**	**Above 3+0**	**Above 3+1 and above**	**Total**	**Chi-square**	**DF**	**P-value**
History of complications in pregnancy and labor	YES	61	11	23	9	16	0	8	4	132			
	NO	146	23	103	14	42	7	27	2	364			
Total		207	34	126	23	58	7	35	6	496	15.5	7	0.03

4.3.2 History of multiple gestation

From the findings, the majority of the respondents (77%, n=101) of the women with complications and (93%, n=340) of the women without complications had no history of multiple pregnancies, 23.5%, (n=31) of the women with complications and 6.6%, (n=24) of the women without complications had a history of multiple pregnancies. On the Chi-square test, there was a statistically significant association between History of Multiple gestation and presence of complications (P-value 0.001, χ228.0343) as shown in table 4.3 below.

Table 4.3: History of multiple gestation

History of multiple gestation	Women with Complications	Women without Complications	χ^2	df	p-value
Yes	31(23.48)	24(6.59)	28.0343	1	0.001
No	101(76.52)	340(93.41)			

4.3.3 Previous mode of delivery

As shown in table 4.4 below, the findings from the study showed that 34%, (n=45) of the women with complications and 49.7%, (n=181) of the women without complications had a history of previous spontaneous Vertex delivery. A small proportion (14%, n=19) of the women with complications and (7%, n=27) of the women without complications had a history of previous cesarean section done. Minority (1%, n=2) of the women with complications and 43%, (n=156) of the women without complications had a history of previous assisted vaginal delivery. On the Chi-square test, there was a statistically significant association between previous mode of delivery and presence of complications (P-value 0.001, χ2 16.8997).

Table 4.4: Association between Previous mode of Delivery and Presence of complication

		Previous Mode of delivery			Total	Chi-square	DF	P-value
		SVD	Caesarean Section	Assisted Vaginal Delivery				
History of complications in pregnancy and labor	YES	45	19	2	66	15.915	2	<0.001
	NO	181	27	0	208			
Total		226	46	2	274			

4.3.4 Known bad obstetric history

The majority of the respondents, (85%, n=112) of the women with complications and (90%, n=329) of the women without complications had no known bad obstetric history. Only a few (15%, n=20) of the women with complications and (10%, n=35) of the women without complications had known bad obstetric history. On the Chi-square test, the findings showed no significant association between bad obstetric history and presence of complications (P-value of 0.083, χ23.0114) as shown in table 4.5 below.

Table 4.5: Known bad obstetric history

Known bad obstetric history	Exposed group	Un-exposed group	d.f	χ^2	p-value
Yes	20(15.15)	35(9.62)	1	3.0114	0.083
No	112(84.85)	329 (90.38)			

4.3.5 Known contracted pelvis

The majority of the respondents, (98%, n=130) of the women with complications and (99%, n=363) of the women without complications had no history of known contracted pelvis, 2%, (n=2) of the women with complications and 1%, (n=1) of the women without complications had a history of known contracted pelvis. On Fischer's exact test, the findings showed no significant association between having a contracted pelvis and presence of complications (P-value 0.115) as shown in table 4.6 below.

Table 4.6: Known Contracted Pelvis

Known contracted pelvis	Women with complications	Women without Complications	Fischer's exact p-value
Yes	2(1.52)	1(0.27)	0.115
No	130(98.48)	363(99.73)	

4.3.6. Adjusting Odds Ratios to control confounders

All the obstetric factors that were statistically associated with perinatal outcomes were fitted into a binary logistic regression to control for confounding. Client with history of multiple gestation were 74% less likely not to develop complications as compared to those without multiple gestation (AOR: 0.259; 95%CI: 0.115 to 0.584). (Those with history of multiple gestation were more likely to develop complications). Table 4.7 below illustrates the results.

Table 4.7: Adjusting the odds ratios

	B	S.E.	Wald	df	Sig.	AOR	95% C.I. for AOR	
							Lower	Upper
PARITY	-0.103	0.091	1.276	1	0.259	0.902	0.754	1.079
History of multiple pregnancy	-1.352	0.416	10.581	1	0.001	0.259	0.115	0.584
No History	Reference							
PREVIOUS DELIVERY			7.033	2	0.03			
SVD	22.222	26735.3	0	1	0.999	4.48E+09	0	.
C/S	21.279	26735.3	0	1	0.999	1.74E+09	0	.
AVD	Reference							
Constant	-20.236	26735.3	0	1	0.999	0		

4.4 Perinatal outcomes of women with maternal complications in pregnancy (100 women followed up)

4.4.1 Complications in pregnancy

As shown in figure 4.1 below, 45%, (n=45) of the respondents were followed for maternal care related to the fetus and amniotic cavity and possible delivery problems related complications, 23%, (n=23) Edema, Proteinuria, and Hypertensive disorders in pregnancy, childbirth, and puerperium, 17%, (n=17) Supervision of High-Risk Pregnancy, 11%, (n=11) other maternal disorders predominantly related to pregnancy and 4%, (n=4) other obstetric complication not elsewhere classified.

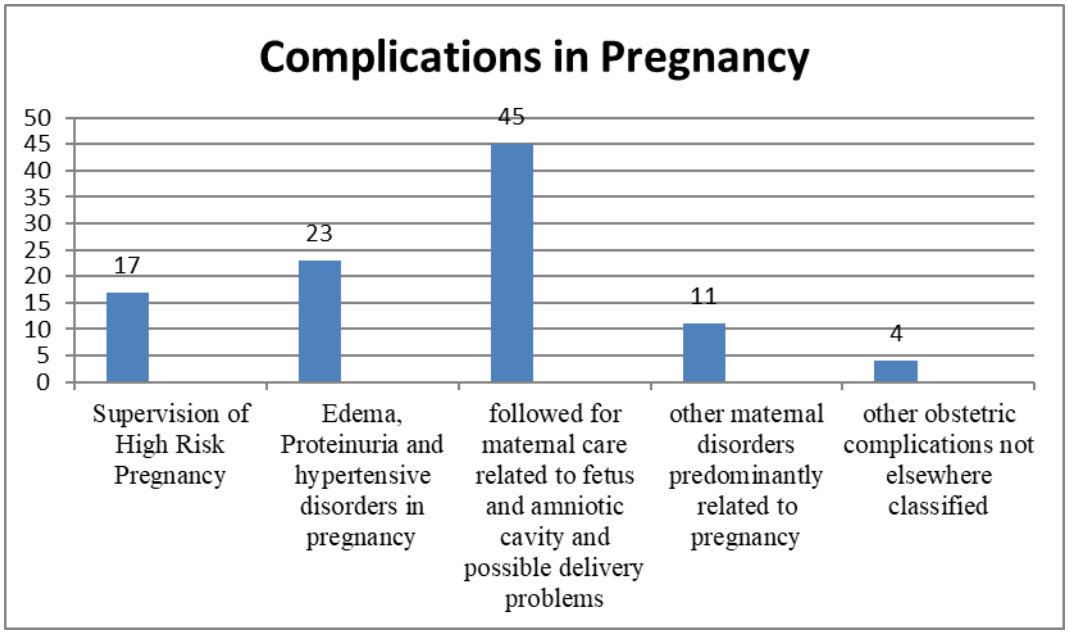


Figure 4.1: Complications in Pregnancy

4.4.2 Mode of delivery

The majority of the newborns (65%, n=65) were born through spontaneous vertex delivery while the others (35%, n=35) were born through the cesarean section as shown in figure 4.2 below.

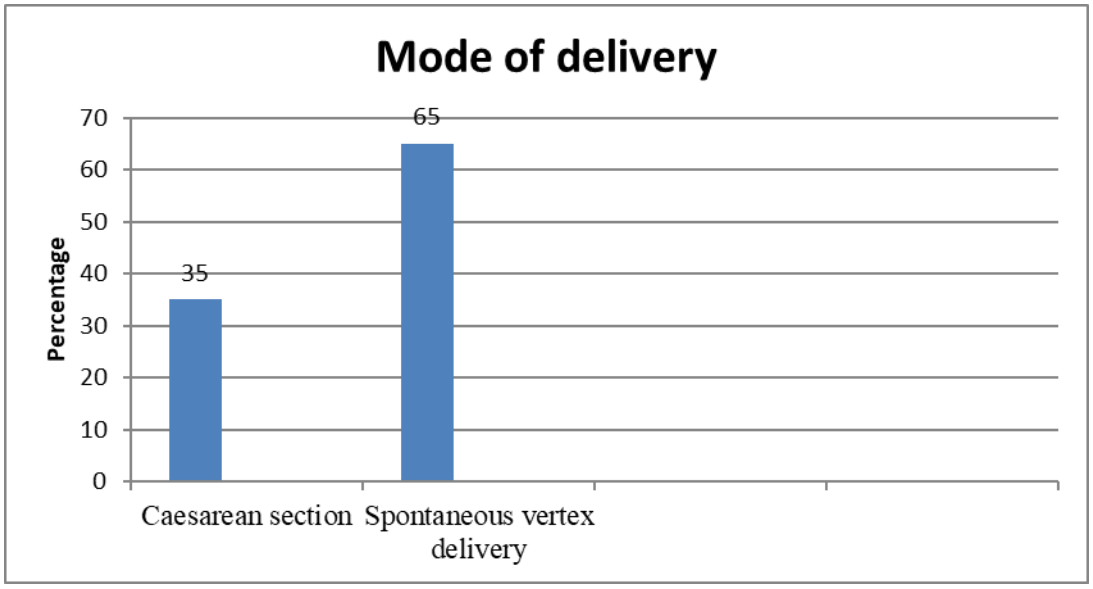


Figure 4.2: Mode of delivery

4.4.3 Mode of delivery versus admission to NBU

There was no statistically significant association between mode of delivery and admission to the newborn unit (P-value-0.343, χ2-2.138, df-2).

Table 4.8: Mode of delivery versus admission to NBU

Mode of delivery	**Admission to NBU**				**df**	**χ^2**	**P-value**
	Yes	**No**	**Dead**	**Total**			
Caesarean Section	7	26	2	35	2	2.138	0.343
Spontaneous vertex delivery	16	40	9	64			
Total	23	66	11	100			

4.4.4 Newborn status at birth

The majority of the newborns (89%, n=89) were born alive while 11%, (n=11) were born dead as shown in figure 4.3 below.

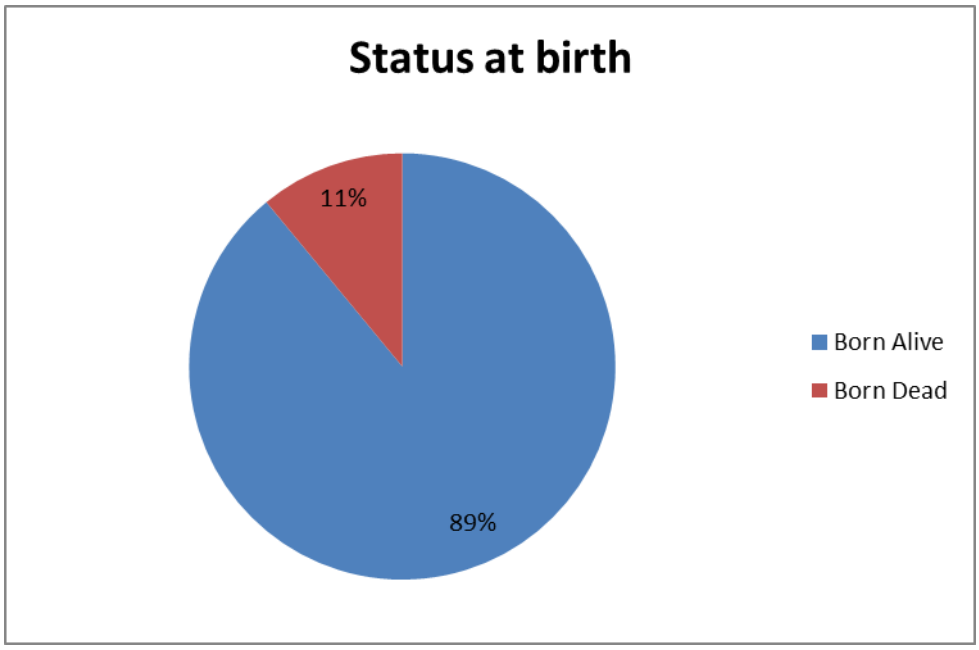


Figure 4.3: Status at Birth

4.4.5 Timing of Death

The majority of the newborns (55%, n=6) died before labor while 45%, (n=5) died during labor as shown in table 4.9 below.

Table 4.9: Timing of death

Duration of death	Frequency	Percentage
Before Labor	6	55
During Labor	5	45
Total	11	100

4.4.6 Apgar score

The majority of the newborns born alive (87.6%, n=78) had an Apgar score of 8-10, 10.1%, (n=9) had an Apgar score of 5-7 and 2.3% (n=2) score 1-4 in one minute as shown in table 4.10 below.

Table 4.10: Apgar score

Apgar score	Frequency	Percentage
1-4	2	2.3
5-7	9	10.1
8-10	78	87.6
Total	89	100

4.4.7 Birth weight at delivery

The majority (88%) of the newborns, had a birth weight of 1600-2499 (44%, n=44) and 2500-3900 grams (44%, n=44) while 7%, (n=7) had weight below 1500g and 5%, (n=5) had a birth weight of above 4000g as illustrated in figure 4.4 below.

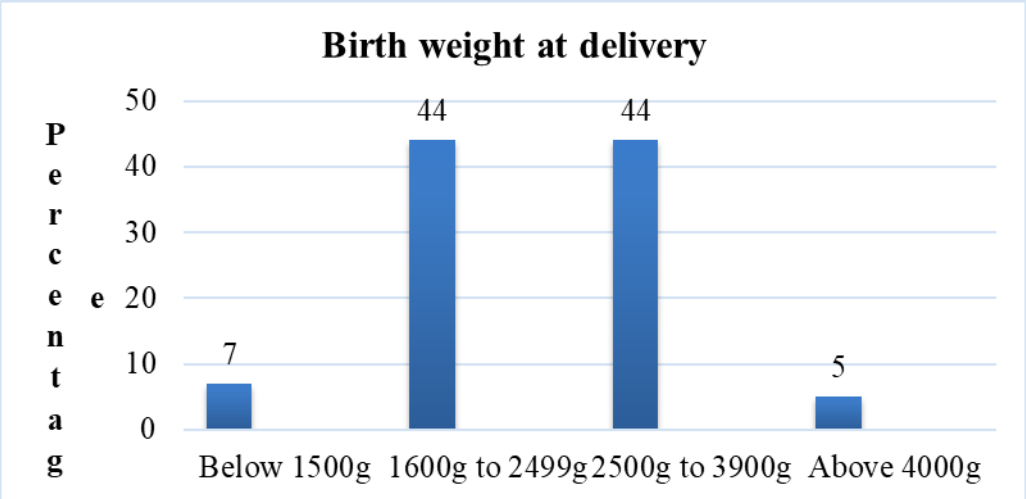


Figure 4.4: Birth weight at delivery

4.4.8 Newborn Maturity

The majority of the newborns (69%, n=61) were term babies while 31%, (n-28) were born prematurely as shown in table 4.11 below.

Table 4.11: Newborn Maturity

Newborn Maturity	Frequency	Percentage
Term Babies	61	69
Premature Babies	28	31
Total	89	100

4.4.9 NBU Admission

The majority of the newborns (74%, n=66) were not admitted while 26%, (n=23) were admitted to the newborn unit after delivery as illustrated in table 4.12 below.

Table 4.12: NBU Admission

NBU Admission	Frequency	Percentage
Yes	23	26
No	66	74
Total	89	100

4.5.10 Reason for admission

Most of the newborns (43.5%, n=10) were admitted due to prematurity, 26.1%, (n=6) had birth asphyxia, 13%, (n=3) had Jaundice and sepsis, and 4.3%, (n=1) had respiratory distress syndrome as shown in table 4.13 below.

Table 4.13: Reason for admission

Reason for Admission	Frequency	Percentage
Prematurity	10	43.5
Birth Asphyxia	6	26.1
Jaundice	3	13
Sepsis	3	13
Respiratory distress syndrome	1	4.3
Total	23	100

4.5.11 Condition of baby 28 days post-delivery

The majority of the babies (95%, n=85) were Alive on follow-up after 28 days post-delivery while 5%, (n=4) were reported to have died as illustrated in figure 4.5 below.

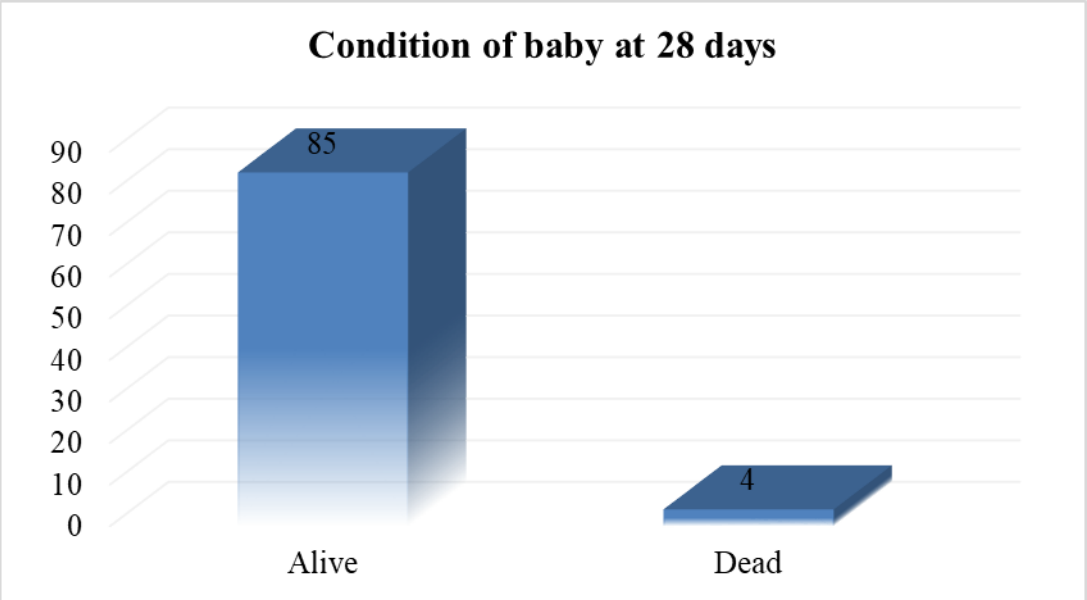


Figure 4.5: Condition of baby 28 days post delivery

4.4.12 History of complications/disease up to 28 days

The majority of the newborns (86%, n=73) did not have any complications/diseases while, 14%, (n=12) were reported to have had complications/diseases within 28 days post-delivery as shown in figure 4.6 below.

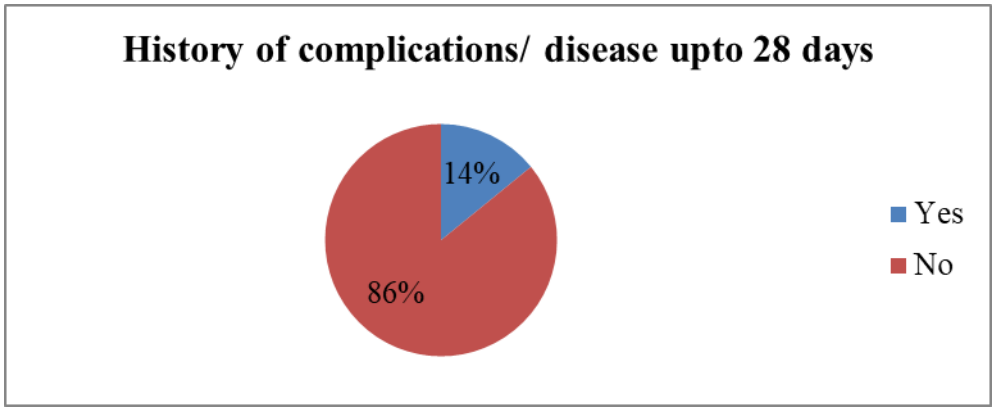


Figure 4.6: History of complications/ disease up-to 28 days

4.4.13 History of Jaundice within 28 days post-delivery

The majority of the newborns (98%, n=83) were not reported to have suffered jaundice while only 2%, (n=2) had a positive report on having suffered physiological jaundice as shown in figure 4.7 below.

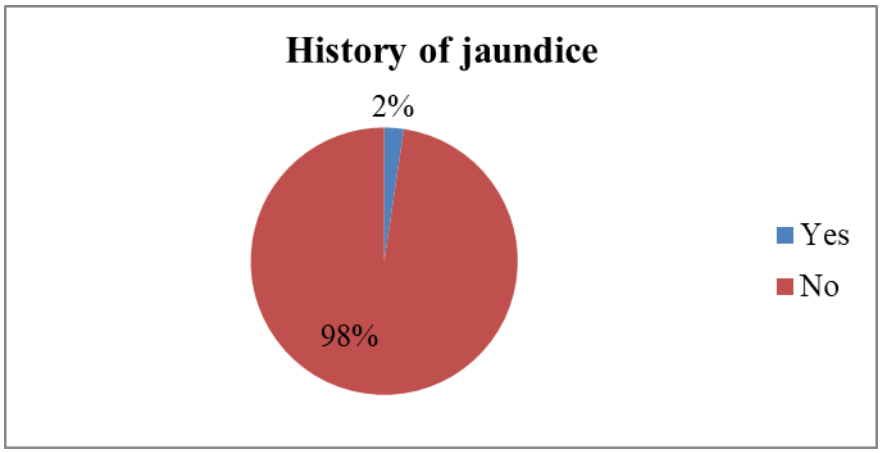


Figure 4.7: History of Jaundice within 28 days post-delivery

4.4.14 History of sepsis within 28 Days post-delivery

The majority of the newborns (98%, n=83) did not suffer from Sepsis while only 2%, (n=2) reported having had sepsis as Ilustrated in figure 4.8 below.

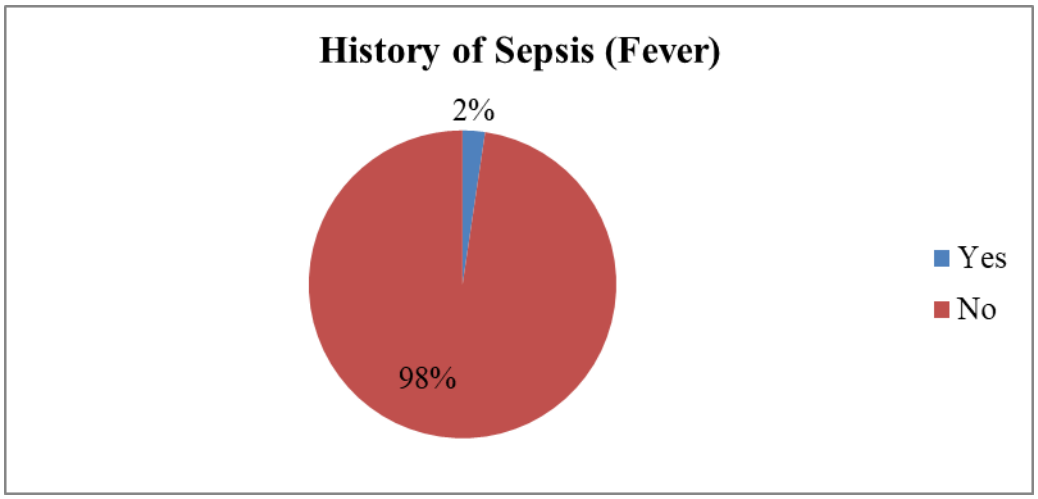


Figure 4.8: History of sepsis within 28 Days post-delivery

4.5 Perinatal outcomes of newborns delivered by women presenting with maternal complications in labor (32 women followed up)

4.5.1 Complications in labor

Most of the respondents (31.3%, n=10) developed obstructed labor due to mal-presentation, 21.9%, (n=7) had labor and delivery complicated by fetal distress, 12.2%, (n=4) developed obstructed labor related to maternal pelvic abnormalities, 6.3%, (n=2) experienced preterm labor, failed induction, Prolonged Labor and labor and delivery complicated by cord complications while 3.1%, (n=1) had abnormalities of forces of labor, labor/delivery complicated by intrapartum hemorrhage and other complications of labor respectively as shown in figure 4.9 below.

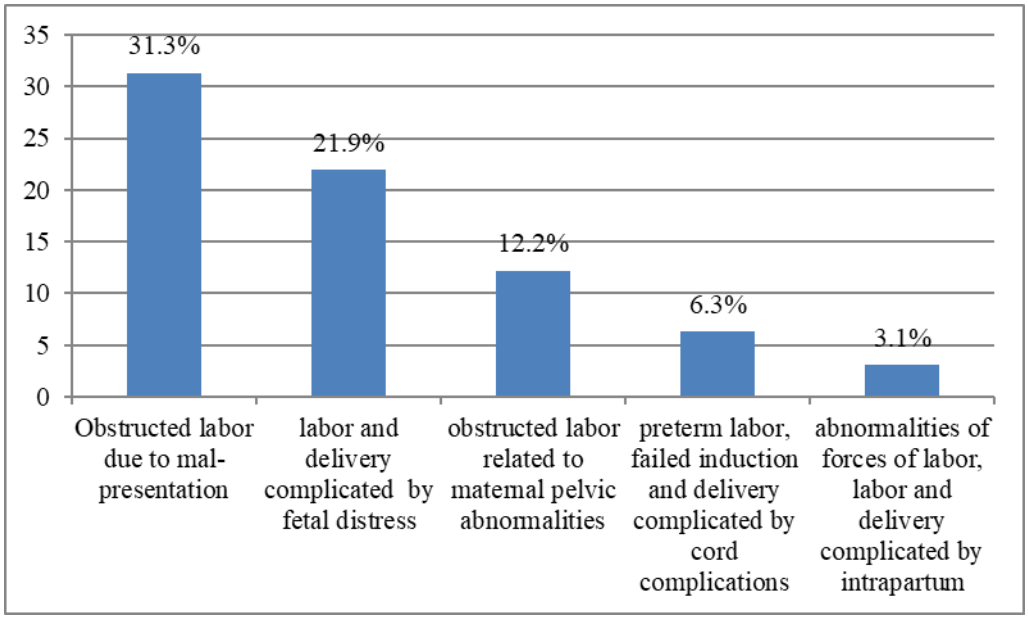


Figure 4.9: Complications in Labor

4.5.2 Mode of delivery

The majority of the newborns (81.25%, n=26) were born via cesarean section while 18.75%, (n=6) were born via spontaneous vertex delivery as shown in figure 4.10 below.

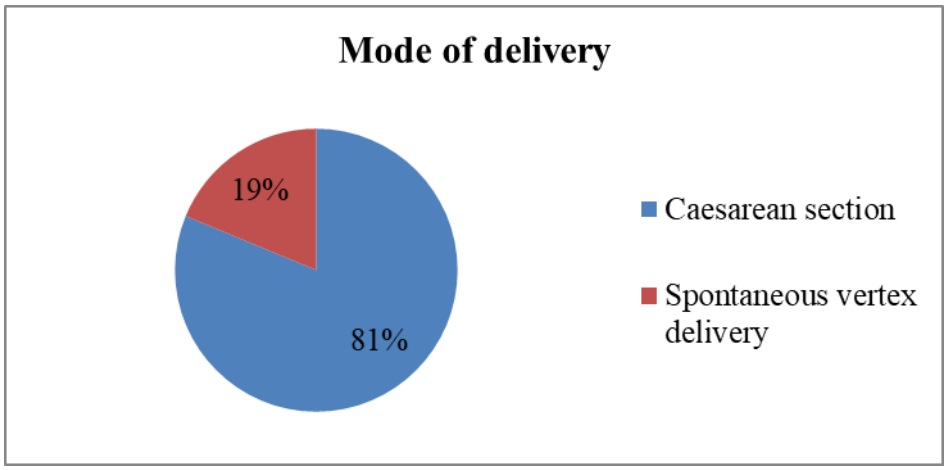


Figure 4.10: Mode of Delivery

4.5.3 Admission to Newborn unit

The majority of the newborns (72%, n=19) were not admitted while 28%, (n=8) were admitted to the newborn unit as shown in figure 4.11 below.

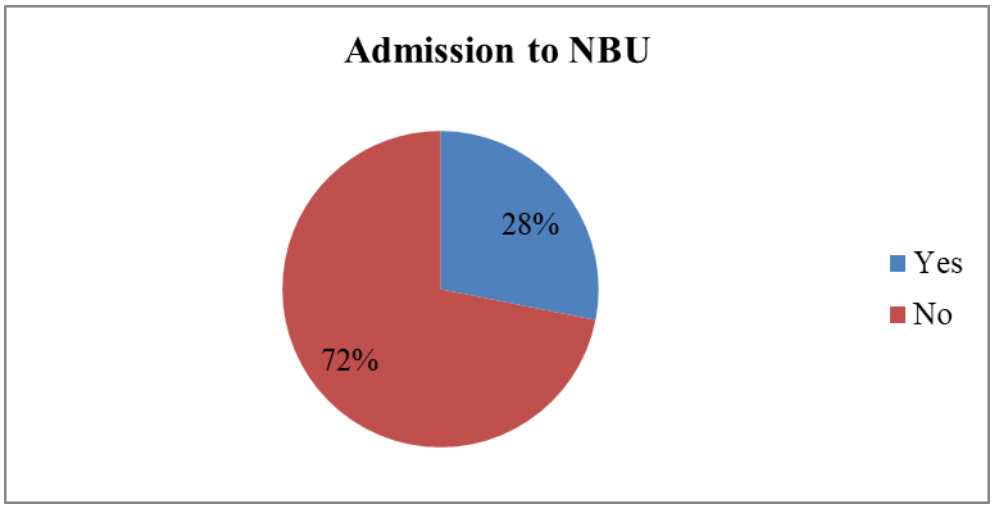


Figure 4.11: Admission to NBU

4.5.4 Mode of delivery versus NBU admission

There was an association between mode of delivery and admission to the newborn unit (P-value 0.0001).

Table 4.14: Mode of delivery versus NBU admission

Mode of delivery	Admission to NBU				df	Fisher's exact P-value
	Yes	No	Dead	Total		
Caesarean Section	8	18	0	26	2	0.0001
Spontaneous vertex delivery	1	1	4	6		
Total	9	19	4	32		

4.5.5 Status at birth

The majority of the newborns (84.4%, n=27) were born alive while 15.6%, (n=5) were born dead as shown in figure 4.12 below.

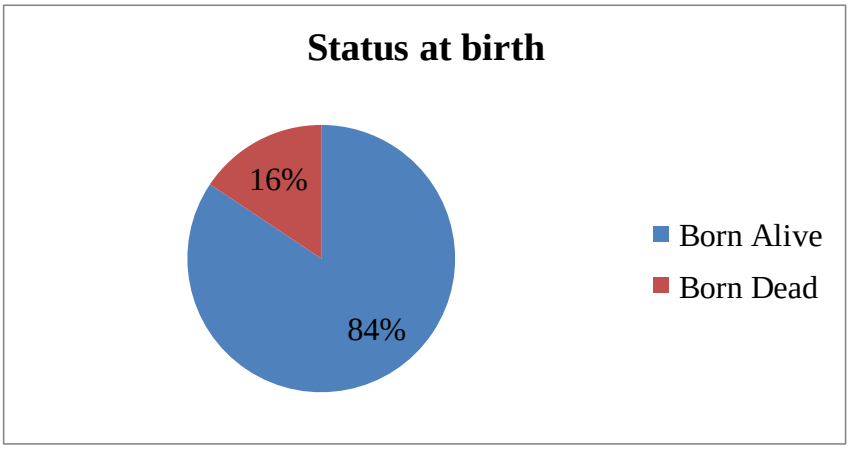


Figure 4.12: Status at birth

4.5.6 Apgar score

Majority of the newborns (62.5%, n=17) scored 8-10, 15.63%, (n=4) Scored 10, 12.5%, (n=3) 1-4 and 9.4% (n=3) scored 5-7 in one minute as shown in figure 4.13 below.

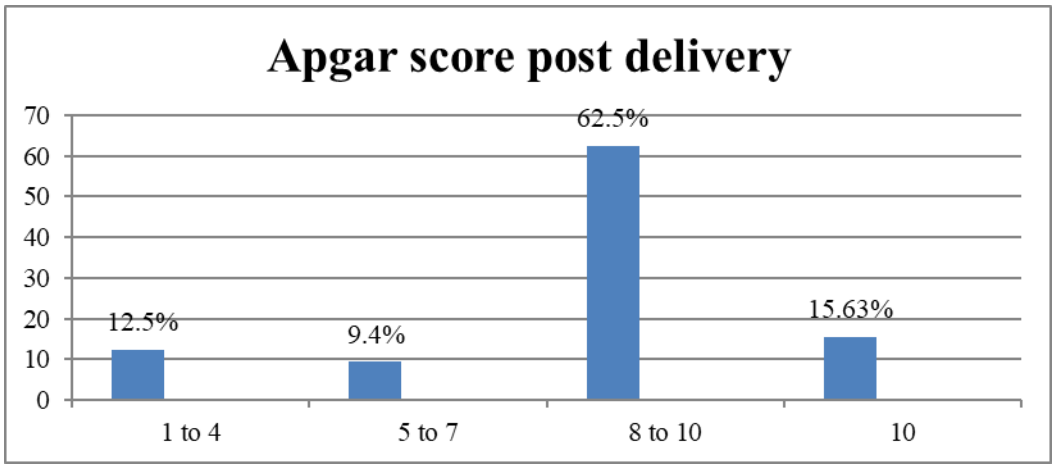


Figure 4.13: Apgar score Post Delivery

4.5.7 Birth weight

Majority of the newborns (62.5%, n=20) weighed 2500g-3900g, 18.8%, (n=6) 1600-2499g, 15.6%, (n=5) weighed above 4000g and 3.1%, (n=1) weighed below 1500g as shown in table 4.15 below.

Table 4.15: Birth Weight

Birth weight	Frequency	Percentage
Below 1500g	1	3.1
1600g-2499g	6	18.8
2500-3900g	20	62.5
Above 4000g	5	15.6
Total	32	100

4.5.8 Maturity of the newborns

The majority of the newborns (97%, n=31) were term babies, 3%, (n=1) were premature as shown in figure 4.14 below.

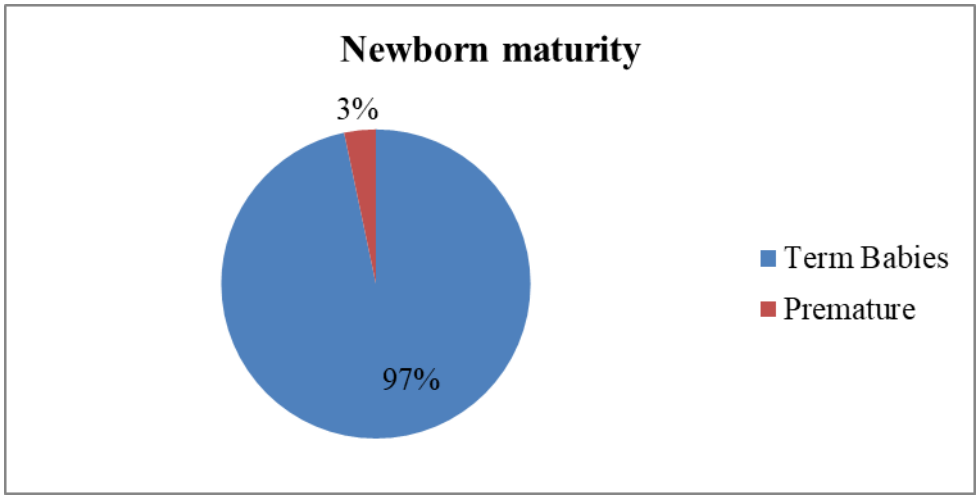


Figure 4.14: Newborn Maturity

4.5.9 Reason for admission to NBU

The majority of admitted newborns (87.5%, n=7) were due to birth asphyxia, 12.5%, (n=1) were due to hypoglycemia as shown in table 4.16 below.

Table 4.16: Reason for admission to NBU

Reason for Admission	Frequency	Percentage
Birth Asphyxia	7	87.5
Hypoglycemia	1	12.5
Total	8	100

4.5.10 Status at 28 days after delivery

The majority of the newborns (96%, n=26) were reported to be alive while 4%, (n=1) died as shown in figure 4.15 below.

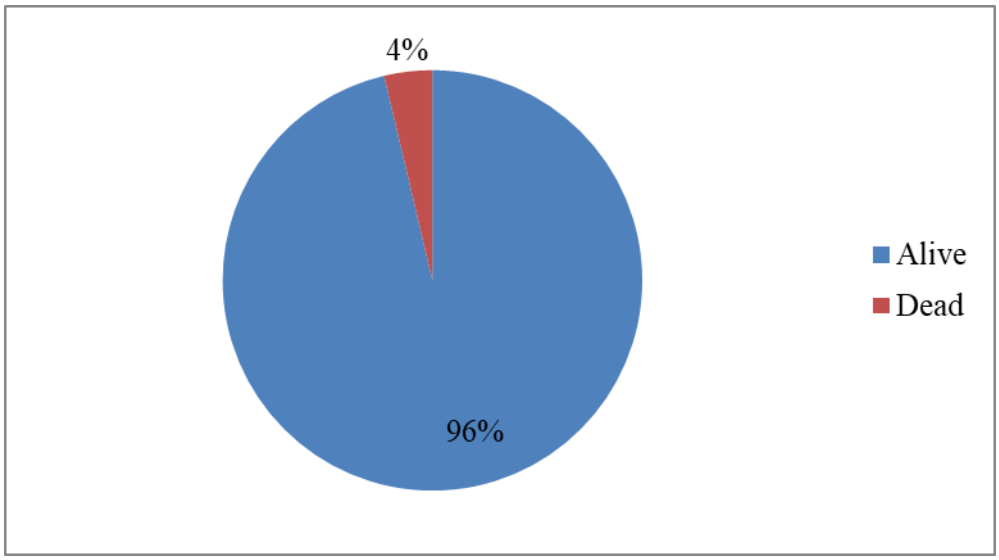


Figure 4.15: Status at 28 days after delivery

4.5.11 History of complications within 28 days after delivery

The majority of the newborns (84.62%, n=22) did not have a history of complications or disease while 15.38%, (n=5) had a positive history as shown in figure 4.16 below.

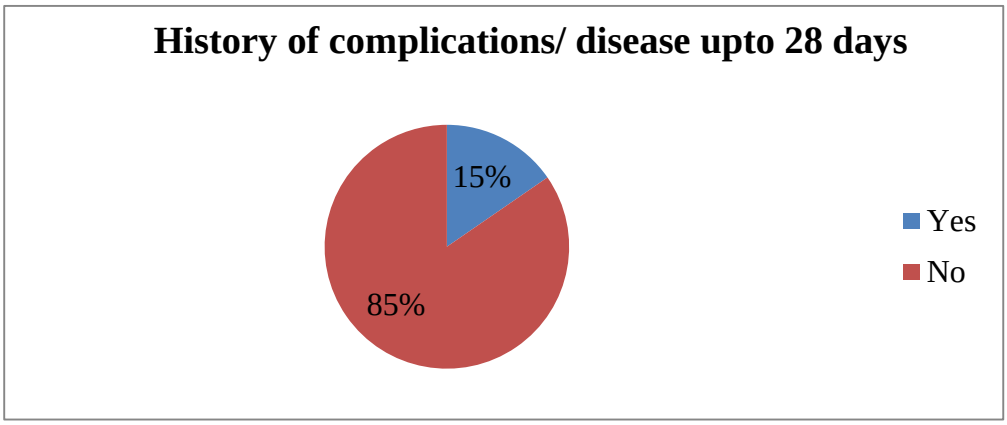


Figure 4.16: History of complications within 28 days after delivery

4.5.12 History of Jaundice

The majority of the newborns (85%, n=23) did not develop jaundice while (15 %, n=4) were reported to have developed physiological jaundice as shown in figure 4.17 below.

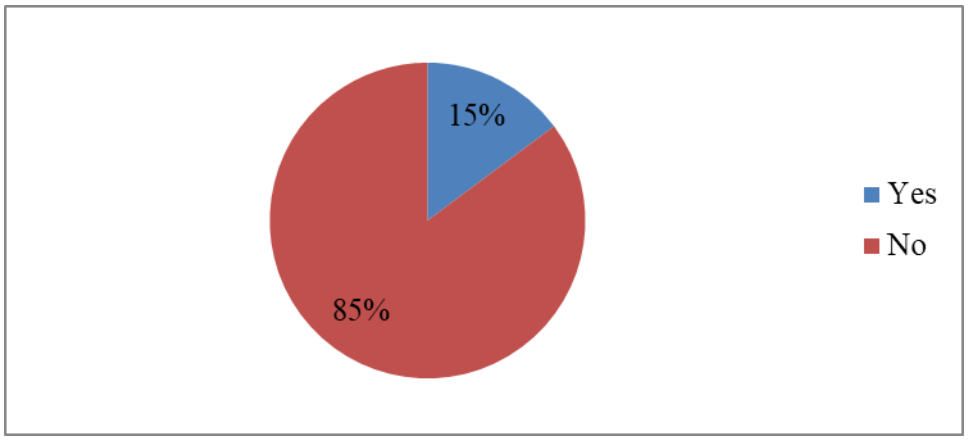


Figure 4.17: History of Jaundice

4.6 Difference in perinatal outcomes of exposed and un-exposed newborns

4.6.1 Status at birth

As shown in figure 4.18 below, the findings of the birth status of the babies at birth show that majority of the newborns (87.9%, n=116) by women with complications and 100%, (n=364) newborns by the women without complications were born alive while (12.1%, n=16) newborns by women with complications were born dead.

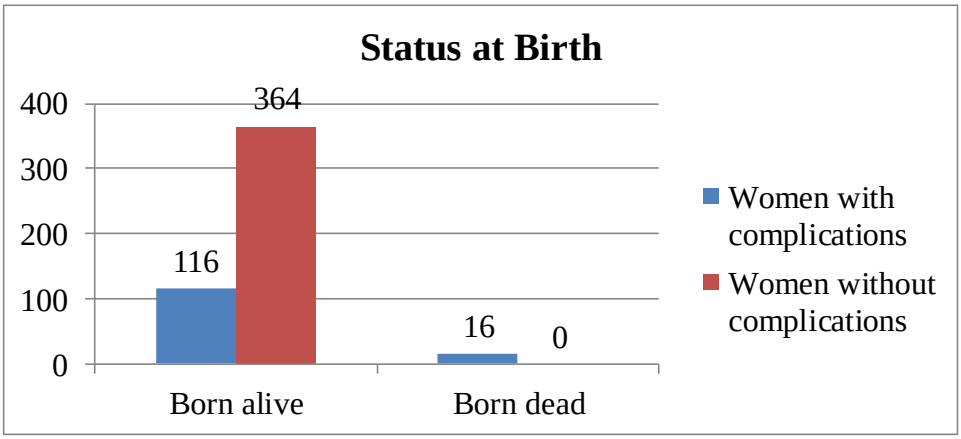


Figure 4.18: Status at Birth

4.6.2 Apgar Score

The risk of having a low APGAR score among newborns by mothers with maternal complications was eight times more than those born by mothers without complications (RR: 8.0;95% CI 3.427, 18.677) P-value < 0.001 as shown in table 4.17 below.

Table 4.17: Apgar Score

Maternal complications	Low Apgar score (disease)	Normal Apgar Score (No Disease)	Total	Risk Ratio (RR)	95% Confidence interval	
					Lower Limit	Upper Limit
Exposed	18	99	117			
Unexposed	7	357	364			
Total	25	456	481	8.000	3.427	18.677

4.6.3 Birth Weight

The risk of having low birth weight for a newborn born by a woman with maternal complications was 1.8 times that of a newborn born by a woman without maternal complications (RR: 1.838; 95% CI 1.409 to 2.398) P-Value <0.001 as shown in table 4.18 below.

Table 4.18: Birth Weight

Maternal complications	**Low Birth weight (disease)**	**Normal birth weight (No Disease)**	**Total**	**Risk Ratio (RR)**	**95% Confidence interval**	
					Lower Limit	Upper Limit
Exposed	58	74	132			
Unexposed	87	277	364			
Total	145	351	496			
				1.838	1.409	2.398

4.6.4 Newborn Maturity

The risk of being born prematurely for a newborn born by a woman with maternal complications was 9.652 times that borne by a woman without complications (RR: 9.652; 95%CI 5.245 to 17.760, P-value <0.001) as shown in table 4.19 below.

Table 4.19: Newborn Maturity

Maternal complications	**Prematurity (disease)**	**TERM Babies (No Disease)**	**Total**	**Risk Ratio (RR)**	**95% Confidence interval**	
					Lower Limit	**Upper Limit**
Exposed	42	90	132			
Unexposed	12	352	364			
Total	54	442	496	9.652	5.245	17.760

4.6.5 NBU Admission

The risk of admission to the Newborn Unit for a newborn by a woman with complications was 8 times that of a newborn by a woman without complications. (RR: 8.0; 95% CI 3.427, 18.677, P-value < 0.001) as shown in table 4.20 below.

Table 4.20: NBU Admission

Maternal complications	**Admitted To NBU (disease)**	**NOT Admitted (No Disease)**	**Total**	**Risk Ratio (RR)**	**95% Confidence interval**	
					Lower Limit	Upper Limit
Exposed	32	100	132			
Unexposed	11	352	363			
Total	43	452	495			
				8.000	4.154	14.408

4.6.6 Mode Of delivery

The risk for the Women with complications to undergo Caesarian section was 13.893 times that of women without complications (RR: 13.893; 95%CI 7.726 to 24.982, P-value <0.001) as shown in table 4.21 below.

Table 4.21: Mode of Delivery

Maternal complications	**Caesarian Section (disease)**	**Spontaneous Vertex Delivery (No Disease)**	**Total**	**Risk Ratio (RR)**	**95% Confidence interval**	
					Lower Limit	**Upper Limit**
Exposed	60	71	131			
Unexposed	12	352	364			
Total	72	423	495			
				13.893	7.726	24.982

4.6.7 Condition at 28 Days Post delivery

The condition at 28 days post-delivery was not different between the exposed and the unexposed (RR 2.241; CI 0.725 to 6.928, P-value 0.152) as shown in table 4.22 below.

Table 4.22: Condition after 28 Days

Maternal complications	DEAD	ALIVE	Total	Risk Ratio (RR)	95% Confidence interval	
					Lower Limit	Upper Limit
Exposed	5	111	116			
Unexposed	7	357	364			
Total	12	468	480			
				2.241	0.725	6.928

4.6.8 History Complications/Disease within 28 days

The risk of developing a complication/ disease within 28 days for a newborn by a woman with complications was 2.186 times that of a newborn by a woman without complications (RR: 2.186; 95%CI: 1.205, 3.987, P-Value 0.017) as shown in table 4.23 below.

Table 4.23: History Complications/Disease within 28 days

Maternal complications	Disease/ complication	No disease/ complication	Total	Risk Ratio (RR)	95% Confidence interval	
					Lower Limit	Upper Limit
Exposed	16	95	111			
Unexposed	24	340	364			
Total	40	435	475			
				2.186	1.205	3.987

4.6.9 History of admission within 28 Days after delivery

A newborn of a woman with complications had a higher risk of admission post-delivery compared to a newborn of a woman without complications (RR: 4.892; (95% CI 1.409, 17.026; P-value 0.006) as shown in table 4.24 below.

Table 4.24: History of admission within 28 Days after delivery

Maternal complications	Baby admitted	Baby Not admitted	Total	Risk Ratio (RR)	95% Confidence interval	
					Lower Limit	Upper Limit
Exposed	6	105	111			
Unexposed	4	358	362			
Total	10	463	473			
				4.892	1.409	17.026

The risk of developing jaundice for the exposed and the unexposed was not significantly different (P-Value 0.06) as shown in table 4.25 below.

Table 4.25: History of Developing Jaundice within 28 Days Post-delivery

Maternal complications	Jaundice (disease)	No jaundice (No disease)	Total	Risk Ratio (RR)	95% Confidence interval	
					Lower Limit	Upper Limit
Exposed	5	106	111			
Unexposed	5	357	362			
Total	10	463	473			
				3.261	0.962	11.06

4.6.10 History of Developing Sepsis within 28 Days Post-delivery

The risk of developing sepsis within 28 days post-delivery was not different between the exposed and the unexposed at 95% confidence interval (P-Value 0.209) as shown in table 4.26.

Table 4.26: History of Developing Sepsis within 28 Days Post-delivery

Maternal complications	**Sepsis (disease)**	**No Sepsis (No disease)**	**Total**	**Risk Ratio (RR)**	**95% Confidence interval**	
					Lower Limit	**Upper Limit**
Exposed	2	109	111			
Unexposed	2	360	362			
Total	4	469	473	3.261	0.465	22.886

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter covers discussions in line with the study objectives. The aim of the study was to determine the perinatal outcomes of newborns delivered by women with maternal Complications, at Kitui County Referral Hospital. The study objectively assessed, obstetric factors outcomes contributing to perinatal outcomes, perinatal outcomes of newborns delivered by women with maternal complications in pregnancy, perinatal outcomes of newborns delivered by women with maternal complications in labor, and the differences in perinatal outcomes of newborns delivered by women with maternal complications and those without. Conclusions were drawn and recommendations were made based on the study findings.

5.2 Discussion of Findings

5.2.2 Obstetric factors contributing to perinatal outcomes

The study findings showed a significant difference between women with complications and women without complications in the Parity of the respondents. Primi-parity was attributed to maternal complications and also women with maternal complications were more likely to have a history of miscarriages. The findings disagree with Blomberg *et al*., (2014) who found that Children born to primiparas Sweedish teenagers had little likelihood of showing fetal distress and meconium aspiration despite having incidences of Apgar score less than seven in five minutes compared to children born to multiparas women.

The study found a significant difference in multiple gestations between women with maternal complications and women without maternal complications. Women with a history of multiple gestations were more likely to present with maternal complications which agree with Quomariah *et al*., (2016) who found that majority of the pregnant women who had maternal complications in labor had a history of twin pregnancy, shoulder dystocia, hypertensive disorders, fetal compromise, hemorrhage,

obstructed labor and fetal mal-presentations with increased neonatal mortality/ high cases of NICU admissions.

There was a significant difference between women with complications and women without complications in the previous mode of delivery in which maternal complications were attributed to the previous history of cesarean section. The findings are in agreement with Berner *et al,* (2012) who found that a history of cesarean section was high among women with pre-gestational diabetes. There was also an increase in the risk of neonatal morbidity among the same group.

The study findings revealed no significant difference in maternal known bad obstetric history and known contracted pelvis findings which disagree with Quomariah *et al.,* (2016) who reported that eighty-four percent of the stillborn had no fetal hearts on admission to the hospital in Malaysia and that the mother's demonstrated high percentages of postpartum hemorrhage with bad obstetric history.

5.2.3 Perinatal outcomes on newborns by women with maternal complications in pregnancy.

The study found out that majority of the respondents was followed for maternal care related to the fetal and amniotic fluid cavity complications followed by women presenting with edema and proteinuria. The study results disagree with Angodowatti *et al.,* (2017) who reported in a prospective study done on maternal attributes and obstetrical difficulties impact on Indonesian neonatal outcomes that, the most prevalent complications on admission were: Premature rupture of membranes at twenty-six percent, severe pre-eclampsia/ eclampsia at eleven percent, postpartum and antepartum hemorrhage and mal-presentation at twenty-one point six percent.

The study findings indicate that majority of the babies were born through spontaneous vertex delivery. No significant difference was found after a cross-tabulation between mode of delivery and admission to the newborn unit. The results were dis-agreeing with Angodowatti *et al.,* (2017) in a prospective study done on maternal attributes and obstetrical difficulties impact on Indonesian neonatal outcomes who reported that a good percentage (41.5%) of the admitted women was

delivered by cesarean section, 8.7% of the mothers experienced near-miss and 60% of their children were admitted in the newborn unit with birth asphyxia.

The majority of the newborns (eighty-nine percent) were born alive while eleven percent was born dead out of which the majority died before labor with the remaining forty-five percent dying during labor. The study results disagree with Figuaroa-damian and Arredondo, (2012) who reported increased cases of fetal mortality among women with tuberculosis.

The study found out that the majority of the newborns who were born alive had a good Apgar score of eight to ten and a small portion of them with a poor Apgar score in one minute which disagree with Angodowatti *et al.,* (2017) whose results brought out that Women with maternal complications were at a higher risk of experiencing shoulder dystocia, difficult second stage and poor Apgar score in one minute.

The majority of the newborns were under-weight on delivery weighing between sixteen hundred and twenty-four ninety-nine grams at forty-four percent, those with a normal weight between twenty-five hundred and thirty-nine hundred grams were forty-four percent with the remaining being very low birth weight. Maternal complications in pregnancy were therefore attributed to the delivery of newborns with low and very low birth weight which agrees with Fatemeh and Nazanin, (2012) who while studying Pregnancy complications and outcomes in women with epilepsy in Karaman University in Iran found that eighteen percent of the most fatal complications were due to preterm labor and ten percent intra-uterine growth retardation.

The study found that only twenty-six percent were admitted with a majority of them being admitted due to prematurity followed by birth asphyxia. Maternal complications in pregnancy were therefore linked to an admission of newborns to the newborn unit after delivery. The study results however dis-agree with Berner *et al,* (2012) who reported that there were higher rates of newborn intensive care unit admission among newborns by women presenting with maternal complications compared to women presenting with Gestational diabetes.

After newborn follow-up to twenty-eight days post-delivery, the majority at eighty-five percent were alive with five percent being reported to have died, very few cases who reported complications and diseases like jaundice and sepsis. The findings, therefore, dis-agrees with Figuaroa-damian and Arredondo, (2012) who reported that there was an increased risk for perinatal deaths, cases of jaundice post-delivery perinatal, small for gestation, and low births weight among newborns to women who presented with tuberculosis.

5.2.4 Perinatal outcomes of newborns delivered by women presenting with maternal complications in labor

Thirty one point three percent developed obstructed labor due to mal-presentation, twenty-one point nine had labor and delivery complicated by fetal distress, twelve-point two developed obstructed labor related to maternal pelvic abnormalities, six-point three experienced preterm labor, failed induction, Prolonged Labor, labor, and delivery complicated by cord complications while three-point one had abnormalities of forces of labor, labor/delivery complicated by intrapartum hemorrhage and other complications. The large number of women who developed obstructed labor brings out misdiagnosis of both mal-presentations and contracted pelvis during the antenatal visits. The study results agree with Angodowatti *et al.*, (2017) in a prospective study done on maternal attributes and obstetrical difficulties impact on Indonesian neonatal outcomes found, which found out that the most prevalent complications on admission were: Obstructed and prolonged labor at twenty-six percent, severe pre-eclampsia/ eclampsia at eleven percent, postpartum and antepartum hemorrhage and mal-presentation at twenty-one point six percent.

The study found that the majority of the newborns eighty-one point two five were born via cesarean section while eighteen point six were born via spontaneous vertex delivery. There was a significant association between the mode of delivery and admission to the newborn unit in which the odds ratios were higher in children admitted via spontaneous vertex delivery. Cesarean section was therefore found to be a newborn live-saving procedure among women who developed complications since no newborn was dead. The study results however dis-agree with Briand et al., (2012)

who reported that Maternal and neonatal mortality was found to be high in women who had undergone intrapartum cesarean section due to complications in labor compared to those who had spontaneous vaginal delivery in Senegal.

The findings indicate that majority of the newborns sixty-three percent scored 8-10 with the remaining percentage scoring poorly which disagrees with Angodowatti *et al*. (2017) whose results brought out that Women with maternal complications were at a higher risk of experiencing shoulder dystocia, difficult second stage and poor Apgar score in one minute.

The majority of the newborns sixty-three percent were found to have a normal birth weight between twenty-five hundred grams and thirty-nine hundred grams with eighteen percent having low birth weight below twenty-four hundred and ninety-nine grams which agrees with Aggodowati, (2017) who while studying maternal characteristics and obstetrical complications impact on neonatal outcomes in Indonesia, found that (three points four percent) of the newborns weighed less than 1500 grams, (fifteen points two percent) weighed below 2500 grams and the rest who were the majority had normal birth weight.

The study found that the majority of the newborns were born at term 97% while 3% were premature which dis-agree with Saranya, (2017) who found that Preterm labor was the most common fatal complication at eighteen percent.

The study revealed that the majority of the newborns seventy-two percent were not admitted while only twenty-eight percent were admitted to the newborn unit. The majority of those admitted were due to birth asphyxia. The study results agree with Angodowatti *et al.,* (2017) in a prospective study done on maternal attributes and obstetrical difficulties impact on Indonesian neonatal outcomes reported that a good percentage of forty-one point five of the admitted women were delivered by cesarean section, eight-point seven percent of the mothers experienced near-miss and sixty percent of their children were admitted in the newborn unit with birth asphyxia.

The study found that the majority of the newborns at ninety-six percent were reported to be alive 28 days post-delivery after follow-up while four percent were

reported to have died. The majority did not have complications reported along with diseases like jaundice and sepsis. The single death reported was associated with birth asphyxia. The study results are dis-agreeing with Figuaroa-damian and Arredondo, (2012) who reported that there was an increased risk for perinatal death, cases of jaundice post-delivery, small for gestation, and low births weight among newborns to women who presented with tuberculosis compared to those without.

5.2.5 Differences in newborns perinatal outcomes between exposed and unexposed neonates

None of the un-exposed neonates was born dead while 12.1% of the exposed newborns neonates were born dead. The results, therefore, attribute maternal complications with newborn mortality at Kitui County Referral Hospital. The study results are in agreement with a study by Briad *et al.*, as cited by Figuaroa-damian and Arredondo, (2012) which brought out that infants born to mothers presenting with tuberculosis had twice the risk of neonatal complications such as growth retardation and prematurity. There were increased cases of fetal mortality among women with tuberculosis. Similar results were reported by Jan et al as cited by Figuaroa-damian and Arredondo, (2012) which indicated an increased risk for perinatal deaths, small for gestation, and low birth weight among newborns to women who presented with tuberculosis compared to those without.

The study findings indicated that the risk of having a low APGAR score among newborns by mothers with maternal complications was eight times more than that of newborns born by mothers without complications. This is in agreement with study results by Naire et al., (2016) who reported that asphyxia was among the main outcomes of newborns by women who had prolonged labor and those who experienced bleeding in labor. These finding links neonates born by women presenting with a maternal complication with a higher risk of having a poor Apgar score within one minute of birth. The study results are also in agreement with Angodowatti *et al.,* (2017) whose results brought out that Woman with pre-gestational diabetes were at a higher risk of experiencing shoulder dystocia, difficult second stage, and poor Apgar score in one minute.

The study results revealed that a newborn by a woman with complications was at a higher risk (RR: 1.8) of having a low birth weight compared to a newborn by a woman without complications. Newborns born by exposed mothers had a higher risk of being born prematurely (RR: 9.7) compared to those born by mothers without complications. The finding places newborns by women with maternal complications at a higher risk of being born underweight and premature. The results are in agreement with Fatemeh and Nazanin, (2012) who While studying Pregnancy complications and outcomes in women with epilepsy at Karaman University in Iran found that 18% of the most fatal complications were preterm labor, underweight and 10% intra-uterine growth retardation.

The study found out that the risk of admission to the Newborn Unit for a newborn by an exposed mother, was eight times more than that of a newborn by an un-exposed mother which was in agreement with Berner *et al.,* (2012) and Ray, *et al.,* (2011) who pointed out higher rates of newborn intensive care unit admission among newborns by women presenting with pre-gestational diabetes compared to women presenting with Gestational diabetes. Also in the United Kingdom Banhidy *et al.,* (2010), found that there were higher chances of admission to the neonatal intensive care unit for the children born by women who had died due to complications compared to those who had survived.

The study results showed that the exposed mothers were 13.9 times more likely to undergo caesarian section than un-exposed mothers which agrees with Angodowatti *et al.,* (2017) in a prospective study done on maternal attributes and obstetrical difficulties impact on Indonesian neonatal outcomes, which found out that the most prevalent complications on admission were: Obstructed and prolonged labor at twenty-six percent, severe pre-eclampsia/ eclampsia at eleven percent, postpartum and antepartum hemorrhage and mal-presentation at 21.6%. A good percentage (41.5%) of the admitted women were delivered by cesarean section, 8.7% of the mothers experienced near-miss and 60% of their children were admitted in the newborn unit with birth asphyxia.

Newborns born by exposed women were at a higher risk of developing diseases and being admitted within twenty-eight days post-delivery however the results on the risk of dying, developing sepsis, and jaundice was not statistically significant. The results disagree with Marchant *et al.,* (2012), in East Africa whose results after comparing very preterm babies born to women with complications to term babies born by women without complications, found that babies with low birth weight had a higher risk of death within the first twenty-eight days (RR: 7) compared to the ones with a normal birth weight. Babies who were born very preterm had 60 times risk of dying within the first 28 days of life and babies born small for gestational age were twice likely to die within twenty-eight days.

5.3 Conclusions

Having history of multiple pregnancy was found to be the significant obstetric factors contributing to neonatal outcomes at Kitui County referral Hospital

Women presenting with maternal complications were likely to give birth to underweight newborns.

Obstructed labor due to mal-presentation and contracted pelvis were the leading complications in labor that also contributed to high rate of caesarean sections among women developing maternal complications at Kitui County Referral Hospital.

The high risk of being born dead, with a low Apgar score, being born underweight via caesarean section, developing diseases within twenty eight days and dying were the poor perinatal outcomes found after comparing newborns from the exposed and un-exposed groups at Kitui County Referral Hospital.

5.4 Recommendations

Government and non-governmental organizations in Kenya and the region should maintain their focus on alleviating the consequences of maternal complications by ensuring women with history of multiple pregnancy are followed more closely than the routine follow-ups.

- There should be emphasis on antenatal diagnosis of contracted pelvis and mal-presentation to avoid obstructed labor and plan for delivery via caesarean section.
- Refresher courses on the early diagnosis of obstructed labor due to mal-presentation and contracted pelvis to be done frequently through the continuous medical education to the midwives working at Kitui County Referrals Hospital.
- Newborn care should be up scaled at the main facilities do be able to deal with the most difficult cases brought about by maternal complications together with equipping rural facilities to be able to deal with newborns poor outcomes.

REFERENCES

Anggondowati, T., El-Mohandes, A. A., Qomariyah, S. N., Kiely, M., Ryon, J. J., Gipson, R. F., ... & Wright, L. L. (2017). Maternal characteristics and obstetrical complications impact neonatal outcomes in Indonesia: a prospective study. *BMC pregnancy and childbirth*, *17*(1), 1-12.

Anggondowati, T. (2017). Maternal characteristics and obstetrical complications impact neonatal outcomes in Indonesia: A prospective study. *BMC Pregnancy and Childbirth*, 3-4.

Bener, A., Salameh, K. M. K., Yousafzai, M. T., & Saleh, N. M. (2012). Pattern of Maternal Complications and Low Birth Weight : Associated Risk Factors among Highly Endogamous Women, *International Scholarly Research Notices*, *2012*.

Blomberg, M., Tyrberg, R. B., & Kjølhede, P. (2014). Impact of maternal age on obstetric and neonatal outcome with emphasis on primiparous adolescents and older women : a Swedish Medical Birth Register Study. *BMJ open*, *4*(11), e005840.

Briand, V., Dumont, A., Abrahamowicz, M., Sow, A., Traore, M., Rozenberg, P., … & Fournier, P. (2012). Maternal and Perinatal Outcomes by Mode of Delivery in Senegal and Mali: A Cross-Sectional Epidemiological Survey. *PLoS ONE*, *7*(10), 6–13.

Fatemeh, M., & Nazanin, E. B. (2012). Pregnancy complications and outcomes in women with epilepsy. *Open Journal of Obstetrics and Gynecology*, *2*(September), 230.

Iyengar, K., Yadav, R., & Sen, S. (2012). Consequences of maternal complications in women's lives in the first postpartum year: a prospective cohort study. *Journal of Health, Population, and…*, *30*(2), 226–240.

Marchant, T., Willey, B., Katz, J., Clarke, S., Kariuki, S., ter Kuile, F., …

&Armstrong Schellenberg, J. (2012). Neonatal Mortality Risk Associated with Preterm Birth in East Africa, Adjusted by Weight for Gestational Age: Individual Participant Level Meta-Analysis. *PLoS Medicine*, *9*(8), e1001292.

Mesdaghinia, E., Samimi, M., Homaei, Z., Saberi, F., Moosavi, S. G., & Yaribakht, M. (2013). Comparison of newborn outcomes in women with gestational diabetes mellitus treated with metformin or insulin: a randomised blinded trial. *International journal of preventive medicine*, *4*(3), 327-33.

MOH. (2016). *Kenya Reproductive, Maternal, Newborn, Child and Adolescent Health (RMNCAH) Investment Framework.* Nairobi: MOH.

Nair, M., Knight, M., & Kurinczuk, J. J. (2016). Risk factors and newborn outcomes associated with maternal deaths in the UK from 2009 to 2013: a national case–control study. *BJOG: An International Journal of Obstetrics & Gynaecology*, *123*(10), 1654-1662.

Ray, J. G., Vermeulen, M. J., Shapiro, J. L., & Kenshole, A. B. (2001). Maternal and neonatal outcomes in pregestational and gestational diabetes mellitus, and the influence of maternal obesity and weight gain: The DEPOSIT study. *QJM - Monthly Journal of the Association of Physicians*, *94*(7), 347–356.

Report, F. (2017). Saving mothers' lives: confidential enquiry into maternal and child health 2003-5. *International journal of obstetric anesthesia*, *17*(2), 103-105.

Saranya, S. (2017). Comparative study ofmaternal socio-demographic factors andlow birth weight of new-borns at a tertiary care hospital in Chennai, India. *International Archives of Integrated Medicine*, 210-2011.

APPENDICES

Appedix I: Consent Form

My name is Joseph Mulwa. I am a postgraduate student at Jomo Kenyatta University of Agriculture and Technology. I am doing a research on perinatal outcomes of newborns born to mothers presenting with complications at Kitui County Referral Hospital. I am going to give you information and invite you to be part of this research. Before you decide, you can talk to anyone you feel comfortable with about the research.

There may be some words that you do not understand. Please ask me to stop as we go through the information and I will take time to explain. If you have questions later, you can ask me or any of the staff.

Purpose of the research

The research will match the perinatal outcomes between children born by women who present with complications and those who do not. The research will help to identify the relationship between maternal complications and bad perinatal outcomes. The information acquired from the study can help in coming up with recommendations that can lead to reduction of perinatal mortality rates.

Participant Sélection

I am inviting all women who present in Antenatal clinic at 34 Weeks with maternal complications and those women with normal pregnancies at Kitui County referral Hospital to participate in the study.

Voluntary Participation

Your participation in this research is entirely voluntary. It is your choice whether to participate or not. Whether you choose to participate or not, all the services you receive at this hospital will continue and nothing will change. If you choose not to participate in this research project, you will be offered the treatment that is routinely

offered in this hospital as usual. You may change your mind later and stop participating even if you agreed earlier.

Duration of the study

The research takes place from the day of selection up to twenty eight days after delivery during which we will give you a call and ask a few questions concerning baby.

Risks and benefits

There are no risks involved in the study. There would be no added physical pain to the participants. The participants will have a benefit of being admitted and followed up after presenting with complications. Consenting process would also take place in private consultation room.

Confidentiality

The information that we collect from this research project will be kept confidential. Information about you that will be collected during the research will be put away and no-one but the researchers will be able to see it. Any information about you will have a number on it instead of your name. Only the researchers will know what your number is and we will lock that information up with a lock and key. It will not be shared with or given to anyone except ethics and research board and the supervisors.

Justice: The results and recommendations shall be disseminated to all stake holders after the study completion.

Non-maleficence: there shall be no harm both physical and psychological to the participants

Beneficence: The participants and the entire community shall benefit from the research recommendations

Right to Refuse or Withdraw

You do not have to take part in this research if you do not wish to do so and refusing to participate will not affect your treatment at this hospital in any way. You will still have all the benefits that you would otherwise have at this hospital. You may stop participating in the research at any time that you wish without losing any of your rights as a patient here.

Who to Contact

If you have any questions you may ask them now or later, even after the study has started. If you wish to ask questions later, you may contact the following: Joseph Mulwa cell phone 072771567, Dr Makworo 0721262355, Mr Mwangi 0722349473 and the Education research committee secretary telephone 726300-9.

Certificate of Consent

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily to participate as a participant in this research.

Print Name of Participant_____

Signature of Participant _____

Date _____

Day/month/year

If illiterate

I have witnessed the accurate reading of the consent form to the potential participant, and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.

Name of witness_____ AND Thumb print of participant

Signature of witness _____

ate _____

Day/month/year

Statement by the researcher/person taking consent

I have accurately read out the information sheet to the potential participant, and to the best of my ability made sure that the participant understands what will be done.

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Name of Researcher/person taking the consent_____

Signature of Researcher /person taking the consent_____

Date _____

Day/month/year

Appendix II: Approval to Conduct Research

JOMO KENYATTA UNIVERSITY
OF
AGRICULTURE AND TECHNOLOGY

COLLEGE OF HEALTH SCIENCES
SCHOOL OF NURSING
TEL: 067- 5352181-4 Extn. 4064 Box 62000-00200 NAIROBI Email: deannursing@jkuat.ac.ke/school.nursing@jkuat.ac.ke

Ref : JKU/2/125/0037 **Date :** 10TH April, 2019

The Secretary
KNH – UoN ERC
P.O. Box 20773 – 00202
NAIROBI.

Dear Sir,

RE: APPROVAL TO CONDUCT RESEARCH :
JOSEPH MULWA KITHOKOO – HSN311-7542/2016

The above named is a student taking Master of Science in Nursing (Midwifery) at the School of Nursing, JKUAT. He is undertaking a research project titled "Perinatal outcomes of newborns Delivered by women with maternal complications – A paired cohort study at Kitui County Referral Hospital" the proposal has been presented to the school post graduate committee and approved for implementation.

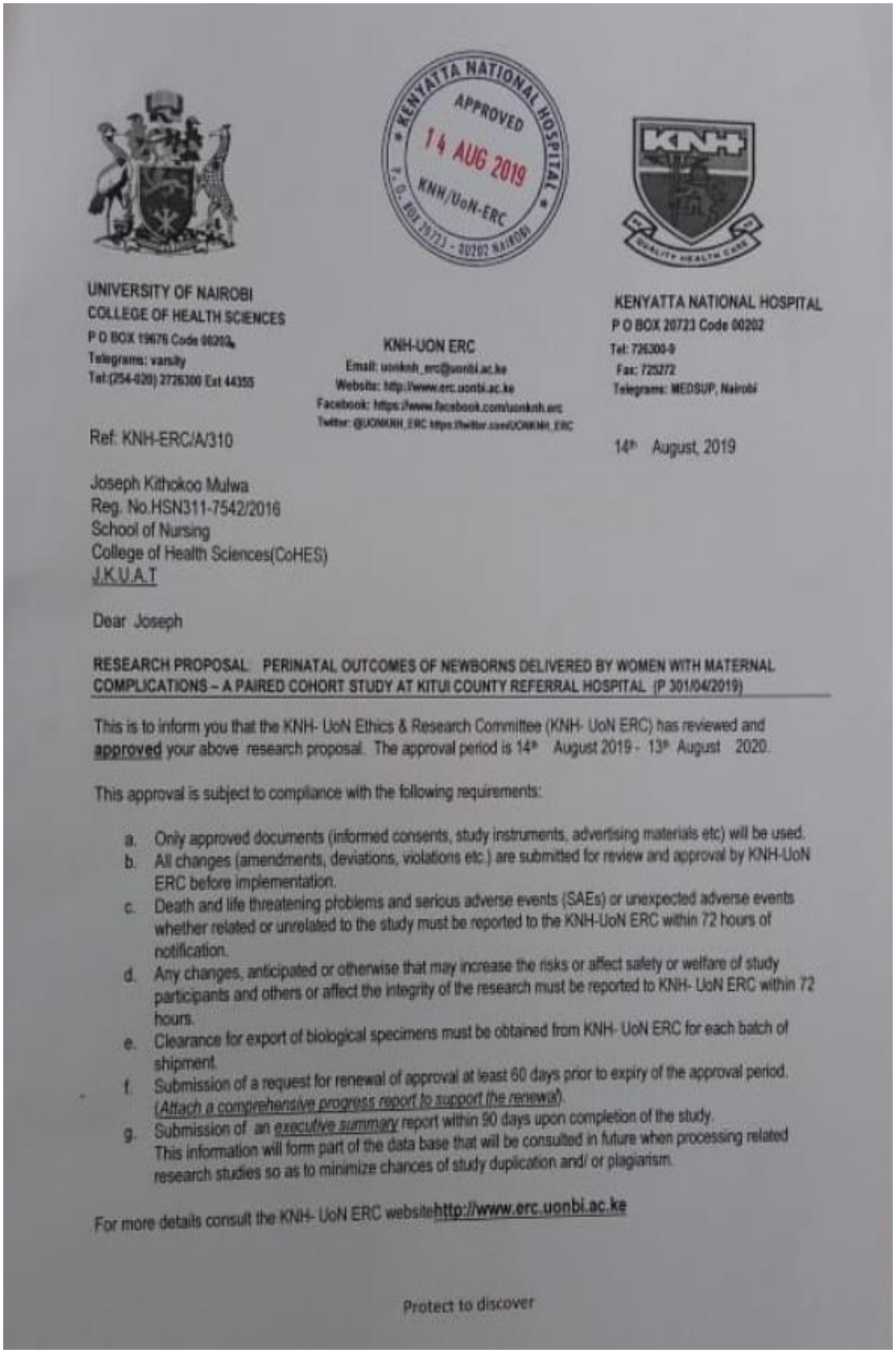
This is therefore to request for ethical approval from your organization for the research to be implemented.

Thank you for your continued support.

DEAN, SCHOOL OF NURSING
10 APR 2019
P.O. Box 62000-00200 NAIROBI

PROF. MONDA
COORDINATOR, COMMUNITY HEALTH
MSC PROGRAMME CO-ORDINATOR, SCHOOL OF NURSING

Appendix III: Ethics Approval Letter



KENYATTA NATIONAL HOSPITAL
APPROVED
14 AUG 2019
KNH/UoN-ERC
P.O. BOX 20723 - 00202 NAIROBI

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

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

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

Ref: KNH-ERC/A/310

14th August, 2019

Joseph Kithokoo Mulwa
Reg. No.HSN311-7542/2016
School of Nursing
College of Health Sciences(CoHES)
J.K.U.A.T

Dear Joseph

RESEARCH PROPOSAL: PERINATAL OUTCOMES OF NEWBORNS DELIVERED BY WOMEN WITH MATERNAL COMPLICATIONS – A PAIRED COHORT STUDY AT KITUI COUNTY REFERRAL HOSPITAL (P 301/04/2019)

This is to inform you that the KNH- UoN Ethics & Research Committee (KNH- UoN ERC) has reviewed and approved your above research proposal. The approval period is 14th August 2019 - 13th August 2020.

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. Clearance for export of biological specimens must be obtained from KNH- UoN ERC for each batch of shipment.
f. 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*).
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.

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

Protect to discover

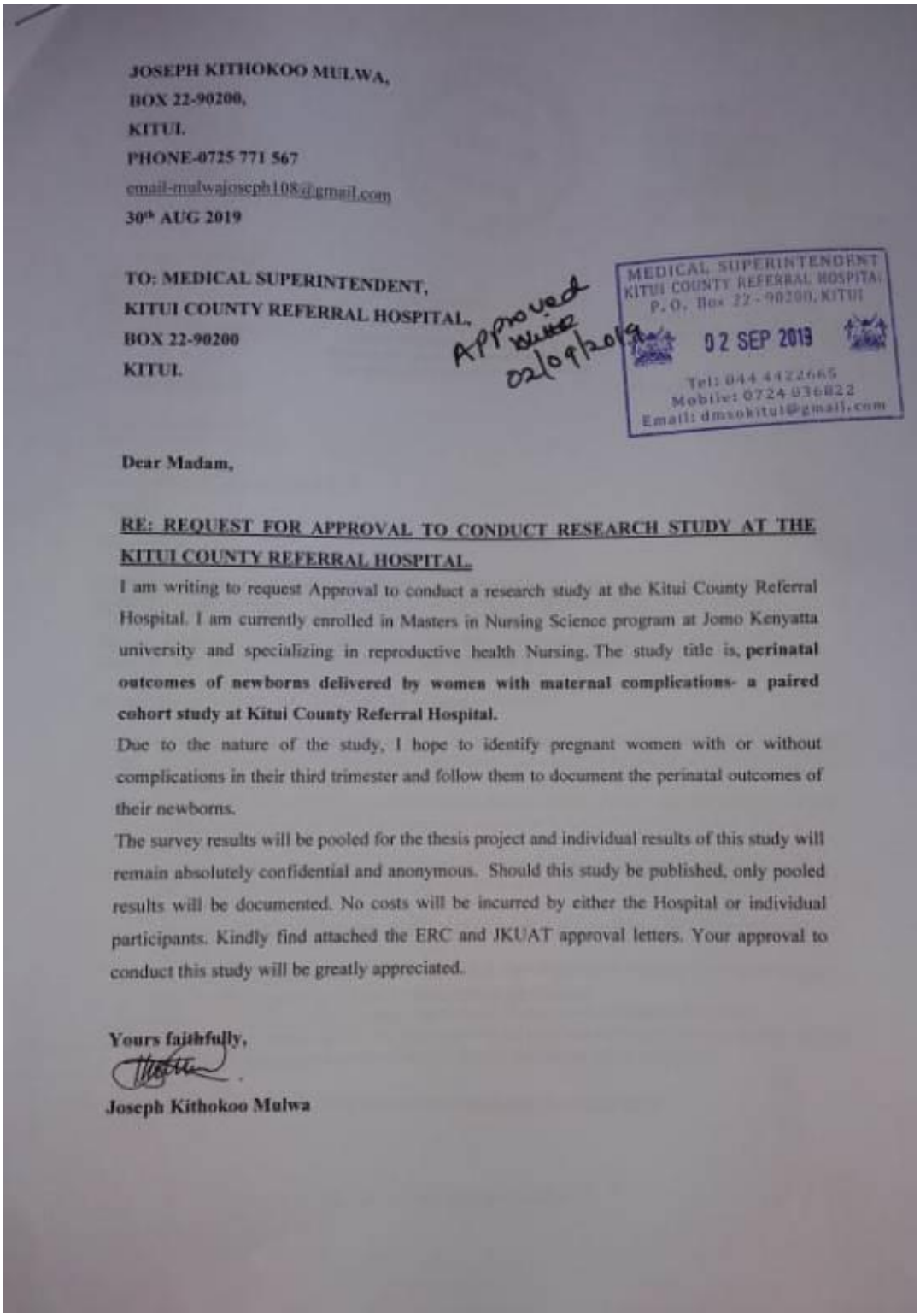
Yours sincerely,

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

c.c. The Principal, College of Health Sciences, UoN
The Director, CS, KNH
The Chairperson, KNH- UoN ERC
The Assistant Director, Health Information, KNH
Supervisors: Dr. Drusilla Makworo, School of Nursing, J.K.U.A.T
Mr. Elijah Githinji Mwangi, School of Nursing, J.K.U.A.T

Protect to discover

Appendix IV: Permission to Collect Data



JOSEPH KITHOKOO MULWA,
BOX 22-90200,
KITUI.
PHONE-0725 771 567
email-mulwajoseph108@gmail.com
30th AUG 2019

TO: MEDICAL SUPERINTENDENT,
KITUI COUNTY REFERRAL HOSPITAL,
BOX 22-90200
KITUI.

Approved
02/09/2019

MEDICAL SUPERINTENDENT
KITUI COUNTY REFERRAL HOSPITAL
P.O. Box 22 - 90200, KITUI
02 SEP 2019
Tel: 044 4422665
Mobile: 0724 036822
Email: dmskitui@gmail.com

Dear Madam,

RE: REQUEST FOR APPROVAL TO CONDUCT RESEARCH STUDY AT THE KITUI COUNTY REFERRAL HOSPITAL.

I am writing to request Approval to conduct a research study at the Kitui County Referral Hospital. I am currently enrolled in Masters in Nursing Science program at Jomo Kenyatta university and specializing in reproductive health Nursing. The study title is, **perinatal outcomes of newborns delivered by women with maternal complications- a paired cohort study at Kitui County Referral Hospital.**

Due to the nature of the study, I hope to identify pregnant women with or without complications in their third trimester and follow them to document the perinatal outcomes of their newborns.

The survey results will be pooled for the thesis project and individual results of this study will remain absolutely confidential and anonymous. Should this study be published, only pooled results will be documented. No costs will be incurred by either the Hospital or individual participants. Kindly find attached the ERC and JKUAT approval letters. Your approval to conduct this study will be greatly appreciated.

Yours faithfully,

Joseph Kithokoo Mulwa

JOSEPH KITHOKOO MULWA,
BOX 22-90200,
KITUI.
PHONE-0725 771 567
Email- mulwajoseph108@gmail.com

3rd OCT 2019

TO: MEDICAL SUPERINTENDENT,
MAKUENI COUNTY REFERRAL HOSPITAL,
BOX 95-90300
MAKUENI.

No IEC Approved.

MEDICAL SUPERINTENDENT
MAKUENI COUNTY REFERRAL HOSPITAL
07 OCT 2019
P. O. Box 95-90300
TEL: 044 - 33175/33195

Dear Sir,

RE: REQUEST FOR APPROVAL TO CONDUCT A RESEARCH STUDY PRE-TESTING AT MAKUENI COUNTY REFERRAL HOSPITAL.

I am writing to request Approval to conduct a research study at Makueni County Referral. I am currently enrolled in Masters in Nursing Science program at Jomo Kenyatta University and specializing in reproductive health Nursing. The study title is, **perinatal outcomes of newborns delivered by women with maternal complications- a paired cohort study at Kitui County Referral Hospital.**

Due to the nature of the study, I hope to identify pregnant women with or without complications in their third trimester and follow them to document the perinatal outcomes of their newborns. The survey results will be pooled for the thesis project and individual results of this study will remain absolutely confidential and anonymous. Should this study be published, only pooled results will be documented. No costs will be incurred by either the Hospital or individual participants. Kindly find attached the ethics approval letters and the Questionnaire. Your approval to conduct this study Pre-test will be greatly appreciated.

Yours faithfully,

Joseph Kithokoo Mulwa.

Appendix V: Questionnaire

Study arm: cases……. control…….. (Tick where appropriate)

A data collection tool for the Masters in Science nursing Reproductive Health Project on Perinatal outcomes of newborns born to women presenting with maternal complications- A paired Cohort study at Kitui County referral Hospital.

Interview date ……..……

Serial number …….

Section A; Demographic data (tick appropriately)

1. Age……..
2. Place of residence……
3. Education level

    a) Nursery ☐
    b) Primary ☐
    c) Secondary ☐
    d) College ☐
    e) University ☐
    f) Others (specify)……..

4. Marital status

    ☐
    a) Married
    b) Single ☐
    c) Divorced ☐
    d) Widowed ☐
    e) Separated ☐

5. Occupation

   a. Employed ☐
   b. Unemployed ☐
   c. Self employed ☐

6. Occupation spouse

   a) Employed ☐
   b) Unemployed ☐
   c) Self-employed ☐
   d) Not applicable ☐

7. Religion

a) Christian ☐
b) Muslim ☐
c) Atheist ☐
d) Others Specify…..

SECTION TWO: PREVIOUS OBSTETRIC FACTORS

8. Parity……
9. History multiple gestation Yes ☐ No ☐
10. Previous Mode of Delivery
    a) SVD ☐
    b) Caesarean Section ☐
    c) Assisted Vagina Delivery ☐
    d) Breech Delivery ☐
11. Known Bad obstetric History
    a) Yes ☐
    b) No ☐
12. Known Contracted pelvis as per initial assessment
    a) Yes ☐
    b) No ☐

SECTION THREE: MATERNAL COMPLICATIONS IN PREGNANCY CHECKLIST AS PER THE ICD10 CHAPTER 15

Tick along the complication which the presents with

ICD NO. Number	**Maternal Complication**	**Tick if present**
009	Supervision of high risk pregnancy	
010-016	Edema, proteinuria, and hypertensive disorders in pregnancy, childbirth, and the puerperium	
020-029	Other maternal disorders predominantly related to pregnancy	
030-048	Maternal care related to the fetus and amniotic cavity and possible delivery problems	
080-082	Encounter for labor	
094-09A	Other obstetric conditions, not elsewhere classified	

SECTION FOUR: MATERNAL COMPLICATIONS IN LABOR CHECKLIST AS PER THE ICD10

Tick along the complication which the presents with

ICD NO. Number	**Maternal Complication**	**Tick if present**
060	Preterm Labor and Delivery	
061	Failed induction of labor	
062	Abnormalities of forces of labor	
063	Long Labor	
064	Obstructed labor due to mal-presentations of fetus	
065	Obstructed labor due to maternal Pelvic abnormality	
066	Other Obstructed labor	
067	Labor and Delivery Complicated by intra-partum hemorrhage not elsewhere classified	
068	Labor and delivery complicated by Fetal distress	
069	Labor and delivery complicated by umbilical cord complications	
071	Other Obstetric trauma	
074	Complications of anesthesia during labor and delivery	
075	Other complications of labor and delivery not elsewhere classified	

SECTION FIVE: NEWBORN OUTCOMES

13. Status at birth
    a) Born Live ☐
    b) Born Dead ☐
14. If born dead, what time did the death occur?
    a) Before labor ☐
    b) During labor ☐
    c) Not Known ☐
15. Agar Score Post Delivery (check from the records)

Apgar score	**1 minute**	**5 minutes**	**10 minutes**
1-4			
5-7			
8-10			
0			

16. Birth weight at delivery
    a) Below 1500g ☐
    b) 1600g-2500g ☐
    c) 2500g- 3900g ☐
    d) Above 4000g ☐
17. Newborn Maturity
    a) Premature ☐
    b) Normal term baby ☐
    c) Underweight ☐
18. a. Admission to NBU
    a) Yes ☐
    b) No ☐

    c. If admitted to NBU kindly tell the reason for admission……..

19. Mode of delivery

a) Caesarean section

b) Spontaneous vertex Delivery

c) Breech Delivery

d) Assisted Vaginal Delivery

SECTION SIX. FOLLOW UP AFTER 28 DAYS

20. Condition of the baby delivery to 28 complete days

a) Alive

b) Dead

21.a. History of disease/ complications to the baby form delivery to 28 days

a) Yes

b) No

21.b.If yes kindly specify……

21.c. If yes did was the baby admitted…?

a) Yes
b) No

22. History of Jaundice

a) Yes

b) No

23. History of sepsis (fever)

a) Yes ☐

b) No ☐

Thank You for Participating

OMBI LA IDHINI

Kitangulizi

Jina langu ni Joseph Mulwa Nimehitimu kama muuguz na kusajiliwa na bodi linalo wasajili wauguzi inchini Kenya .Kwa sasa mimi ni mwanafunzi wa shahada y ajuu (masters) yaafyayauzazi (reproductive health); Chuo Kikuu cha Jomo Kenyatta cha Ukulima na Technologia. Ningependa ujiunge na utafitini na ofanya kuhusu matokeo ya wototo wanaozaliwa na kina mama wanafika kwenye Hospitali ya Rufaa Jimbo La Kitui wakiwa na shida mbali. Utafiti huu utafanywa katika sehemu ya kujifungulia akina mama na cliniki ya wamama katika hospitali ya rufaa Jimbo La Kitui.

Kiini Cha Utafiti

Utafiti huu utalinganisha matokeo kati ya watoto wanaozaliwa na kina mama wenye matatizo mbali mbali ya kiafya na wale ambao uzaliwa na kina mama bila matatizo. Utafiti unalenga kubainisha uhusiano kati ya matatizo ya kiavya kati ya kina mama waja wazito na matokeo mabaya ya watoto wanaozaliwa kutoka wiki theladhini nan ne hadi kuzaliwa had siku ishirini na nane baada ya kuzaliwa.Matokeo ya utafiti yatatumika kupeana mapendekezo ambayo yanaweza kupunguza vifo vya watoto wanapozaliwa.

Uchaguzi wa watakaoshiriki

Nawakaribisha kina mama wote waja wazito watakaofika katika Cliniki ya a kina mama kwa wiki ya thelathini na nne katika Hospitali ya Rufaa Jimbo la Kitui kushiriki kwenye utafiti huu.

Kushiriki Kwa Kujitolea

Kushiriki kwenye utafiti huu ni hiari yako mwenyewe. Unaweza kushiriki ama kutoshiriki.Utapata huduma zote unazopaswa kupata uwe umeshirii au la. Unaweza kubadili uamuzi wako katikati mwa utafiti huu bila kushurutishwa ama kuangaishwa na yeyote.

Muda wa Utafiti

Utafiti utaendelea toka siku ya kuchaguliwa wakati hadi siku ishirini na nane baada ya kuifungua ambapo tutakupigia simu kujua hali ya mtoto.

Adhari na Manufaa

Adhari za utafiti huu ni finyu sana. Hakutakuwa na uchungu wowote utakaopitia kwa kushiriki kwenye utafiti huu japo kuna adhari za kifikira kutokana na maswali ya utafiti. Adhari za utafifiti zitapunguzwa kupitia kuyaweka makaratasi ya mahojiano kusiko fikika na wasioruhusiwa.

Usiri

Matokeo ya utafiti huu yatawekwa kwa usiri mkuu. Habari kukuhusu wewe tutakayoipokea itawekwa pahali amabapo ni mtafiti pekee atakuwa n uwezo wa kuiona. Habari yoyote kukuhusu itakuwa na nambari wala sio majina yako. Mtafiti pekee ndiye atakayeijua nambari hiyo na itafungiwa na haitopeanwa kwa yeyote Yule ila bodi ya maadili na utafiti na waangalizi chuoni.

Haki ya kukataa au Kuachia kati

Si lazima ushiriki kwenye utafiti huu na kukataa kwako hakutoadhiri jinsi unavyopata matibabu kwenye hospitali hii. Utayapata manufaa yote kama kawaida. Unayo haki ya kuuachia utafiti katikati bila kupoteza haki zako za kimsingi.

Nani Utakayepigia Simu

Kama unayo maswali kwa sasa ama baadaye, hata utafiti ukiwa umeanza unaweza wpigia wafuatao, Joseph Mulwa Nambari ya simu **0725771567**, Daktari Makworo **0721262355** na Bwana Mwangi **0722349473** Na katibu wa muungano **726300-9**

Cheti Cha Idhini

Nimeyasoma maelezo yafuatayo, ama nimeyasomewa maelezo yafuatayo. Nimeupata mda wa kuuliza maswali na kujibiwa kwa maridhio yangu. Hivi napeana idhini kama mshirika katika utafiti huu.

Majina ya mshirika_____

Sahihi ya Mshirika_____

Tarehe_____

(siku/Mwezi/Mwaka)

Kama Hajasoma

Nimeshuhudia ksomewa kamili kwa mshirika mtarajiwa na amepata ruhusa ya kuuliza maswali. Napeana hakikisho kwamba mshirika amepeana idhini bila kushurutishwa.

Jina la Shuhuda_____ **NA ALAMA YA KIDOLE**

Sahihi Ya Shuuda_____

Tarehe_____

(Siku/ Mwezi/ Mwaka)

Maneno ya Mtafiti/Msaidizi

Nimeyasoma kwa umakini maneno yaliyoko kwenye karatasi ya mshirika mtarajiwa na nimehakikisha kwamba anayaelewa mambo yatakyofanyika.

Ninakiri ya kwamba mshirika amepewa mda wa kuuliza maswali kuhusu utafiti huu na yote yakajibiwa kadri ya uweza wa mtafiti.

Ninakiri ya kwamba mshirika hajashurutishwa kupeana idhini na kwamba idhini imepeanwa kwa uhuru na hiari.

Jina la Mtafiti/ msaidizi achukuaye idhini_____

Sahihi la mwenye kuchukua idhini_____

Tarehe_____

(Siku/ Mwezi/Mwaka)

Fomu Ya Maswali

Tawi La utafiti: Kina mama wajawazito wenye Matatizo mbali mbali .....Kina mama wajawazito wasio na matatizo (Tia alama inavyolingana)

Fomu ya maswali kwa shahada ya juu (masters) ya uuguzi afya ya uzazi (reproductive healh) juu ya Matokeo ya watoto wanaozaliwa na kina mama wajawazito wanaofika kwenye wadi ya kujifungua ya kina mama katika Hospitali ya Rufaa ya Jimbo la Kitui

Tarehe ya Mahojiano.....

Nambari Ya Mahojiano.....

KIPENGELE CHA A; Habari kumuhusu Mshirika (Tia Alama inavyofaa)

1. Miaka……..

2. Unakotokea……

3. Kiwango cha Elimu

g) Chekechea ☐

h) Shule Ya Msingi ☐

☐

i) Shuke ya upili

j) Chuo Cha anuai

k) Chuo Kikuu

l) Kinginecho (fafanua)……..

4. Maisha Ya ndoa

a) Ndani ya Ndoa

b) Bado Kuolewa

c) Talaka

d) Nilifiwa

e) Tuliachana

5. Maisha Ya Ajira

a. Nimeajiriwa

b. Sina Kazi

c.Nimejiajiri

6. Occupation spouse

a) Ameajiriwa

b. Hana Kazi

c.Amejiajiri

7.Religion

e) Mkristu

f) Muislamu

g) Asiyeamini

h) Wengine taja…..

8. Mara Ngapi Umejifungua……

KIPENGELE B; MATATITZO YANAYOWAKUMBA KINA MAMA WAKIWA WAJA WAZITO KUAMBATANA NA ORODHA YA KIMATAIFA (ICD 10)

Tia alama inavyopaswa

NABARI YA ORODHA	**TATIZO LA MAMA**	**ALAMA**
009	Mimba yenye adhari	
010-016	Kufura mwilini, protini kwenye mkojo, shindikizo la juu ladamu wakati wa mimba, kujifungua na baadaye	
020-029	Matatizo mengine yahusianayo na uja uzito	
030-048	Huduma kwa mama ihusianayo na mtoto na maji kwenye mfuko wa uzazi	
080-082	Unayopitia wakati wa kujifungua	
094-09A	Shida zingine ambazo hazija orodhereshwa	

KIPENGELE CHA C; MATATITIZO MBALIMBALI YANAYOWAKUMBA KINA MAMA WAKATI WANAPOJIFUNGUA (Tia alama kama tatizo lipo)

NAMBARI YA ICD	**TATIZO LA MAMA**	**Alama**
060	Uchungu wa mapema wa kujifungua	
061	Uchungu kushindikana kuanza baada ya dawa	
062	Matatizo ya uchungu wa kujifungua	
063	Mda mwingi wa kabla kujifungua	
064	Mtoto kuwa amekaa viabaya	
065	Mifupa ya mama kuwa ndogo	
066	Jia zingine zinazomfungia mtoto kuzaliwa	
067	Kutoa damu kabla ya kujifungua	
068	Mtoto kuchoka kabla ya kuzaliwa	
069	Matatizo ya Kitovu	
071	Mifano mingine ya kuumia wakati wa kujifungua	
074	Sid ya dawa zinazopeanwa wakati wa kujifungua	
075	Mashida mengine ambayo hayajatajwa	

KIPENGELE CHA D: MATOKEO YA MTOTO

9. Hali Yake anapozaliwa

a. Hai ☐

b. Kazaliwa mfu ☐

10. Iwapo kazaliwa mfu…kifo kilitokea wakati upi?

d) Kabla ya machungu ☐
e) Wakati wa machungu ☐
f) Haijulikani ☐

11.Alama zake za kiavya anapozaliwa (Angalia rekodi)

Alama	**1 Dakika**	**5 Dakika**	**10 minutes**
1-4			
5-7			
8-10			
0			

12.Uzito baada ya Kuzaliwa

e) Chini Ya 1500g ☐
f) 1600g-2500g ☐
g) 2500g- 3900g ☐
h) Juu ya 4000g ☐

13.Ukomavu anapozaliwa

d) Hajakomaa ☐
e) Amekomaa ☐

14a. Kulazwa kwenye Wadi Ya watoto

a. Ndio ☐

b. La ☐

14b. Kama Alilazwa tafadhali eleza sababu za kulazwa kwake……..

15. Jia Ya kuzaliwa

a) Upasuaji ☐

b) Kuzaliwa kawaida ☐

c) Kichwa Nyuma ☐

d) Kwa usaidizi ☐

KIPENGELE CHA E; MATOKEO BAADA YA SIKU 28

16a. Hali baada ya Siku 28

a) Hai ☐

b) Aliaga dunia ☐

16.b. Kunayo historia ya Ugonjwa

a) Ndio ☐

b) La ☐

17.Kama Ndio Fafanua tafadhali……..……

18a. Kulazwa kwenye chumba watoto

☐

c) Ndio

d) La ☐

18.b. Kama alilazwa peana maelezo tafadhali……..

19. Jia ya Kuzaliwa

a) Upasuaji

b) Kawaida

c) Makalio kutangulia

d) Kuzaliwa kwa usaidizi

KIPENGELE CHA F; KUFUATILIA MPAKA SIKU 28

20. Hali ya mtoto kutoka kuzaliwa mpaka siku 28

a) Hai

b) Amefariki

21.a. Historia ya ugonjwa

a) Ndio

b) La

21.b.Kama ndio fafanua……

21.c. Kama ndio mtoto alilazwa……..…?

c) Ndio
d) La

22. Historia Ya rangi ya manjano kwenye ngozina macho

a) Ndio

b) La

23. Historia ya Joto

a) Ndio

b) La

Asante Kwa kushiriki

UKULYO WA MWANYA

Mwambililyo

Masyitwa makwa ni Joseph Mulwa nan i nasi muandikthye ni kyama kuandokithya kya Kenya. Kwa oyu ni musomi sukulini munene wa Jomo Kenyatta ya ngilikasa na sayanzi na nisoma ndikilii ya keli (masters) ya Uima wa mwii wa usyai (reproductive health). Nikunikila mauvoo iulu wa matokeo ma syana ila isyawaa ni aa mwaitu ala aito mavikaa sivitalini munene wa Kitui Mena mathina .

Kielelo Kya Ukunikili

Kuthiananya matokeo ma syana ila isyawaaa ni aa mwaitu ala mavikaa na mathina na matokeo ma syana ila isyawaa ni aa mwaitu ala matethiawa na mathina. Ukunikili uu ni kusisya kana vena ukwatianiu kati wa mathina ala mevuilaa aa mwaitu na matokeo mathe ma sya sivitalini munene wa Kiti Kaunti. Mawendekethyo ma ukunikili uu makatetheesya kuolanga ikwu sya syana ila isyawaa sivitalini munene wa kitui kaunti.

Kusakua ala makasungia mokulyo

Nimathokya aa mwaitu onthe aito ala mavikaa sivitalini munene wa kitui kaunti kiliniki kuma wiki miongo itatu na inya.

Kusungia kwa kwiyumya

Kwithia umwe wa ala mekusungia maswali ni kwenda kwaku mwene. No witikile kana ukalea na ndukavatwa mautethyo ala wailite ni ukwata wavikia kulea. No ualyule kiliko kyaku ukunikili uendeeye ana vai mundu ukausukuma kuemdeeya.

Ivinda ya ukunikili

Ukunikili uu ekeekwa kuma yila wasakuwa nginya kusyaa na wenuka ukakuniwa simu itina wa matuku miongo ili na nyanya.

Moseo na mauthuku ma ukunikili

Mothuku ma ukunikili uu ni maniini muno. Maswali ala wikulywa nomaunyamasye kiliko. Mothuku asu makaolangwa kwa kuvingiya mosungio maku vandu vaseo

Kimbithi

Mosungio ma ukunikili makaiwa kwa kimbithi kinene. Mosungio makaiwa vandu vala no mwene ukunikili utonya umavikia. Mauvoo onze iulu waku makthiwa na namba na ti masyitwa. Namba isu ikethiwa na mukunikili eo weka na akaminengane kwa ikundi ya tavia nzeo na ukunikili na kwa asisya ma sukulu

Uthasyo Wa Kulea kana Kuekela kati

Ti lasima usungue maswali aa ana kulea kwaku kuituma utatetheka sivitalini uyu. Ni haki yaku kusungia kana kulea kusungia mookulyo asu.

Utonya Ukunia uu Simu

Ethiwa wina maswali iulu wa ukunikili oyu kana ukunikili uendeeye no ukune namba ii sya simu, Joseph Mulwa Namba ya simu **0725771567**, Dakitali Makworo **0721262355** na Vwana Mwangi **0722349473 Munandiki wa kikundi 726300-9.**

Lingilia ya Mwanya

Ninakwata uelesyo, kana ninasomewa uelesyo wa ukunikili uu, na ninakwata ivinda ya kukulya makulyo na nakwata mausungio neaniwa. Yuyu ningunengane nwanya wa kwithiwa umwe wa ala me ukunikilini uu.

Masyitwa makwa_____

Saii Yakwa_____

Taliki_____

(Taliki/Mwei/ Mwaka)

Ula ute Musomu

Nineyone umwe wa ala makethiwa ukunikilini aisomewa uelesyo wa ukunikili na anewa mwanya wa ukulya maukulyo. Ninguathana kana anengane mwanya vate kuingiw'a ni mundu ona wiva.

Isytwa ya ngusi_____ **NA ALAMA YA KITOLE**

Saii wa ngusi_____

Taliki_____

(Ituku/ Mwei/ Mwaka)

Ndeto sya mukunikili/ mutetheesya

Ninasoma maundu onthe ma uyu ukwithiwa ukunikilini na naikiithya kana niwaelewa. Ningwathana kana niwanewa mwanya wa kukulya maukulyo na on the masungiwa o nesa ni mukunikili.

Ningumbula kana ndananengane mwanya kwa kusukumwa ni mundu ona iva indi eka uu kwa kwenda kwake mwene.

Isytwa Ya Mukunikili/ mutetheesya_____

Saii_____

Taliki_____

(Ituku/ Mwei/Mwaka)

mu Ya Maswali

Uvonge wa ukunikili: Aaa mwaitu ala aito me na mathina kivathukayo ma mii.Aaa mwaitu ala aito mate na mathina ma (Ikia alama)

Fomu ya maswali ma ndikilii (masters) ya unasi wa usyai (reproductive healh) iulu wa matokeo ma syana ila isyawaa ni aa mwaitu ala mavikaa sivitalini munene wa Kitui Kaunti.

Taliki Sya maswali.....

Namba ya maswali.....

KILUNGU CHA A; Mauvoo iulu waku (Ikia Alama/kuandika)

1. Myaka yaku……..

2. Umite Va……

3. Kiwango kya kisomo

a) Nasali ☐
b) Sukulu wa musingi ☐
c) Shuklu wa sekondali ☐
d) Kolenji ☐
e) Yunivasiti ☐
f) Ila Ingi (Weta)……..

4.Mutwaano

a) Nimutwae ☐
b) Ndyaatwawa ☐
c) Nitwaumaniwe ☐
d) Ni Ndiwa ☐
e) Nitwataanisye ☐

5.Kuandikwa

a. Nimuandike ☐
b. Ndina Wia ☐
c. c.Niniyiandikite ☐

6. Wia Wa musee

7. Ndini

a) Mukilisito ☐
b) Muislamu ☐
c) Mulei ☐
d) Ala angi weta….. ☐

8. Usyaite keanata……

KILUNGU B; MATHINA ALA MEVUILAA A MWAITU ME AITO KWIANANA NA ORODHA YA MATAIFA

Ikia alama

NAMBA	THINA	ALAMA
009	Ivu yia madhina	
010-016	Ivu yin a madhina, kwimba mwii, kwambatwa ni nthakame wi muito, uitetheka na itina wa kutetheka	
020-029	Mathina angi ma usyai	
030-048	Utenthyo wa mama muito kuusikana na kana kana kiw'u	
080-082	Maundu ala uisilaa uisyaa	
094-09A	Mathina angi matemaandike	

KILUNGU KYA C; MATHINA ALA MEVUILAA AA MWAITU AITHI KUTETHEKA KUANANA NA ICD 10 (Ikia alama ethiwa ve thina)

NAMBA YA ICD	THINA WA MWAITU	ALAMA
060	Mathina ma woo wa kusyaa	
061	Kwongelwa woo na uilea kuwiw'a	
062	Mathina ma woo	
063	Kukua ivinda iasa utasyaite	
064	Mwana kusywa ailye nthi	
065	Mawaso ma inya kwithiwa me manini	
066	Mathina angi mavingingaisyaa mwana	
067	Kuuwa utanasyaa	
068	Mwana kunoa atanasyaa	
069	Mathina ma mukauti	
071	Mithemba ingi ya kuumia mundu aisyaa	
074	Mathina ma ndawa sya kusyiiya woo	
075	Mathina angi mate mawete	

KILUNGU KYA D; MATOKEO MA KANA

9.Hali Ya mwana asyawa

a. E thayu ☐

b. Ni mukw'u ☐

10. Ethiwa asyawa emukw'u, akwiye saa syiana?

a) Atanasyawa ☐
b) Ivinda ya usyawa ☐
c) Vayisikiiye ☐

11. Makisi ma asyawa (Sisya mavuku)

Makisi	**1 Ndatika**	**5 Ndatika**	**10 Ndatika**
1-4			
5-7			
8-10			
0			

12. Uito wa mwana asyawa

a) Ithio wa 1500g ☐
b) 1600g-2500g ☐
c) 2500g- 3900g ☐
d) Iulu wa 4000g ☐

13. Kuvika kwa mwana

a) Nimuviku ☐
b) Timuviku ☐

14a. Kukoma kwa syana e muwau

a. Yii ☐

b. Aiyee ☐

14b. Ethiwa niwakomie elesya kitumi tafadhali……..

15. Asyaiwekwa nzia yiva..?

a) Kutemwa ☐

b) Kawaita ☐

c) Ailye Nthi ☐

d) Kwa kutetheew'a ☐

KILUNGU KYA E; ALI YA MWANA ITINA WA MATUKU 28

16a. Ali ya mwana itina wa matuku 28

a) E thayu ☐

b) Niwetiwe ☐

16.b. Niwawaiye..?

a) Yii ☐

b) Ekai ☐

17.Ethiwa niwawaiye elesya tavathali ……..……

18a. Niwandikiiwe kukoma?

a) Yii ☐
b) Ekai ☐

18.b. Ethiwa niwandikiiwe kuko tuelesye……..

19. Asyaiwe ata?

a) Kutemwa ☐

b) Kawaita ☐

c) Okite na mauu ☐

d) Niwatetheesye kusyaa ☐

KILUNGU CHA F; KUATIWA MBAKA MATUKU IGO ILI NA NYANYA

20. Hali ya mwana kuma ila asyaiwe mabaka matuku 28

a) Ethayu ☐

b) Niwetiwe ☐

21.a. Niwawaiye ?

a) Yii ☐

b) Aiyee ☐

21.b. Ethiwa niwawaiye elesya……

21.c. Niwandikiiwe kukoma……..…?

a) Yii ☐

b) Aiyee ☐

22. Akwatwa ni muuku?

a) Yii ☐

b) Aiyee ☐

23. Akwatwa ni ivyuvi?

a) Yii ☐

b) Aiyee ☐

Nimuvea

Appendix VI: Research Permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **646264**

Date of Issue: **23/March/2020**

RESEARCH LICENSE

This is to Certify that Mr.. JOSEPH KITHOKOO MULWA of Jomo Kenyatta University of Agriculture and Technology, has been licensed to conduct research in Kitui on the topic: PERINATAL OUTCOMES OF NEWBORNS BORN TO MOTHERS PRESENTING WITH COMPLICATIONS -A PAIRED COHORT STUDY AT KITUI COUNTY REFERRAL HOSPITAL for the period ending : 23/March/2021.

License No: **NACOSTI/P/20/3727**

646264

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013

The Grant of Research Licenses is Guided by the Science, Technology and Innovation (Research Licensing) Regulations, 2014

CONDITIONS

1. The License is valid for the proposed research, location and specified period
2. The License any rights thereunder are non-transferable
3. The Licensee shall inform the relevant County Director of Education, County Commissioner and County Governor before commencement of the research
4. Excavation, filming and collection of specimens are subject to further necessary clearence from relevant Government Agencies
5. The License does not give authority to tranfer research materials
6. NACOSTI may monitor and evaluate the licensed research project
7. The Licensee shall submit one hard copy and upload a soft copy of their final report (thesis) within one of completion of the research
8. NACOSTI reserves the right to modify the conditions of the License including cancellation without prior notice

National Commission for Science, Technology and Innovation
off Waiyaki Way, Upper Kabete,
P. O. Box 30623, 00100 Nairobi, KENYA
Land line: 020 4007000, 020 2241349, 020 3310571, 020 8001077
Mobile: 0713 788 787 / 0735 404 245
E-mail: dg@nacosti.go.ke / registry@nacosti.go.ke
Website: www.nacosti.go.ke

Appendix VII: Kitui County Map