

**ASSESSMENT OF NEONATAL OUTCOMES AMONG TEENAGE
MOTHERS AT KITALE COUNTY REFERRAL HOSPITAL,
KENYA**

BY:

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**A THESIS PRESENTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE AWARD OF THE DEGREE OF
MASTER OF SCIENCE IN NURSING (MATERNAL AND
NEONATAL HEALTH)**

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DECLARATION

Declaration by candidate

This thesis is my original work and has not been presented for a degree in any other university. No part of this thesis may be produced without prior written permission of the author or Moi University.

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DEDICATION

I dedicate this work to my family as well as my teachers, through whose effort and sacrifice over the years, I have become a better person and Nurse.

OPERATIONAL DEFINITION OF TERMS

Low birth weight – Refers to babies born with a weight less than 2500 grams.

Neonate – Refers to a newborn between 0 – 28 days of life.

Neonatal mortality – Also known as neonatal death is death within 28 days of life.

Parity – Refers to the number of pregnancies reaching viable gestational age (including live births and stillbirths).

Preterm birth – Refers to babies born alive before 37 weeks of pregnancy are completed.

Teenage pregnancy – Also known as adolescence pregnancy. Is pregnancy below the age of 20 years.

LIST OF ABBREVIATIONS AND ACRONYMS

ANC	Antenatal care
APGAR	Appearance, Pulse, Grimace, Activity and Respiration
CDC	Centers for Disease Control and Prevention
CS	Caesarian Section
HIV	Human immunodeficiency virus
IREC	Institutional Research Ethics Committee
KCRH	Kitale County Referral Hospital
KDHS	Kenya Demographic Health Survey
KNBS	Kenya National Bureau of Statistics
LBW	Low birth weight
NACOSTI	National Commission for Science, Technology and Innovation
RDS	Respiratory distress syndrome
SDG	Sustainable development goals
SVD	Spontaneous Vertex Delivery
UNFP	United Nations Population Fund
WHO	World Health Organization

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Abstract

Introduction: Approximately 14 million mothers aged 15 – 19 years give birth annually globally. The number of teenage births in Sub Saharan Africa (SSA) is particularly high with an estimated 50% of mothers under the age of 20. In Kenya one in every five school going teenage girls gets pregnant before they reach 20 years. The national teenage pregnancy prevalence rate in Kenya is 18% with Trans-Nzoia County having a rate of 23% ranking position 10 out of the 47 counties. Teenage mothers have a significantly higher risk of neonatal mortality, low birth weight and premature deliveries in comparison to adults. SSA and south Asia make up over 60 percent of preterm births worldwide. Of the 15 million babies born as extreme premature each year, more than one million die due to complications related to preterm birth.

Objective: This study aimed at determining prevalence and factors associated with adverse neonatal outcomes (low birth weight, preterm and neonatal mortality) among teenage mothers in Kitale County Referral Hospital (KCRH).

Methods: This was a retrospective study using records of pregnant mothers aged 11-19 years who delivered at KCRH. A total of 454 records of teenage mothers that gave birth at KCRH were systematically sampled from the records department, whereby every 10th file was systematically selected to participate in the study. Data was collected using a records checklist comprising four sections (individual characteristics, maternal health care and health system factors, biological factors and the outcome of birth). Data analysis was done using STATA version 16. The odds ratios (OR) and the corresponding 95% confidence intervals (95% CI) were reported. Descriptive statistics were used to summarize the variables; mean and median were used to summarize continuous variables while frequencies were used to summarize categorical variables. Bivariate and multivariate analysis was used to analyze the factors associated with the adverse outcomes. Results were presented using tables and figures. A p value < .05 at 95% confidence interval was considered statistically significant.

Results: The mean age of the participants was 17 years (std = 1.3), 170 (37.4%) had attended antenatal clinic up to the fourth visit, 262 (57.7%) had spent less than twelve hours in labor and 410 (90.3%) gave birth via SVD. Of all the sampled teenage mothers, 62 (13.7%) had less than two years inter-pregnancy intervals. Out of 454, 244(54%) had newborns with adverse outcomes while 210 (46%) had normal newborns. The prevalence of preterm, low birth weight and neonatal mortality was (126)27.8 %, (114)25.1% and (4)0.9% respectively. Adjusting for age, occupation, residence, parity, number of ante-natal visits, mode of delivery and pregnancy interval; maternal HIV (human immunodeficiency virus) status was statistically significantly associated with low birth weight (LBW) neonates. For teenage mothers who were HIV positive, their odds of having a low birth weight neonate was 5 times (AOR = 5.12, 95% C.I. = 1.38-21.2, p-value = 0.016) more than that of HIV negative teenage mothers. The odds of giving birth to a low birth weight neonate among students was twice (AOR = 2.49, 95% C.I. = 0.95-7.91, p-value = 0.086) that of the employed teenage mothers though not statistically significant. Although not statistically significant, multiple pregnancies had 50% outcome in preterm deliveries.

Conclusions: Prematurity was the commonest adverse neonatal outcome among the participants. HIV infection among the teenage mothers was a factor associated with LBW newborns. This study did not find any association between the variables and preterm delivery as well as neonatal deaths.

Recommendations: Delayed teenage pregnancy programs and other programs to discourage early marriages as well as health education to the teens especially on contraceptive use is highly recommended. There is need for healthcare providers in KCRH to put more emphasis on focused antenatal care to ensure risk of LBW and preterm delivery is detected early and treated appropriately, especially among mothers with a positive HIV status.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the Study

Approximately fifteen million babies are born prematurely globally. Fifteen percent of such births are estimated to be among teenage mothers. In the United States more than one third of all infant deaths are estimated to be preterm related (Amelia *et al*, 2012). Prematurity is profiled as the leading cause of death among children less than five years around the world, and a leading cause of disability and ill health later in life (CDC, 2016). According to (CDC, 2016), preterm birth rates increased for the second consequent year 2015 and 2016 in the United States. Sub-Saharan Africa and south Asia make up over sixty percent of preterm births worldwide. Of the fifteen million babies born too premature each year, more than one million die due to complications related to preterm birth.

Globally, adolescent pregnancy has remained a significant problem with the associated poor neonatal outcomes that include preterm delivery and low birth weight being of great concern. This is according to (Karatasli, et al 2019). In Turkey a study was conducted that revealed that adolescent pregnancy had an adverse effect on the maternal and infant health in terms of preterm deliveries, low birth weight/ intrauterine retardation, low apgar scores and fetal distress (Karacam, Cakaluz & Demir, 2021). The odds of giving birth to extremely low birth weight babies (<1000 grams) were significantly higher in adolescent mothers as compared to adult mothers. This was a study conducted in Bradford, United Kingdom by (Dowle, Kilner, Burley & Soltani, 2018).

According to (WHO, 2018), approximately twenty-one million girls aged fifteen to nineteen years and two million girls aged fifteen years got pregnant every year in

developing countries. The estimated number of teenage pregnancies in developing countries is sixteen million for girls aged fifteen to nineteen years and two and a half million for girls below sixteen years (WHO, 2018). According to (Yakubu & Salisu, 2018), adolescent pregnancy rates have remained persistently high in Sub – Saharan Africa. Adolescent deliveries have been on the rise in the semi – urban regions of Cameroon where one in every ten births occur among the adolescents. Babies born by these adolescents have a higher risk of developing adverse outcomes such as low birth weight (Agbor, Mbang, Njim, 2017).

The major determinants of neonatal mortality and morbidity are prematurity and low birth weights. These are also significant contributors of adverse health outcomes among babies. Babies born preterm with low birth weight suffer from many conditions that include RDS, NEC, retinopathy of prematurity, anemia of prematurity, neonatal jaundice, sepsis and feeding difficulties among others. These babies are at risk of suffering from adverse long-term conditions such as cerebral palsy, intellectual impairment, chronic lung disease, and vision and hearing loss. These outcomes lead to heavy financial burden on families of such babies resulting from hospital stay, neonatal intensive care and ongoing long-term complex health needs occasioned by the resultant disabilities (Muchemi, 2015). According to Blencowe, Cousens, Chou, Oestergaard, Say, (Moller, & Kinney, 2013), African children are at a higher risk of neonatal death resulting from preterm birth. The rates of neonatal deaths among African children are estimated to be 12 percent higher than in European babies. This has been attributed to lack of access to good quality health care services for women and their newborns.

In Kenya, one hundred and ninety-three thousand babies are born prematurely each year while thirteen thousand, three hundred children under five years die due to direct preterm complications. This according to (USAID, 2015) every premie scale report

translates to twelve percent countrywide. According to the World Health Organization there is need to reduce the number of preterm babies globally because premature birth is the leading cause of neonatal death (WHO, 2018).

According to (KDHS, 2014), a baby's birth weight and their size indicate their vulnerability to the risk of childhood related illnesses and their maturity. Previous studies have shown a trend of babies born with a weight of less than twenty-five hundred grams by teenage mothers. Such births contribute to child deaths, disability, and development of communicable diseases among children globally as reported by the Kenya Profile of Preterm and Low Birth Weight Prevention and Care in (2015). A survey done in 2018 established that among mothers who gave birth before the age of twenty, neonatal and infant mortality rates were twenty nine percent and thirty-point eight percent higher than the national average (KDHS, 2018).

1.2 Statement of the Problem

Teenage pregnancy is a problem with far reaching effects and has been on the rise globally with a higher prevalence in developing countries (WHO, 2018). According to the (WHO, 2018), eleven percent of all births in the world result from teenage pregnancies. Out of these births, ninety five percent occur in low and middle-income countries. According to (WHO, 2018), complications from teenage pregnancies are a second leading cause of death among teenage girls aged fifteen to nineteen years. (WHO, 2018) asserts that this number is two point five times higher in girls who are below fifteen years. Teen delivery is associated with a higher risk of low birth weight among babies, neonatal asphyxia, prematurity and stillbirth (WHO, 2018).

Previous studies have brought out an association between young maternal age and adverse neonatal outcomes. One of these studies was conducted in Singapore and a

positive association between young maternal age and a higher risk of prematurity and perinatal mortality was established (Kang, Lim, Kale & Lee, 2015).

A study that was done in Cameroon established that participants with teenage pregnancy were 1.94 and 1.46 times more likely to deliver very low birth weight and low birth weight neonates as compared to their adult counterparts (Ngowa, Kasia, Pison & Ngassan, 2015). A study conducted in the Northwest part of Ethiopia revealed that babies who are born from adolescent mothers are at a higher risk of developing adverse neonatal outcomes like low birth weight and preterm births than babies born by adult women (Kassa, et al 2019). Adverse obstetric and perinatal outcomes are significantly associated with teenage pregnancies as compare to adult pregnancies (Bebe, et al 2020).

In Kenya, the adolescent birth rate has been established to be at a high rate of seventy-three per a thousand women as compared to the global adolescent rate that stands at forty-four point one per a thousand women. In all the counties across the country, teenage pregnancy rates have remained high for quite some time now, and despite the public outcry emanating from this menace, the numbers do not seem to be on a downward trajectory. This therefore calls for extra measures in order to address this issue and also enable the teenage girls maximize their full potential. The Neonatal mortality rate in western Kenya stands at 19 deaths per 1000 live births while the national rate is 22 deaths per 1000 live births (KDHS, 2014).

1.3 Justification of the Study

Teenage pregnancy has become a major concern globally. It has elicited both social and health concerns due to the rising number of teen mothers in both developed and developing countries. Teenage pregnancy has major health complications on both mother and child. According to (KDHS, 2014), one in every five-school going teenage

girls gets pregnant before they reach 20 years. The national teenage pregnancy prevalence rate in Kenya is 18percent with Trans-Nzoia County having a rate of 23percent which is higher than the national level, and is ranked position 10 out of the 47 counties (KDHS, 2014). Limited research exists on the prevalence and factors attributed with neonatal outcomes among teenagers in Kenya, yet it is a major public health problem. The inadequacy of information on factors leading to adverse neonatal outcomes among teenage pregnancies is prominent in Kitale County Referral Hospital, Trans-Nzoia County, hence the need for further research.

This study was conducted to determine the adverse neonatal outcomes in teenage pregnancies managed at Kitale County Referral Hospital. The findings will create awareness in the community about the problem and contribute towards formulating and implementation of appropriate interventions to reduce the numbers of teenage pregnancies and the associated adverse neonatal outcomes. The findings will be disseminated to various stakeholders to create focused intervention programs.

1.4 Research Questions

- 1) What is the frequency of occurrence of adverse neonatal outcomes (preterm babies, low birth weight babies & neonatal deaths) among teenage mothers giving birth at KCRH?
- 2) What are the factors associated with preterm babies among teenage mothers giving birth at KCRCH?
- 3) What are the factors associated with low-birth-weight babies among teenage mothers giving birth at KCRH?
- 4) What are the factors associated with neonatal deaths among teenage mothers giving birth at KCRH?

1.5 Research Objectives

1.5.1. Broad Objective

To assess the prevalence and factors associated with adverse neonatal outcomes among teenage mothers giving birth at KCRH.

1.5.2. Specific Objectives

- 1) To determine the frequency of occurrence of adverse neonatal outcomes (preterm babies, low birth weight babies & neonatal deaths) among teenage mothers giving birth at KCRH.
- 2) To determine the factors associated with preterm babies among teenage mothers giving birth at KCRH.
- 3) To determine the factors associated with low-birth-weight babies among teenage mothers giving birth at KCRH.
- 4) To determine the factors associated with neonatal deaths among teenage mothers giving birth at KCRH.

1.6 Conceptual Framework

This study has two types of variables: dependent variables; neonatal outcomes such as preterm birth, low birth weight and neonatal mortality, and independent variables within individual characteristics, maternal healthcare and health system factors and biological factors.

The conceptual framework illustrates the effects of the independent variables of the teenage mother. A teenage pregnant mother requires specialized care all through the pregnancy period, delivery and up to post-partum period. Previous studies have elaborately outlined the health complications related to pregnancy among teenagers.

The antenatal period of the teenage pregnant mothers is a critical period in that, if these mothers receive comprehensive obstetric care together with focused antenatal care (FANC) then the outcome of delivery for both the mother and the baby will be good.

FANC entails offering an individualized type of care to each pregnant mother in order to ensure a normal pregnancy process. The mothers are guided and given advice on; nutrition during this pregnancy period, birth preparedness, personal hygiene, immunization as well as family planning. They are also advised on the danger signs and symptoms to look out for when pregnant and to seek medical help as soon as they occur.

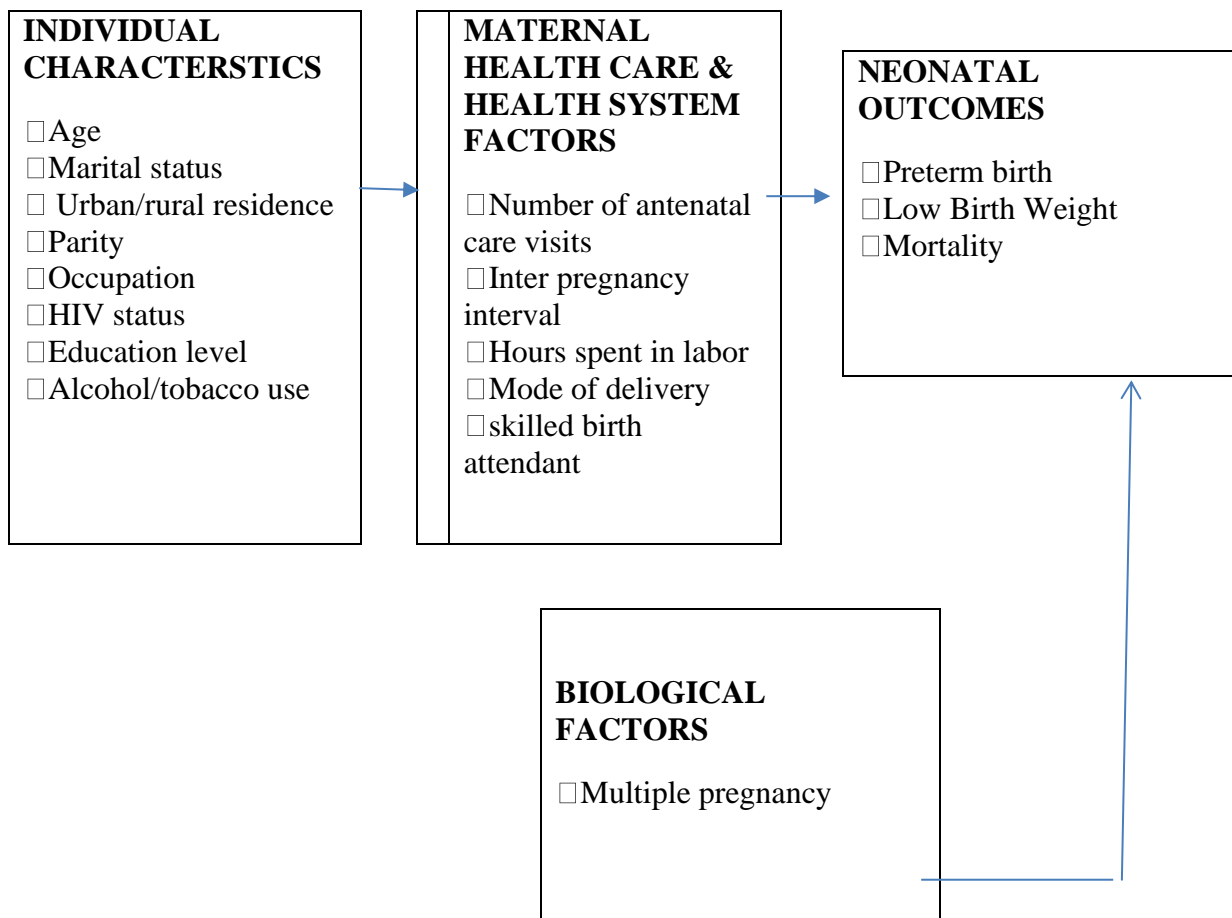


Figure 1: Conceptual Framework for analyzing the factors associated with adverse neonatal outcomes among teenage mothers giving birth at KCRH.

Source: Research

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

Teenage pregnancy is defined as pregnancy occurring among adolescents aged between 12 and 19 but it can also include girls as young as 10 years (Workineh & Workie, 2022). Teenage pregnancy is a major public health concern since it results in adverse neonatal outcomes. Adverse neonatal outcomes are defined as the occurrence of preterm delivery, low APGAR test scores, low birth weight, small gestational for age, and severe neonatal conditions. According to (Workineh & Workie, 2022), low birth weight refers to the delivery of an infant weighing less than 2500 grams. On the other hand, preterm delivery refers to the delivery of a baby whose gestational age is less than 37 weeks. Small for gestational age newborns are those that are smaller in size than the normal for gestational age. Usually, they weigh below the 10th percentile for the gestational age (Workineh & Workie, 2022). A low APGAR test score is one below 7 points and a predictor of adverse neonatal outcomes. Lastly, neonatal death refers to passing on of the infants within the first 28 days of their life while early neonatal death refers to death of newborns zero to seven days after their birth.

This chapter reviews the existing literature on factors associated with adverse neonatal outcomes among teenage mothers. Neonatal outcomes analyzed in this chapter include low birth weight, neonatal deaths, and pre-term babies. Related literature was reviewed under various subtitles:

- a) Teenage pregnancy prevalence
- b) Drivers of teenage pregnancy
 - i. Individual Factors
 - ii. Familial and Parenting Factors

- iii. Factors Related to Health Services
 - iv. Religious and Cultural Factors
 - v. Social and Economic Factors
 - vi. Demographic Factors
- c) Factors associated with adverse neonatal outcomes
 - d) Young maternal age and adverse neonatal outcomes
 - i. Teenage pregnancy and preterm births
 - ii. Teenage pregnancy and low birth weight
 - iii. Teenage pregnancy and neonatal deaths

2.2 Teenage Pregnancy Prevalence

According to (WHO, 2018), teenage pregnancies have been on the rise globally having a higher prevalence in developing countries. About 16 million girls aged between 15 to 19 years and 2.5 million girls below 16 years of age give birth in developed countries. According to the Centre for Disease Control and Prevention (CDC, 2017), there was a decline in teen births in the United States by 7 percent from 2016 to 2017. This translated to 18.8 births per a thousand females aged 15 to 19 years. There is a declining rate in fertility as shown in the 1977-1978 survey that recorded an average of 8 children per woman in relation to a 2014 survey that recorded an average of 4 children per woman. Statistics from CDC survey in 2016 indicate that teenagers aged 15-17 and 18-19 had 8.8 and 37.5 births per a thousand women respectively. This is a decline from a 2015 survey that recorded a lower rate for both groups of 11 percent and 8 percent respectively. The birth rates for the above groups have fallen by 59 percent and 48 percent respectively in 2007 and 77 percent and 60 percent since 1991. Females aged 10 to 14 had a birth rate of 0.2 births per a thousand females in 2016. The United States was shown to have the highest teenage pregnancy rates among developed countries.

Europe has the lowest teenage pregnancy rates globally while African countries had the highest rates of teenage pregnancies (CDC, 2016).

According to the WHO, (2018), approximately 21 million girls and 2 million aged 15 to 19 and 15 years respectively got pregnant every year in developing countries. The estimated number of teenage pregnancies in developing countries is 16 million for girls aged 15 to 19 years and 2.5 million for girls below 16 years.

According to (Agbor, Mbang & Njim, 2017) the Sub-Saharan Africa has a high prevalence rate of teenage pregnancies. Teenage pregnancies have been associated with poverty, unemployment, and lack of education. Marginalized communities are at a higher risk of increased teenage pregnancy rates. Some adolescent mothers have planned pregnancies while others are not. Majority of the teenage pregnancies are a result of social pressure to get married at a young age. Approximately 15 million girls are married off before turning 18 years, it is estimated that 90 percent of births happen within marriage to girls aged 15 to 19 years (WHO, 2018).

According to Sama, (Ngasa, Dzekem & Choukem, 2017), the sub-Saharan Africa has a high prevalence of teenage pregnancies. It is estimated that half of women in this region gave birth before attaining 20 years. This has resulted to increased pregnancy-related morbidity and mortality in the region (Sama *et al.*, 2017). According to (Sedgh, et al, 2015), teenage pregnancies remain high despite declining numbers. According to (Torre, 2018), Africa has the highest rates of teenage pregnancies.

Teenage pregnancies have been associated with many risks especially among girls below the age of 17 years. This is associated with the biological immaturity of the teenagers. A study by (Annan & Asiedu, 2018) concluded that teenage pregnancies had several risks such as increasing the rate of low birth weight, pre-term births, and

neonatal morality. According to (Pradhan, Wynter & Fisher, 2018), teen pregnancies have adverse maternal outcomes. These include obstructed labor, nutritional anemia, preterm birth, postpartum infections, unsafe abortions, and adverse infant outcomes, including infant mortality, foetal growth retardation, and low birth weight. It is estimated that 95 percent of teen births occur in low-income countries. (Pradhan, Wynter & Fisher, 2018) recognized teen pregnancies as a public health priority. The study suggested raising awareness about the adverse effect of teenage pregnancy outcomes to reduce such outcomes for the welfare of mother as well as children. A study done in Indonesia revealed that teenage pregnancies in that country continue to increase every year. It also revealed that the age of the mother was a significant indicator in the determination of teenage pregnancy, (Rohmah, et al 2020).

According to (Yakubu & Salisu, 2018), adolescent pregnancy rates have remained persistently high in Sub – Saharan Africa. This study also revealed that there are various factors capable of influencing adverse neonatal outcomes among the teenage mothers in this region, which include, health service-related factors e.g. inadequate health care providers, unskilled birth attendants, long waiting hours and lack of in depth sexual education to the teenage mothers. In another study conducted in Lira District of Uganda, the findings revealed that the demographic, familial, social and behavioral factors are all vital contributors of teenage pregnancy. This study added that information touching on sexual health and reproductive health of the teenage girls as well as improving access and information about contraceptive use among the teenage girls, may have a tremendous positive improvement on the adolescent sexual and health services in the low-income areas (Ochen, Chi & Lawoko 2019).

In Kenya, one in every five-school going teenage girls gets pregnant before they reach 20 years (KDHS, 2014). The national teenage pregnancy prevalence rate is 18 percent

with Trans-Nzoia county having a rate of 23 percent, which is higher than the national rate and ranking it at position 10 among the 47 counties (KDHS, 2014). According to a report by the (UNFPA, 2017), a total number of 28,932 girls between 10 and 14 years of age were pregnant, while 349,465 girls between 15 to 19 years were impregnated. The Counties with the highest burden of teenage pregnancies include Narok, with 40 percent teenage pregnancy rates, Homa Bay at 33 percent, West Pokot at 29 percent, Tana River at 28 percent, Nyamira at 28 percent, Samburu at 26 percent, while Migori and Kwale had 24 percent each. Counties with the lowest burden include Murang'a, where only 6 percent of teenagers became pregnant during the period. Nyeri was at 7 percent and Embu at 8 percent (UNFPA, 2017).

Teenage pregnancies have great effect on mothers and children. It has been framed as a social menace, which poses major health issues such as higher morbidity and mortality for both mother and child. In Kenya, 15 percent of women aged 15-19 have already given birth, and 3 percent are expectant with their first child (KDHS, 2014). Despite the small rural-urban differences, the prevalence of early pregnancy and childbirth varies by region, ranging from 10 percent in Central region to 21 percent in Rift Valley and Coast and 22 percent in Nyanza. Teenage girls from the poorest backgrounds are more likely to have begun childbearing standing at 26 percent compared to teenage girls from wealthy backgrounds at 10 percent (KDHS, 2014).

The number of teenage girls who have begun motherhood and childbirth has not changed since the 2008-2009 KDHS survey. At the national level, the rate of early motherhood and childbearing age is 18 percent and 16.8 percent in the western region according to (KDHS, 2014). 26 in every 100 girls in Kenya are married before they reach 18 years. Kenya contributes to the global percentage by having 103 in every 1000 pregnancies being attributed to girls between 15 and 19 years.

In rural western Kenya, 23.3 percent of teenage girls had a history of pregnancy, this according to (Omor, et al 2017). Teenage pregnancies are associated with newborn complications which include still births, low birth weight babies, preterm births and neonatal mortalities. There are higher risks of adverse birth outcomes among adolescent mothers (Ganchimeg, et al, 2014). (Ganchimeg, et al, 2014) asserts that teenage pregnancy prevention is crucial. Since early marriages of girls below 18 years and sexual debut have been reported to be determinants of teenage pregnancy, government policies to control marital age and early education on sex and contraception are fundamental to prevent adolescent pregnancies (WHO Guidelines, 2011).

Adolescent fertility rates have steadily declined for the past few decades. Despite the global decline, teenage fertility continues to be more prevalent in developing countries. In this region approximately 10% of female adolescents give birth every year compared today 2% of teenage girls who give birth in the developed countries (Nyarko & Potter, 2021). Adolescent fertility it's especially highest in the Sub-Saharan Africa region. In this region, out of 1000 women aged between 15 and 19, 104 births are reported. Therefore, of the 62 million babies born to teenagers between 2015 and 2020 globally, 46% were born in Sub-Saharan Africa (Nyarko & Potter, 2021). The teenage fertility rate in Kenya is at a high rate of 91.53 births per a thousand women who are aged fifteen to nineteen years. This is according to the World Bank (2016) indicators. In Kenya, the

adolescent fertility rate increases swiftly with advancement in age. This statistic predicts that 3% of adolescents usually give birth by their 15th birthday while 40% are mothers by their 19th birthday (Monari et al., 2022).

Research shows that the increase in adolescent fertility is a direct result of lack of use of contraceptives by Kenyan youths. Moreover, between the years 1998 and 2003, the number of adolescents who did not approve of family planning methods had increased by 66% (Monari et al., 2022). This study also established that the negative attitude towards family planning was increasing and that fertility preferences of teenagers were changing in favor of larger family sizes.

Monari et al.'s (2022) study also found that adolescent fertility rate is also associated with several socioeconomic factors. Wealth status is the main predictor of teenage fertility. Adolescents from low-income households are more likely to experience childrearing than their counterparts from higher income households. The association between household income status and teenage fertility is likely mediated by contraceptives. Besides, teenagers from wealthy households can easily access contraceptives and significantly reduce their pregnancy risk compared to their counterparts residing in poor households (Nyarko & Potter, 2021). Also, female teenagers from low-income households are likely to be given out for marriage at a tender age as a means of poverty alleviation. Otherwise, female teenagers from poor backgrounds might get pregnant as a result of being compelled to engage in romantic relationships with men in exchange for financial favors to afford their livelihood.

2.3 Drivers of Teenage Pregnancy

2.3.1. Demographic Factors

Demographic factors significantly influence the likelihood of teenage pregnancy. Teenage girls who reside in rural areas are more likely to become pregnant than their counterparts who reside in urban areas. According to (Ochen et al.'s 2019) research support this argument, citing that living in rural areas exposes young girls to early pregnancies because they have limited access to reproductive health information. Also, young girls living in rural areas are more vulnerable to sexual abuse. Most pregnant teenage girls from rural areas get pregnant due to sexual coercion. Study shows that up to 68% of young people in Sub-Saharan Africa have countered at least one experience of sexual coercion (Gunawardena et al., 2019). In this case, pregnancy is a result of coerced sex. Alternatively, the victims may get pregnant since they have little power to negotiate for the use of contraceptives. Also, victims of sexual abuse thereafter tend to engage in risky sexual behavior. These conditions place them at a higher risk of getting pregnant and contracting diseases transmitted through sex, including HIV and AIDS. The inability to attend school also increases the risk of teenage pregnancy. Moreover, being in school increases the level of supervision from both educators and parents and can help reduce the probability of engaging in risky activities such as unprotected sex. Research shows that teens who stay in school and excel in their education highly understand the risks and responsibilities associated with engagement in early sexual activity (Gunawardena et al., 2016). In addition, they may have high future aspirations for themselves, deterring them from engaging in sex.

2.3.2. Familial and Parenting Factors

Ochen et al.'s (2019) study found that there was a direct correlation between familial and parenting factors and teenage pregnancy. In essence, poor parenting and inadequate parental support and communication were reported as some of the main predictors of teen pregnancies. In (Ochen et al.'s 2019) research, most study participants presented their parents' unavailability as a reason why they were vulnerable to engaging in sexual relationships with men. The same study also concluded that parents as a source of social support increased resilience to getting pregnant. Approximately 74.6% of the adolescent girls that were highly resilient to getting pregnant cited that they had adequate parental support (Ochen et al., 2019). This observation is accurate since encouraging communication between children and their parents about sexual issues can help teens make better sexual decisions (Tabei et Al., 2021). This is impossible if the home environment does not encourage adolescents to consult with their parents about their sexual reproductive health issues. Additionally, (Mwaisaka et al.'s 2021) study also found that most societies on SSA discourage open discussions about sexual reproductive health and any other topics related to it, especially between adults and younger people. This makes adolescents develop fear and discomfort in speaking to their parents about sexual reproductive health and contraception.

The family structure also plays a massive role in influencing teenage pregnancy. Teenage girls whose parents live together have lesser odds of engaging in sexual activities than those that live with single parents either as a result of divorce, separation, or death. Also, the history of early marriages or sexual activity in a family can be a predictor of teenage pregnancy. Girls are likely to follow in their parents' footsteps. Thus, maternal teenage pregnancy increases the chances of the girls in that family getting pregnant at an early age. Kearney and Levine (2012) also observed that girls

born to single mothers or teenage mothers are at a higher risk of teenage pregnancy than their counterparts without these disadvantages since these deprivations could make them vulnerable as they strive to make a better life and gain male companionship. Additionally, factors such as domestic violence and physical neglect intensify the issue of teen pregnancy. Moreover, victims of these circumstances tend to look for solace outside their homes and, in the process, increase their susceptibility to risky behavior such as drug abuse and engagement in unprotected sex. Also, the disagreement between parents leads to the negligence of the children. This adversely affects their social and moral development and increases their risk of developing low self-esteem. Children that cannot cope with their precarious home conditions choose to find ways of escaping their problems, such as running off to the streets. Consequently, such adolescents tend to be at a higher risk of being prostituted or sex-trafficked under the guise of compassion. Ultimately, this may result in unwanted pregnancies and sexually transmitted diseases.

2.3.3. Factors Related to Health Services

Many studies find health care workers' attitudes as a predictor of teenage pregnancy and motherhood. In most cases, health care providers are quoted as unfriendly; hence, the teenagers cannot freely consult with them. In other cases, the health care providers make nasty remarks and even insult the girls seeking sexual reproductive health services. Some nurses go to the extent of deliberately withholding information on the proper use of contraceptives. Often, they argue that the girls are too young to be sexually active. Consequently, their attitudes toward young girls seeking their services tend to be punitive and dismissive rather than helpful. Instead of simply advising the girls against reckless intercourse, they condemn them for being loose. Thus, these girls

lack the confidence to visit health care centers for contraceptives or any information regarding sexual reproductive health.

The lack of privacy at sexual reproductive health clinics and the long wait times are also primary factors contributing to increased adolescent pregnancies. Also, in some cases, teenagers fail to seek sexual reproductive health services because of the unavailability of these services. For most teens, it is almost impossible to access transportation money to visit healthcare facilities that tend to be located far away from their homes. Others simply do not know that they can access reproductive health services and get contraceptives free of charge. Therefore, they choose to stay away from healthcare facilities lest the hospital administration shun them away for lack of money.

Perceptions regarding the use of contraceptives are also a major driver for the spiking teenage pregnancy rates. Many teenagers avoid modern contraceptives because of the misconceptions that they cause hormonal changes that might result in infertility and fetal malformation in the future. According to a study conducted by (Mwaisaka et al., 2021), many of the study participants agreed that they avoided modern contraceptives for fear of them interfering with their future fertility and preventing them from being unable to conceive later on. Although these participants knew that contraceptives were meant to prevent early and unintended pregnancies, giving them time to complete their studies, get employed, and get married, most girls still avoided them for the fear that they would interfere with their fertility. Surprisingly, Community health workers who are supposedly knowledgeable as they are given the responsibility of training and educating communities on various health-related topics also seemed to carry negative perceptions about contraceptive use. Therefore, early pregnancies are often preferred over the use of contraceptives. In other cases, adolescents perceive contraceptives as only preferable for married women.

2.3.4. Religious and Cultural Factors

Some communities still practice misleading beliefs that contribute to an increase in teenage pregnancies. For example, some communities still believe that only boys should attend school while girls remain at home helping their parents with house chores. One of the main reasons for keeping young girls from accessing education is to train them to be good wives from an early age. Immediately, the girls acquire the required skills they are married off as child brides. Other practices such as Female Genital Mutilation (FGM) cause girls to run away from their homes at a tender age. As such, they risk falling in the hands of the wrong people who offered them protection but instead end up sexually abusing them. Also, this outdated cultural tradition increases the risk of teenage pregnancy because, after the ceremony, the girl is now perceived to be a woman and is permitted to engage in adult behaviors, including sexual activity. Additionally, after this rite, the girl is regarded as eligible for marriage despite her age. Therefore, this cultural practice is usually a driver for child marriages and consequently teenage pregnancies.

On the other hand, the religious environment could result in a spike in teenage pregnancy. In particular, the religious environment can affect contraceptives' availability. For example, some religions directly prohibit the use of contraceptives. Therefore, it prohibits adolescent from gaining knowledge about proper and consistent contraceptive use and result in unintended teenage pregnancies.

2.3.5. Social and Economic Factors

Among the leading social indicators that are a risk factor for teenage pregnancy is peer pressure. Peer influence can directly result in the promotion or prohibition of teenage pregnancy as it affects perceptions, attitudes, and behaviors. (Hayes', 1987) study

suggested if a teenager believed that her peers are sexually active, regardless of their sexual status, the risk of engaging in sexual intercourse would increase. These findings are consistent with (Ahinkorah et al.'s 2019) study that concluded that 61% of adolescents who engage in sexual intercourse are influenced by their peers. Additionally, most teenage girls will have a boyfriend because other adolescents are doing the same. In the case that they land boyfriends who pressure them into having sex, their risk of teenage pregnancy increases.

Social factors such as the mother's educational attainment can also significantly contribute to the risk level of teenage pregnancy. Besides, a mother's education level is associated with the environment in which her children will be raised. In general, women with higher educational attainment tend to land high-paying jobs, thereby affording to live in safer and developed neighborhoods (Hendrick & Maslowsky, 2019). Also, they are likely to have lower divorce rates and have more access to quality health care services for themselves and their children. Therefore, their children are likely to grow up in higher-resource settings, reducing the risk of engaging in risky sexual behavior and increasing their access to reproductive health care services.

In many cases, teenage pregnancy is a consequence of poverty. Poverty is defined as the daily income of less than \$1. In developing countries, poverty is highlighted as one of the leading causes of teenage pregnancies. Moreover, many teenage girls from poor backgrounds have fewer reasons and low access to opportunities that can delay childbearing. For example, girls from low-income families may not have the financial support to continue with their education and pursue high career goals. This creates a significant disadvantage for them, especially as they strive to get good-paying jobs. Without the necessary skills and knowledge, they either become uneducated or unemployed or land jobs whose pay can barely afford their needs. Thus, they instead

settle for other means of satisfying their needs, such as prostitution. In addition, economic constraints can lead teenage girls to develop sexual relationships with all the men who promise to satisfy their financial needs. In such relationships where the power dynamics are varied, young girls may not have the bargaining power to negotiate for contraceptive use; hence, their risk of getting pregnant increases.

In some communities, the long distance to educational institutions is also a driver for adolescent pregnancies. In many rural areas, schools are located so far away, and girls that want to continue with their studies have to walk many kilometers every day to get to their schools (Olenja et al., 2020). This makes the girls vulnerable to men and sexual abusers along the route. Furthermore, affording transportation is usually a major challenge, and preying men can offer to provide these girls with free transportation in exchange for sexual favors. Alternatively, parents who can afford opt to rent accommodation near their daughters' schools, making it easier for them to access education. However, this arrangement also presents challenges because girls living alone without adult supervision are susceptible to sexual preying by men who are aware of their living arrangements.

In these rural areas, the school setting may also promote teenage pregnancies. In most of these schools, teachers are employed in a very informal way, affecting the sexual vulnerability of the students. Although the Teacher Service Commission (TSC) is tasked with the responsibility of hiring teachers on behalf of the government, it does not always adequately and equally distribute staff across all schools (Olenja et al., 2020). Therefore, school boards sometimes have to hire the teachers themselves to bridge the gap. Often these teachers are untrained high school or university graduates. While teachers appointed by the TSC have to operate under set policies and codes of employment behavior, teachers hired by school boards are not bound by these rules.

Also, the lack of training and oversights increases the chances of these teachers failing to observe appropriate boundaries with their students, especially the girls.

2.3.6. Individual Factors

There are several individual factors that can contribute to an increased risk of teenage pregnancy. Alcohol and substance abuse spikes the risk of unplanned pregnancies. A study by (Mensch & Kandel, 2012) found that the risk of teen pregnancy is four times higher in adolescents that use drugs than their counterparts who do not use alcohol and other illicit drugs. Also, research indicates that nearly half of high school students have sexual intercourse and that approximately 22% of those sexually active high school students use alcohol and other drugs (Connery et al., 2014). This increases their chances of getting pregnant since alcohol and drug use is associated with an impaired judgment that might propel teenagers to engage in risky sexual behavior and experience the consequences of this behavior, including unplanned pregnancies and contracting sexually transmitted illnesses. Alcohol and drugs use also increase the chances of teenagers forgetting to use contraception while encouraging them to engage in sex with multiple partners, further making them vulnerable to getting pregnant.

The education status of teenagers can also increase their risk of early pregnancy. According to (Omar et al.'s 2010) conclusions, adolescents who are not enrolled in school, have no formal education, or have a lower level of education are more likely to become pregnant. Moreover, the motivation to continue with education is known to serve as a protective factor. Teenagers who stay in school receive meaningful information regarding sexual health and fully perceive the risks associated with early sexual activity. Also, the aspiration to have a better future can serve to deter them from engaging in early sex. Lastly, teaching-related interventions and supervision from teachers can reduce the chances of teenagers engaging in risky sexual behavior that might result in pregnancy.

Low self-esteem is also evidenced as one of the most prominent factors that increase the risk of teenage pregnancies. People with low self-esteem tend to be openly vulnerable to criticism. Consequently, they find means to substantiate their lack of self-worth or perceived incompetence and inadequacy. Self-esteem in adolescents results in insecurity, low ambitions, and fear of being rejected. Thus, teenagers with low self-esteem are likely to be lured into sex as soon as they perceive acceptance. Additionally, they present lower knowledge in terms of sexual education; hence, they easily indulge in risky sexual behaviors.

Sexual assertiveness also increases the risk of teen pregnancy. Sexual assertiveness refers to the ability to either initiate or reject sexual advances and negotiate the use of methods to enhance safety and satisfaction in sexual intercourse (Moyano et al., 2021). In some cases, sexual assertiveness may work to the advantage of adolescents. They can use their assertiveness to negotiate the use of contraceptives after sex. Also, they can use their assertiveness to reject sexual advances. Therefore, less assertive teens are

more likely to get pregnant since they cannot negotiate for safe sex or the use of contraceptives after intercourse.

2.4 Factors Associated with Adverse Neonatal Outcomes

The neonatal period is one of the most vulnerable and sensitive moments in a baby's life. According to (Saboohi et al. 2021), the success of this period is greatly influenced by the intrauterine and maternal conditions. According to (Yakubu & Salisu, 2018), adolescent pregnancy rates have remained persistently high in Sub – Saharan Africa. This study also revealed that there are various factors capable of influencing adverse neonatal outcomes among the teenage mothers in this region, which include, health service-related factors e.g., inadequate health care providers, unskilled birth attendants, long waiting hours and lack of in-depth sexual education to the teenage mothers. In another study conducted in Lira District of Uganda, the findings revealed that the demographic, familial, social and behavioral factors are all vital contributors of teenage pregnancy. This study added that information touching on sexual health and reproductive health of the teenage girls as well as improving access and information about contraceptive use among the teenage girls, may have a tremendous positive improvement on the adolescent sexual and health services in the low-income areas (Ochen, Chi & Lawoko 2019).

These conditions are further summarized in the following categories;

2.4.1. Availability and Access to Prenatal Care and Maternal Health Care

Services

Limited access to health care, lack of skilled delivery services and delayed antenatal care deprive teen mothers and their babies needed health care services (UNFPA, 2014). Every year, at least 1 million newborn deaths as a result of poor care are reported across the globe. Antenatal care is a significant factor influencing neonatal outcomes. Prenatal care directly impacts the health and survival of newborns by preventing neonatal deaths and still births (Wondemagegn et al., 2018). Besides, the aim of the prenatal visits is to prevent, identify, and treat conditions that threaten the health of the fetus and the mother. It gives opportunity for mothers to get diagnostic tests and screening that can help in the early detection of issues that might be affecting the pregnancy. In this case, antenatal care attendance provides adolescent mothers with a chance to have pregnancy termination options especially where severe fatal anomalies are detected.

WHO recommends that every pregnant woman attends antenatal care at least four times during their pregnancy, and if possible start the visits in their first trimester. During these visits, the standard testing practices diagnose issues such as pre-eclampsia, anemia, and gestational diabetes mellitus. Also, these visits provide an opportunity for healthcare workers to educate the pregnant women and girls on the danger signs and the actions to be taken.

WHO's (2003) study found that early diagnosis of gestational diabetes mellitus, which is only possible with antenatal care attendance, can ensure effective treatment to prevent future adverse outcomes including respiratory distress syndrome in newborns, high perinatal mortality, and high birth weight. Also, antenatal care visits helps in interventions to prevent infections, preterm birth, birth asphyxia, and birth injury, which are some of the most common causes of neonatal mortality (Tekelab et al., 2019).

(Wondemagegn et al.'s 2018) study found that antenatal care could help reduce neonatal mortality rate by approximately 34% globally. Also, in the SSA region, antenatal follow-ups could contribute to a reduction of neonatal mortality rate by at least 41%. Another survival rate study by (Tekelab et al. 2019) on low and middle income countries found that women who met WHO recommendations for antenatal care visits reduced the risk of neonatal mortality by 55% while those that attended antenatal care at least once had a 32% lower risk of neonatal mortality.

Study proves that many women in SSA continue to miss out on crucial interventions in antenatal clinics since they do not attend the visits either due to fear, inaccessibility, or ignorance (Telekab et al., 2019). According to research done in North Mexico, women with inadequate antenatal care had an increased risk of preterm deliveries compared to those women who receive adequate prenatal care (Minjares-granillo, et al, 2016). A study conducted in Tigray, Northern Ethiopia also found out that early marriages of girls below 18 years, rural residence and no antenatal follow-up were some of the factors that were significantly associated with low birth weight babies and preterm births (Mengesha, et al 2017). A report by the WHO (2014) also found that only 49 percent of teenage mothers under 20 years of age received four or more antenatal care visits, as recommended by the WHO, compared to 60 percent of mothers aged 20 to 34 years.

The failure to attend antenatal clinics increases the risk of adverse neonatal outcomes. Moreover, pregnant women miss the opportunity to receive adequate health information regarding pregnancy complications warning signs. Therefore, most of the women that fail to attend prenatal clinics only go to hospital after encountering issues during labor (Wondemagegn et al., 2018). Consequently, their neonates are likely to pass on or have complications in the perinatal period.

Teenagers that are pregnant are even more likely to miss out on antenatal care. One of the main reasons cited for their failure to seek antenatal care is the fear of being seen in these facilities. However, in other instances, the failure to seek prenatal care is usually a lack of options that results from lack of education. Other hindering factors include low empowerment and information influencing behavior that seeks good quality health care service and the inaccessibility of health care services due to poverty.

According to (Sedgh *et al.*, 2015), teenage pregnancy is associated with adverse psychosocial, socioeconomic, and health outcomes. Although pregnant adolescents are at higher risk of poor birth outcomes, the majority of adolescents have full-term, healthy babies. According to (Harville, Madkour & Xie, 2014), in the United States, lower body mass index was associated with lower gestational age. However, the study was limited to singleton live births only. (Darling, 2017) established that late prenatal care was a significant predictor of poorer birth outcomes in New York State counties. Out of wedlock births, rural location and teen pregnancies were significant factors associated with poor neonatal outcomes.

2.4.2 Gestational Anemia

Anemia is a global issue affecting low- and medium-income countries. Research also shows that approximately two-thirds of the pregnant population across the globe is affected by anemia. In essence, approximately 32 million pregnant women suffer anemia. However, the prevalence of anemia varies across regions. West and Central Africa have the highest prevalence of maternal anemia (56 percent) followed by South Asia recording 52 percent of maternal anemia. Central and East Africa also record high rates of maternal anemia at 36 percent. On the other hand, Central and Western Europe record the lowest rates of gestational anemia (24 percent). In females of a reproductive

age, anemia is attributed to several factors including poor economic status, dietary deficiency, and the presence of other illnesses. A majority of the women in low- and medium-income countries start the pregnancy journey with depleted iron stores, meaning that their daily iron requirement is even higher than usual. According to (Shah et al., 2022), 50 percent of the gestational anemia cases are a consequence of depleted stores and inadequate iron intake. The same research further cited that daily requirement for menstruating women is 1.5 mg/day while pregnant women require 45 mg/day, which is far greater than non-pregnant women. Moreover, the plasma expands during pregnancy, which may lead to anemia if the pregnant women do not up their daily iron intake. Anemia during pregnancy has detrimental effects on the neonates. Combined with low hemoglobin levels, anemia leads to low Apgar score, preterm labour, low birth weight, small for gestational age babies, intrauterine death, and intrauterine growth retardation. APGAR scoring is used to determine the vitality of newborns in the first minutes of their lives. Basically, it determines the well-being of the newborn, where 'A' indicates the newborn's appearance, 'P' signifies the baby's pulse, 'G' checks the grimace, 'A' indicates the infant's activity, and 'R' shows the respiratory rate of the newborn. An APGAR score of 7 out of 10, is considered as a valid indicator for a neonate of normal conditions (Straube et al., 2009). Conversely, an APGAR score between 0 and 3 for a prolonged period of time informs subsequent disability. Low APGAR scores are also linked to lower IQ scores later in life. Research shows that 5-min APGAR score can predict neonatal outcomes and survival more accurately than umbilical-artery blood pH (Straube et al., 2009). Although this test was not initially meant for long-term predictions of infants' health outcomes, it informs prognosis beyond the neonatal period.

Given that APGAR scores are crucial indicators of subsequent outcomes, it is in clinical interest to understand the determinant of low APGAR scores. (Straube et al.'s 2009) study found that there is direct relationship between the maternal age and the APGAR scores. The researchers further found that lower maternal age led to lower APGAR scores as a result of vulnerability to adverse social circumstances including poverty and low education levels. In addition, adolescent mothers have a higher risk of missing out on the benefits of prenatal care, where they could be diagnosed with pregnancy warning signs that contribute to low APGAR scores including anemia. Besides, research shows that 77 percent of babies with low APGAR scores in the first minute are born of anemic mothers compared to the 23 percent born of non-anemic mothers (Shah, 2022).

Study shows that, during the first trimester, gestational anemia is a leading cause of preterm births and low birth weights. According to WHO's research, 60 percent to 80 percent of all neonatal deaths in low- and medium-income countries is associated with low birth weight (Rahman et al., 2020). Therefore, proper nutrition, taking of iron supplements, screening for gestational anemia during pregnancy are recommended to improve neonatal outcomes.

2.4.3. Mother's Demographics

Young mothers in Sub-Saharan Africa have increased social and biological risk factors associated with neonatal mortality. Prevalence of premature delivery and low birth weight neonates was higher in adolescents as compared to their adult counterparts, (Ramaiya, et al, 2014). (Mombo-ngoma, et al, 2016) study established that the overall prevalence of low birth weight babies and preterm deliveries in Sub-Saharan Africa was higher among mothers aged 16 and below. Teenage mothers do not receive the health care needed compared to others in other age groups. Approximately 40 percent of these teenage mothers gave birth without the assistance of a trained health professional and outside of a health facility, putting them at risk of complications during childbirth (WHO, 2015). According to (Pradhan *et al.*, 2018), there are several factors that lead to increased risks of teenage pregnancies. The study indicated that the risk of teenage pregnancy has been increased not only by lack of health care access but also by great socio-demographic and cultural factors. These include limited education, low socioeconomic status, inadequate access to, and non-use of contraception, early sexual initiation, and belonging to an ethnic and religious minority group. (Pradhan *et al.*, 2018) study recommends that each country require comprehensive, specific data about local risk and protective factors in order to assess the patterns and prevalence of adolescent pregnancy and to target interventions effectively. Evidence-informed programs can be designed to reduce the prevalence of teenage pregnancies and risks associated with it.

Annan & Asiedu's (2018) study determined that marital status and occupation of mothers had a significant relationship with neonatal deaths. A study by (Barr & Marugg, 2019), established that unmarried mothers were more likely to result in adverse antenatal outcomes. Their main explanation was that marriage is a social

institution that formalizes a commitment to ensure the wellbeing of the spouse and the child. Also, people that are married tend to have a greater sense of responsibility and more likely to adopt behavior that enhances healthy living. In essence, a married mother is more likely to adopt healthy eating behaviors and even quit risky activities such as smoking and taking alcohol. In addition, the society downplays the role of unmarried fathers in childrearing (Barr & Marugg, 2019). This places the unmarried women at a disadvantage since they have less economic support compared with their married counterparts. Moreover, unmarried mothers are stretched securing a job to generate income to care for themselves and their children and soliciting quality health care. Therefore, they may lack the time or ability to seek medical care even when they notice warning signs during their pregnancy.

2.4.4. Alcohol and Drugs Use

Research shows that women are more susceptible to developing substance use disorder during their reproductive years, which are between 18 and 24. This means that women that are pregnant or soon-to-be pregnant are at a higher risk of drinking alcohol and abusing drugs. According to study conducted in the US in 2012, approximately 6 percent of the pregnant women were using drugs, 16 percent were drinking alcohol, while 8.5 percent were smoking (Forry, 2016). This resulted in over 930,000 fetuses being exposed to alcohol, tobacco, and other illicit drugs in utero. On the other hand, in low and medium income countries, the maternal tobacco use range from 2.6 percent to 15 percent. The same study also found that between 3.6 percent to 8.8 percent pregnant women in South Africa use illicit substances while about 19.6 percent use alcohol (Forry, 2016). Another study on drug assistance during pregnancy found that only 32 percent of cigarette smokers succeeded in abstaining from smoking during the pregnancy period (Forry et al., 2015).

The risk of still birth is 2 to 3 times higher in women who abuse drugs, take alcohol, and smoke tobacco and marijuana during pregnancy. Between the years 2005 and 2009, smoking tobacco during pregnancy was estimated to cause 1,015 infant deaths annually. Heavy alcohol use during pregnancy is associated with adverse neonatal outcomes including infant mortality, low birth weight, preterm births, and still birth. Besides, alcohol passes from the mother to the fetus through the placenta. Thus, the fetal blood end up having alcohol concentrations equal or more than the mother, resulting in the adverse neonatal outcomes previously mentioned (Addila et al., 2021). On the other hand, smoking is with negative birth outcomes such as low birth weight, preterm birth, infant mortality, miscarriage, and damage to the umbilical cord structure (Forray, 2016). Also, there are concerns for other health outcomes such as respiratory illnesses and sudden infant death syndrome associated with drug and alcohol use during pregnancy. Additionally, opioids, cannabis, and cocaine use in pregnancy also result in low birth weight, preterm births, and intrauterine fetal death.

According to a report by Kenya profile of preterm and low birth weight prevention and care 2015, some of the risk factors for preterm births include giving birth at a tender age (teenage pregnancy) 101 per 1000 girls, birth interval of less than 24 months – 23 percent, short stature among women of childbearing age – 1 percent. Others include anemia among women of childbearing age, obesity in women of childbearing age – 25 percent, adult diabetes prevalence – 8 percent, hypertension in women – 28 percent and HIV prevalence – 6 percent. Girls from poor families were at a higher risk of becoming pregnant than girls from rich families. The kinds of job that parents do also significantly influenced chances of their girls becoming teenage mothers (Kiarie, 2015).

2.4.5 Poverty

Poverty is a major factor associated with adverse neonatal outcomes. In essence, poverty is associated with increased teenage fertility rates, teenage pregnancy, and single motherhood. In nearly all developing and developed countries, the risk of teenage pregnancy increases for young people living in poverty. For example, a survey conducted in Alberta showed that female teenagers living in poverty had a greater risk of pregnancy by at least five times compared to their counterparts from well up backgrounds (Bonnyville, 2017).

Study by (Larson, 2007) shows an association between poverty and infant mortality. Getting the highest and lowest income neighborhoods, the research has found that mortality rates in lowest income neighborhoods were 2/3 higher than in higher income neighborhoods. Also, the study found that poverty resulted in higher cases of preterm birth and intrauterine growth restrictions. The research also estimated that 30% of low birth weight could be attributed to maternal poverty (Larson, 2007). Explanations for these outcomes included increased rates of maternal smoking as the pregnant women sought solace in drugs. The adverse outcomes could also be attributed to their likelihood of lower social class women lacking proper nutrition during pregnancy. Furthermore, pregnant women from low economic backgrounds may not have the means to afford adequate and nutritional meals which may foster poor eating habits. The deprivation of important minerals results in poor outcomes such as still birth which is predicted by maternal anemia. The high prevalence of genitourinary tract infections among women of lower social status could we also be attributed to preterm births. Pregnant women also have a higher risk of accumulating chronic stress due to their crowded home environment, unemployment, lack of social support, financial problems, and single

parenthood. In addition, poverty increases the risk of missing out on prenatal care visits, which can have adverse effects on neonatal outcomes.

2.5 Young Maternal Age and Adverse Neonatal Outcomes

2.5.1 Teenage Pregnancy and Preterm Births

Preterm birth refers to babies born alive before 37 weeks of pregnancy are completed (WHO, 2018). Infants born prior to 37 completed weeks of gestation represent a significant public health concern because premature birth is the leading cause of neonatal deaths (WHO, 2018). An estimated 15 million babies are born too early every year according to the WHO, which represent more than one in ten babies. Almost one million children die each year due to complications of preterm birth. Many survivors experience a lifetime of disability, including learning disabilities and visual and hearing problems (WHO, 2016).

In the United States more than one third of all infant deaths are estimated to be preterm related (Amelia *et al*, 2012). Prematurity is profiled as the leading cause of death among children under 5 years around the world, and a leading cause of disability and ill health later in life (CDC, 2016). According to (CDC, 2016), preterm birth rates increased for the second consequent year 2015 and 2016 in the United States. Sub-Saharan Africa and south Asia make up over 60 percent of preterm births worldwide. Of the 15 million babies born too premature each year, more than one million die due to complications related to preterm birth. In Kenya, 193,000 babies are born prematurely each year while 13,300 children under five years die due to direct preterm complications. This according to (USAID, 2015) every premie scale report translates to 12percent countrywide.

In Ethiopia, a study done by (Abebe et al, 2018) showed that teenage mothers were 2.87 times more likely to give birth to premature babies as compared to the adult mothers. It went further to reveal that the odds of giving birth to low birth weight babies were more than twice in teenage mothers than that with the adult mothers. This study also found out that there was a severe neonatal abnormality that was more pronounced in the teenage mothers group as compared to the adult age group mothers.

The national preterm prevalence rate in Kenya is 12.3 percent in 2019, (WHO, 2019). (Okubatsion & sambu, 2017) study reported a 20.2 percent preterm prevalence in Kenyatta National Hospital. In Africa the prevalence rate was reported at 11.9 percent by Beck et al (2010), Nigeria's prevalence rate at 16.8 percent, (Butali et al 2016) and Ethiopia at 25.9 percent, (Bekele et al 2017).

(Tripathi & Sherchand, 2014) emphasized that pregnant teenagers were at a higher risk to deliver preterm and low birth weight babies. Infants with lower gestational age at birth are frequently born to women with certain socio-demographic and health behavioral characteristics, including younger maternal age.

Preterm births often develop to respiratory distress syndrome (RDS) which is the primary cause of early neonatal mortality and morbidity. According to Roberts *et al.*, (2017), the continued use of a single course of antenatal corticosteroids to accelerate fetal lung maturation in women at risk of preterm birth could lead to a favorable outcome.

2.5.2 Teenage Pregnancy and Low Birth Weight

According to (CDC, 2016), the rate of low-birth-weight babies in the United States increased by one percent from the 2015 data. 92 percent of Low Birth Weight (LBW) babies are born in developing countries with 70 percent born in Asia and 22 percent in

Africa. A study done in Ethiopia found out that 17.5 percent babies with low birth weight are born from teenage mothers as compared to 6.8 percent low birth weight babies that are born by adult mothers. In addition, a study in Gondar University Hospital of North West Ethiopia, (Berihunet *al*, 2012) documented a 17.1 percent in prevalence.

According to (KDHS, 2014), a child's size and birth weight is an indicator of its vulnerability to the risk of childhood illnesses and survival chances. Previous studies have found out that teenage mothers have a higher chance of giving birth to babies whose weight is less than 2500 grams compared to mothers in other age groups. This has been attributed to prematurity and/or restricted growth in utero. This is a major contributor to newborn and infant deaths as well as disability and non-communicable diseases globally. This is according to a report by the Kenya Profile of Preterm and Low Birth Weight Prevention and Care statistics of 2015.

WHO and UNICEF estimate low birth weight babies in Kenya to be about 11 percent. The estimates from the Kenya Profile of Preterm and Low Birth Weight Prevention and Care in 2015 were 8 percent. A study by (Muchemi, 2016) in Olkalou county hospital determined the rate of low birth weight was at 16.8 percent in that region. (Ganchimeg *et al.*, 2014) study found significantly higher risks of low birth weight and preterm delivery among teenage pregnancies, with the magnitude of risk decreasing as age increased.

A low-birth-weight prevalence rate of 16.4 percent was documented in Narok District Hospital of Rift Valley region of Kenya (Migwi, 2012). Similarly, a prevalence of 32.8 percent was documented in Pumwani maternity hospital (Mogire, 2013).

2.5.3 Teenage Pregnancy and Neonatal Deaths

Neonatal mortality is death within 28 days of life (WHO, 2018). The first 28 days of life, which is referred to as the neonatal period, is the most vulnerable time for a baby's survival. Babies face the highest risk of dying in their first month of life, at a global rate of 19 deaths per 1,000 live births. According to the Kenya Country Summary (2017), neonatal mortality rate stood at 22 percent in 2017. According to UNICEF, (2017), 2.6 million children died in the first month of life in 2016 globally, approximately 7,000 newborn deaths occurred every day. Most of these deaths occurred in the first week, with an estimated one million dying on the first day and close to one million dying within the next six days.

In Kenya, neonatal deaths stand at 22 in every 1,000 births, 75 percent of the deaths occurring within the first seven days of the infant's life (KDHS, 2014). A 2014 situation analysis on children and adolescents in Kenya established that giving birth at an early age was associated with high mortality rates. In Kenya, 40,000 newborns die yearly within the first month of life as indicated in the (Dickson, 2014) lancet Every Newborn Series report. Further statistics indicate that 33,000 fetuses die in utero. These figures translate to 200 deaths daily in Kenya.

The (KDHS 2014) survey established that among mothers who gave birth before the age of 20, neonatal and infant mortality rates were 29 percent and 30.8 percent higher than the national average. (Althabe, et al 2015) study indicated that pregnancy among teenagers was associated with worse neonatal outcomes. Preventing intrapartum-related perinatal deaths requires a comprehensive approach to quality intrapartum care, beyond the provision of caesarean section. Early identification and management of women with complications could improve maternal and perinatal outcomes (Vogel, et al 2015).

2.6 Summary of the Literature

This chapter has discussed the prevalence and factors associated with neonatal outcomes among teenage mothers. The literature reviewed in this chapter has indicated a high prevalence in teenage pregnancies in the Sub-Saharan Africa region. The literature has also indicated that the United States has the highest rates of teenage pregnancies among developed countries. The statistics in the literature reveal higher prevalence of teenage pregnancies in low-income countries. Teenage pregnancy rates have been shown to increase with decreasing age of the mothers. The chapter has posited low birth weights, neonatal deaths, and preterm births as outcomes of teenage pregnancies. These outcomes have been shown to range from mild to adverse effects on both the mother and child. Studies reviewed in this chapter have discussed some of the neonatal outcomes and presented statistics on teenage pregnancy prevalence. However, they have not focused on neonatal outcomes of teenage pregnancies in Kenya hence there is a gap in the empirical evidence available. This study seeks to bridge this gap. It is evident that teenage pregnancies have adverse neonatal outcomes.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Introduction

This chapter involves all the procedures that were followed in the execution of the study. It involves all the processes from planning, structuring and execution of the study. It includes methodology, research design, study site, population, sampling, data collection technique, validity, reliability, ethical consideration and limitations of the study.

3.2 Study Design

This study adopted a retrospective study design. Retrospective studies investigate a phenomenon or issue that has taken place in the past (dependent variables) and it purposes to retrospectively identify the causes of said phenomenon (independent variables). This design is appropriate for the study as it entails the collection of data on the study variables and the establishment of extent to which these variables influence neonatal outcomes among the teenage mothers. This study adopted a quantitative study design method.

3.3 Study Site

The study took place in Kitale County Referral Hospital in Trans Nzoia County of Kenya. The hospital is a 260 bed public health facility in Kiminini sub-county of Trans-Nzoia county. It is in the former Rift Valley Province of Kenya and is located between the Nzoia River and Mount Elgon, approximately 380 kilometres northwest of Nairobi (the capital city of Kenya). The county borders [Bungoma](#) to the west, [Uasin Gishu](#) and [Kakamega](#) to the south, [Elgeyo Marakwet](#) to the east, West Pokot to the

north and the republic of Uganda to the Northwest. Trans Nzoia covers an area of 2495.5 square kilometers hospital delivery services are provided 24 hours, seven days a week. The services offered are curative, preventive, diagnostics and rehabilitative. It serves as a referral Hospital for the sub county Hospitals, Health Centres and Dispensaries in Trans Nzoia County therefore the Hospital is able to give a general view of the teenage pregnancy rates as well as the associated factors of the neonatal outcomes of the entire county. The catchment population is five million people. The inhabitants are mainly the Sabaot, Luhya and other ethnic groups from Kenya. The county is largely agricultural with both large scale and small-scale wheat, maize and dairy farming.

3.4 Study Population

The study involved the teenage pregnant mothers aged 11-19 years who carried their pregnancy to 28 completed weeks and beyond and who later gave birth at Kitale County Referral Hospital between Jan 2016 to December 2018.

3.5 Eligibility Criteria

3.4.1 Inclusion Criteria

- 1) All records of the then teenage pregnant mothers aged 11-19 years.
- 2) All records of teenage pregnant mothers who carried their pregnancy to 28 completed weeks and beyond and that gave birth at KCRH.

3.4.2 Exclusion Criteria

Any record of the teenage pregnant mothers who gave birth at KCRH that had incomplete data.

3.6 Sample Size

The sample size was estimated using a formula by (Peduzzi *et al.*, 1996) shown below given that the prevalence rate of the outcome of interest (low birth weight babies) in Kenya is 11 percent, this is the national estimate of low birth weight in Kenya according to WHO and UNICEF as alluded in chapter two above:

$$N = 10k/p$$

Where:

N=Sample size

P= The proportion of the outcome of interest (0.11)

K= The number of independent variables (5)

$$N=10*5/0.11$$

N=454 records were analyzed.

3.7 Sampling Technique and Procedure

Systematic sampling was used to identify the files of the teenage mothers to be studied. The sample frame was obtained from KCRH records department. A value K was specified then one of the first Kth file was selected randomly and files of teenage mothers who met the inclusion criteria were reviewed until the desired sample size was achieved.

The systematic sampling formula for interval (k^{th}) =N/n

N-sample frame for three years – January 2016 to December 2018 (4559 teen deliveries)

n-Sample size -454

$$4559/454=10.04$$

k^{th} value was 10. Meaning every 10th file was retrieved and analyzed.

3.8 Data Collection Tool

A structured data collection tool was developed by the researcher comprising four sections (Individual characteristics, maternal health care & health system factors, Biological factors and the outcome of delivery) as per (annex 1). This was used as the main tool for data collection.

3.9 Pilot Study

A pilot study was conducted in at Kitale County Referral Hospital to test whether the data collection tool would yield reliable information that would meet the study objectives. The sample size of the pilot study was 45 files (10 percent of the sample size). The records used from this pilot study were excluded from the main study. This pilot study was of help to the researcher in detecting and correcting any anomaly.

3.10 Validity

This refers to the accuracy and meaningfulness of inferences which are based on the research results (Kumar, 2019). It is also explained as the degree to which the results obtained from the analysis of the data represents the phenomenon under study. Content validity is concerned with sample population representativeness. A pre-test was done on 45 records of teenage mothers who gave birth at Kitale County Referral Hospital. Expert opinion was sought from the supervisors in Moi University to comment on the representativeness and suitability of the items in the tool. They gave their suggestions on the necessary corrections to be made on the structure of the tool.

3.11 Reliability

Reliability is defined as the degree to which the result of a measurement, calculation, or specification can be depended on to be accurate. It is concerned with the question of whether the results of a particular study can be repeated. In this study, Cronbach's alpha (internal consistency) was employed to test reliability of the data collection tool. The variables on the tool were measured and responses checked on the consistency of the data (Tang et al, 2013) . A construct composite reliability coefficient (Cronbach alpha) of 0.7 or above, for all the constructs, was considered to be adequate for this study (Rydwick, et al, 2012).

3.12 Data Management

The case notes of the mothers were retrieved from the records department. The data was extracted with respect to their age, educational status, occupation, marital status, residence, number of ANC visits, inter-pregnancy interval labor and delivery, HIV status, and outcome of the neonates (low birth weight, preterm birth & neonatal mortality). The personal identifier information was replaced with anonymous file number on the check list.

Data collected was reviewed for completeness. Once confirmed the data was entered into a Microsoft Access Database that would host the data for analysis. The database was encrypted with password to ensure that confidentiality of the patient information was maintained. Upon completion of data entry the record was verified for missing and anomalous values and corrected. All the data collection tools containing the teenage mothers information are kept under lock and key and only the principal investigator has access to them.

3.13 Data Analysis and Presentation

Descriptive statistics including mean and the corresponding standard deviation as well as the median and the corresponding inter quartile range were used to summarize continuous variables such as age, number of antenatal care visits, inter-pregnancy interval and parity.

Frequencies and the corresponding percentages were used to summarize categorical variables such as marital status, mode of delivery, education level and HIV status among others.

The frequency of occurrence of the adverse outcomes (preterm birth, low birth weight and neonatal death) was assessed as well as the factors associated with the outcomes. Pearson's Chi Square test was used to compare categorical variables (i.e to compare the neonatal outcome and independent categorical variables).

Independent variables associated with the outcome (preterm birth, low birth weight and neonatal death) were included in a binary logistic regression model. We reported the odds ratios (OR) and the corresponding 95% confidence intervals (95% CI). All tests were considered statistically significant if the p-value was < 0.05.

Data analysis was done using STATA version 16 SE (College Station, Texas 77845 USA).

Results were presented using tables and figures.

3.14 Measures

3.14.1 Dependent Variables

The dependent variables for this study were the adverse neonatal outcomes i.e preterm births, low birth weight and neonatal deaths.

3.14.2 Independent Variables

The independent variables for this study included various factors capable of influencing the above named neonatal outcomes. Demographic characteristics such as age and its influence on outcomes were examined. Parity, number of antenatal care visits; HIV status and inter-pregnancy interval were also examined and analyzed.

3.15 Ethical Considerations

Ethical approval required to conduct this study was sought from the Institutional Research and Ethics Committee (IREC) of the Moi University. In addition, further permission was sought from Kitale County Referral Hospital administration. Clearance was also sought from NACOSTI as per (appendix 2).

The study was conducted with respect to confidentiality by making sure that patients' names do not appear on the reports. The data was anonymous in the data registries by assigning codes, and therefore no personal names or identifiers were put in the data registries to ensure confidentiality.

3.16 Findings Dissemination

The findings of this study were shared with the relevant authorities i.e. maternity ward in charges and hospital administration. The final document will also be published and a copy shared with the county health department.

3.17 Study Benefits

The findings from this study are to create awareness in the community about the problem that is teenage pregnancy and its associated adverse neonatal outcomes. The findings are also to contribute towards formulating and implementation of appropriate interventions by the relevant county government and national government to reduce the

numbers of teenage pregnancies and the associated adverse neonatal outcomes. The findings will be disseminated to various stakeholders to create focused intervention programs and also form basis for future researches.

3.18 Study Limitations

Since this was a retrospective study, the researcher did not have any influence on the quality of data entered in the teenage mothers' files and data registers. This study was also not able to capture all the teenage mothers who underwent home deliveries.

This study was also hospital based, and therefore the results are not generalizable to all the teenage mothers in Kenya.

CHAPTER FOUR

4.0 RESULTS

The results that are presented here are based on data extracted from 454 records that were reviewed for teenagers who gave birth at Kitale County Referral Hospital. Table 1 shows the characteristics of the participants.

4.1: Socio-demographic characteristics

The mean age of the participants was 17 years (std = 1.3). Of all the sampled teenage pregnant mothers, 242 (53.3%) were married. More than half of the sampled teenage mothers, 236 (52.0%), had completed secondary education and 9 (2.0%) completed tertiary education. Of all the sampled participants, 215 (47.4%) were unemployed while 201 (44.3%) were students as shown in table 1 below:

Table 1: Socio-demographic characteristics of women giving birth at KCRH

Overall (N=454)	
Age (yrs)	
Mean (sd)	17.6 (1.3)
Range	10.0 - 19.0
Marital status	
MARRIED	242 (53.3%)
SINGLE	212 (46.7%)
Education level	
PRIMARY	209 (46.0%)
SECONDARY	236 (52.0%)
TERTIARY	9 (2.0%)
Occupation	
EMPLOYED	38 (8.4%)
STUDENT	201 (44.3%)
UNEMPLOYE D	215 (47.4%)
Residence	
RURAL	396 (87.2%)
URBAN	58 (12.8%)

4.2 Maternal characteristics

More than half of the sampled teenage mothers, 382 (84.1%) were primigravidas. Of the all participants 170 (37.4%) had attended antenatal clinic up to the fourth visit whereas 64 (14.1%) had not attended any antenatal clinic. More than half of the participants, 262 (57.7%) had spent less than twelve hours in labor and 410 (90.3%) gave birth via SVD. Of all the sampled women, 62 (13.7%) had less than two years inter-pregnancy intervals shown in table 2 below:

Table 2: Maternal characteristics of women giving birth at KCRH

	Overall (N=454)
Parity	
0+0	382 (84.1%)
0+1/1+0	72 (15.9%)
Hiv status	
NEGATIVE	444 (97.8%)
POSITIVE	10 (2.2%)
Alcohol/ tobacco use	
NO	452 (99.6%)
YES	2 (0.4%)
ANC visit	
FIFTH VISIT	24 (5.3%)
FIRST VISIT	23 (5.1%)
FOURTH VISIT	170 (37.4%)
SECOND VISIT	70 (15.4%)
THIRD VISIT	103 (22.7%)
ZERO VISIT	64 (14.1%)
Interpregnancy Interval	
>2YEARS	392 (86.3%)
<2YEARS	62 (13.7%)
Hours in Labor	
< 12HRS	262 (57.7%)
12 - 24 HRS	187 (41.2%)
> 24 HRS	5 (1.1%)
Mode of delivery	
C/S	44 (9.7%)
SVD	410 (90.3%)
Multiple pregnancy	
NO	450 (99.1%)

YES	4 (0.9%)
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4.3: To determine the Frequency of occurrence of adverse outcomes (preterm babies, low birth weight babies & neonatal deaths) among teenage mothers giving birth at KCRH (Objective 1)

Table 3 shows the frequency of the adverse outcomes among teenage mothers giving birth at KCRH. There were a total of 114 neonates with low birth weight, thus the prevalence of low birth weight was 25.11% (95% CI: 21.18, 29.36). There were 4 deaths, neonatal mortality was thus 0.88% (95% CI: 0.24, 2.24). In terms of preterm there were 126 neonates who were born preterm, prevalence of preterm was 27.75% (95% CI: 23.68, 32.11).

Table 3: Adverse outcome

Overall (N=454)	
Lowbirth Weight	
NO	340 (74.9%)
YES	114 (25.1%)
Death	
NO	450 (99.1%)
YES	4 (0.9%)
Preterm	
NO	328 (72.2%)
YES	126 (27.8%)

4.4 Factors associated with Low birth weight (Objective 2)

There was a significant association between HIV status and birth weight where HIV positive mothers had higher proportion (60%) of neonates with low birth weight compared to HIV negative mothers (24.3). Though not statistically significant 3 (75.0%) of the 4 women who had multiple pregnancies had low birth weight babies. This is shown in table 4 below;

Table 4: Bivariate analysis: Factors associated with Low birth weight

Variable	Low birth weight		p value
	No (N%)	Yes (N%)	
Age (yrs)			0.111 ¹
COUNT	340	114	
MEDIAN	18.0	18.0	
Q1,Q3	17.0, 19.0	17.0, 18.8	
Marital status			0.301 ²
MARRIED	186 (76.9%)	56 (23.1%)	
SINGLE	154 (72.6%)	58 (27.4%)	
Education level			0.657 ³
PRIMARY	154 (73.7%)	55 (26.3%)	
SECONDARY	178 (75.4%)	58 (24.6%)	
TERTIARY	8 (88.9%)	1 (11.1%)	
Occupation			0.129 ³
EMPLOYED	33 (86.8%)	5 (13.2%)	
STUDENT	144 (71.6%)	57 (28.4%)	
UNEMPLOYED	163 (75.8%)	52 (24.2%)	
Residence			0.150 ²
RURAL	301 (76.0%)	95 (24.0%)	
URBAN	39 (67.2%)	19 (32.8%)	
Parity			0.072 ²
0+0	280 (73.3%)	102 (26.7%)	
0+1/1+0	60 (83.3%)	12 (16.7%)	
HIV status			0.019 ³
NEGATIVE	336 (75.7%)	108 (24.3%)	
POSITIVE	4 (40.0%)	6 (60.0%)	
Alcohol/ tobacco use			0.063 ³
NO	340 (75.2%)	112 (24.8%)	
YES	0 (0.0%)	2 (100.0%)	
ANC visit			0.211 ²
<=3	189 (72.7%)	71 (27.3%)	
4+	151 (77.8%)	43 (22.2%)	
Interpregnancy Interval			0.079 ²
>2YEARS	288 (73.5%)	104 (26.5%)	
<2YEARS	52 (83.9%)	10 (16.1%)	
Hours in Labor			0.541 ²
< 12Hrs	199 (76.0%)	63 (24.0%)	
>= 12Hrs	141 (73.4%)	51 (26.6%)	
Mode of delivery			0.148 ²
C/S	29 (65.9%)	15 (34.1%)	
SVD	311 (75.9%)	99 (24.1%)	
Multiple pregnancy			0.051 ³
NO	339 (75.3%)	111 (24.7%)	
YES	1 (25.0%)	3 (75.0%)	

1. Kruskal-Wallis rank sum test
2. Pearson's Chi-squared test

3. Fisher's Exact Test for Count Data

We further fit a logistic regression model to adjust for confounders. The results are shown in Table 5

4. 5: Multivariate analysis of factors associated with low birth weight

Adjusting for age, occupation, residence, parity, number of ANC visits, mode of delivery and pregnancy interval, we observed that HIV status was statistically significantly associated with low-birth-weight neonates. Specifically, teenage mothers who were HIV positive their odds of having a low-birth-weight neonate was 5 times (AOR = 5.12, 95% C.I. = 1.38-21.2, p-value = 0.016) that of HIV negative teenage mothers. The odds of giving birth to a low-birth-weight neonate among students was twice (AOR = 2.49, 95% C.I. = 0.95-7.91, p-value=0.086) that of the employed teenage mothers though not statistically significant. The findings from this study also revealed that the odds of giving birth to a low-birth-weight baby among the unemployed teenage mothers was two times (AOR = 2.18, 95% C.I. = 0.85-6.76, p-value=0.13) that of the employed teenage mothers though not statistically significant. Table 5 shows:

Table 5: Table 5: Multivariate analysis of factors associated with low birth weight

Characteristic	OR	95% CI	p-value
AGE	0.96	0.81, 1.14	0.6
Occupation			
EMPLOYED	1		
STUDENT	2.49	0.95, 7.91	0.086
UNEMPLOYED	2.18	0.85, 6.76	0.13
Residence			
RURAL	1		
URBAN	1.74	0.92, 3.20	0.081
Parity			
0+0	1		
0+1/1+0	0.83	0.12, 3.69	0.8
Hiv status			
NEGATIVE	1		
POSITIVE	5.12	1.38, 21.2	0.016
ANC visit			
<=3erved that H	1		
4+	0.77	0.49, 1.21	0.3
Pregnancy interval			
>2YEARS	1		
<2YEARS	0.70	0.14, 5.26	0.7
Mode of delivery			
C/S	1		
SVD	0.56	0.28, 1.13	0.10

4.6 Factors associated with Preterm (Objective 3)

At bivariate level we observed that none of the variables was statistically significantly associated with preterm neonates. Though not statistically significant, primigravida mothers had a higher proportion (29.3% $p = 0.086$) of preterm neonates than multigravidas (19.4%). Multiple pregnancies had 50% outcome in preterm deliveries, although not statistically significant, mothers with multiple pregnancies had a higher proportion (50%) of preterm neonates than those with singleton pregnancies (27.6%). The unemployed mothers had a higher proportion (29.3%) of preterm neonates as compared to the employed (18.4%). Those mothers with a positive HIV status had a higher proportion (40%) of preterm neonates as compared to those with a negative HIV status (27.5%). Table 6 below shows:

Table 6: Table 6 Bivariate analysis: factors associated with Preterm

Variable	Preterm		p value
	NO (N %)	YES (N%)	
Age (yrs)			0.747 ¹
COUNT	328	126	
MEDIAN	18.0	18.0	
Q1,Q3	17.0, 19.0	17.0, 19.0	
Marital status			0.700 ²
MARRIED	173 (71.5%)	69 (28.5%)	
SINGLE	155 (73.1%)	57 (26.9%)	
Education level			0.952 ³
PRIMARY	152 (72.7%)	57 (27.3%)	
SECONDARY	169 (71.6%)	67 (28.4%)	
TERTIARY	7 (77.8%)	2 (22.2%)	
Occupation			0.400 ³
EMPLOYED	31 (81.6%)	7 (18.4%)	
STUDENT	145 (72.1%)	56 (27.9%)	
UNEMPLOYED	152 (70.7%)	63 (29.3%)	
Residence			0.731 ²
RURAL	285 (72.0%)	111 (28.0%)	
URBAN	43 (74.1%)	15 (25.9%)	
Parity			0.086 ²
0+0	270 (70.7%)	112 (29.3%)	
0+1/1+0	58 (80.6%)	14 (19.4%)	
Hiv status			0.475 ³
NEGATIVE	322 (72.5%)	122 (27.5%)	
POSITIVE	6 (60.0%)	4 (40.0%)	
Alcohol/ tobacco use			0.478 ³
NO	327 (72.3%)	125 (27.7%)	
YES	1 (50.0%)	1 (50.0%)	
ANC visit			0.147 ²
<=3	181 (69.6%)	79 (30.4%)	
4+	147 (75.8%)	47 (24.2%)	
Interpregnancy Interval			0.058 ²
>2YEARS	277 (70.7%)	115 (29.3%)	
<2YEARS	51 (82.3%)	11 (17.7%)	
Hours in Labor			0.317 ²
< 12HRS	194 (74.0%)	68 (26.0%)	
>= 12HRS	134 (69.8%)	58 (30.2%)	
Mode of delivery			0.323 ²
C/S	29 (65.9%)	15 (34.1%)	
SVD	299 (72.9%)	111 (27.1%)	
Multiple pregnancy			0.309 ³
NO	326 (72.4%)	124 (27.6%)	
YES	2 (50.0%)	2 (50.0%)	

1. Kruskal-Wallis rank sum test
2. Pearson's Chi-squared test
3. Fisher's Exact Test for Count Data

4.7 Factors associated with Neonatal Mortality (Objective 4)

The prevalence for neonatal mortality in this study was 0.88 percent (4 deaths).

Bivariate analysis on the factors associated was not explored because of the low numbers.

CHAPTER FIVE

5.0 Discussion

This chapter entails the discussion of the results that were obtained from this study conducted at Kitale County Referral Hospital. These results were compared to researches that have been previously published by explaining them in relation to these findings. This was guided by the following specific objectives; 1) to determine the frequency of occurrence of adverse neonatal outcomes (preterm babies, low birth weight babies and neonatal deaths) among teenage mothers, 2) to determine the factors associated with preterm babies among teenage mothers, 3) to determine the factors associated with low-birth-weight babies among teenage mothers, 4) to determine the factors associated with neonatal deaths among teenage mothers giving birth at KCRH.

5.1 Frequency of occurrence of adverse neonatal outcomes

The prevalence of preterm neonates at KCRH was 27.75 percent for the period of study. The preterm prevalence rate in this study was higher than that of the national prevalence of 12.3percent in 2020. (Okube & Sambu 2017) reported a 20.2 percent preterm prevalence in Kenyatta National Hospital. This study's preterm prevalence is also higher than the rates reported for African prevalence at 11.9 percent, (Beck et al, 2010). It is also higher than the findings reported in Nigeria at 16.8percent, (Butali et al, 2016) and also higher from a study done in Ethiopia at 25.9percent (Bekele et al, 2017).

The prevalence rate on preterm birth from this study is also higher than the findings reported for Kenyatta National Hospital which was 18.3 percent in 2018 (Wagura et al, 2018). The Kenya Profile of Preterm and Low Birth Weight Prevention and Care reported a preterm prevalence rate of 12 percent which is lower than the rate found in

this study. The high preterm prevalence rate in this study could be attributed to the fact that KCRH (the study area) is the county's referral hospital where all complicated deliveries are referred to for specialized care.

The prevalence rate for low birth weight neonates at KCRH was 25.11 percent for the period of study. This figure is four times the national 2009 KDHS value of 6.0 percent. It is also higher than that of 5.5 percent value reported for Central region (KNBS, 2010). This can be explained by the fact that the national and regional estimates are pooled estimates whereas the 25.11 percent is from a selected population that gave birth at KCRH. This study's prevalence rate was lower than the 16.4 percent prevalence documented in Narok District Hospital of Rift Valley region of Kenya (Migwi, 2012). Similarly, a high prevalence of 32.8 percent was documented in Pumwani maternity hospital (Mogire, 2013). In addition, lower than this study's prevalence rate, was documented in Gondar University Hospital of North West Ethiopia of 17.1 percent (Berihunet *al*, 2012). This study's findings also contradict a study done Ol' Joro Orok, in Nyandarua County that found a 13.3 percent low birth weight prevalence (Wambui, 2019). This difference in prevalence may be explained by variation in biological and environmental factors.

This study from KCRH revealed a neonatal mortality rate of 0.88 percent. This mortality rate is lower than that recorded for sub-Saharan Africa at 2.8percent, (WHO 2019). It also contradicts the findings reported for Central and Southern Asia at 2.5 percent, (WHO, 2019). This rate is also lower than that documented by (KDHS, 2014) at 2.2 percent. The figure from the present study also differs with findings from a hospital based cohort study in the Somali region of Ethiopia, by (Elmi et al 2018), which showed 5.7 percent (57 per 1000 live births) prevalence. This difference in prevalence

rates could be attributed to the relatively small sample size used in this study as compared to the other studies quoted above.

5.2 Factors Associated with Preterm Neonates

This study did not find any association between age, parity, HIV status, alcohol/tobacco consumption; inter pregnancy interval, residence, multiple pregnancy and ANC attendance with preterm delivery. This differs from Okube and Sambu, (2017) study who found a significant association between alcohol consumption during pregnancy and preterm birth, where the proportion of preterm birth was significantly higher (2.5 times) among mothers who had history of alcohol consumption compared to mothers with no history of alcohol consumption. These findings also contradict a study carried out in Kenyatta National Hospital that found out a significant association ($p = < 0.05$) between maternal age and parity with preterm birth (Wagura et al 2018).

However, this study's findings are similar to (Wagura et al, 2018) study who found out that there was no association between smoking and alcohol use, marital status, level of education and antenatal clinic attendance with preterm birth. The findings from this study contradict (Kang et al, 2015) study from Singapore who found out that young maternal age was significantly associated with a higher risk preterm birth. These findings also differ from a study done in Northwest Ethiopia that established that babies born from adolescent mothers are at higher odds of adverse neonatal outcome like preterm births (Kassa et al, 2019).

This study's findings also differ from the findings of (Bekele et al 2017) study that saw a significant association between substance intake during pregnancy and preterm birth. This can be attributed to the fact that smoking and alcohol use by women is not prevalent in Kenya due to cultural influences. In addition, women in our setting recover

faster from the effect of previous pregnancy due to the intensified nutritional care of mothers soon after delivery which is a common practice locally, hence the disparity between this study's findings on inter pregnancy interval and others.

5.3 Factors Associated with Low Birth Weight

Findings of the study showed a significant association of positive HIV status with low birth weights. Mothers who were HIV positive had a higher chance of approximately five times compared to HIV negative mothers of bearing a child with low birth weight. This finding is consistent with a study done by (Xiao et al 2015), which indicated that low birth weight was associated with a positive HIV status.

The study found that students had a higher probability of giving birth to a low weight baby compared to employed mothers. The risk was twice for students compared to the employed. These results are consistent with (Annan & Asiedu, 2018) study, which indicated that marital status and occupation of mothers had a significant relationship with low birth weight. Employed mothers and married mothers had a lower risk of giving birth to low weight babies. This can be attributed to a higher capability among married and employed mothers to take care of themselves during the pregnancy.

The present study reveals that mothers living in urban areas were found to be twice at risk of giving birth to low-birth-weight babies compared to those in rural areas. This finding is consistent with findings by (Gupta et al, 2019), which indicated that neonates born by mothers living in urban areas were at a higher risk (63.4% n=274) of low birth weight as opposed to their counterparts in rural areas.

This study did not find any association between socio-demographic factors such as age, residence, parity and education with low-birth-weight neonates. These findings differ

from (Abebe et al, 2020) study who found out that adverse neonatal outcome such as low birth weight and preterm deliveries were significantly associated with teenage mothers. These findings also contradict those of (Kassa et al, 2019) who established that babies born from adolescent mothers are at higher odds of adverse neonatal outcomes like low birth weight. This also differs from a study done in Turkey that established that adolescent pregnancy was significantly associated with low birth weight babies and preterm deliveries (Karacam et al, 2021). This study's findings also differ from those of a study carried out in Bradford that established that, the odds of extremely low birth weight (< 1000 grams) were significantly higher in the adolescent age group (< 19 years) compared to the adult group (Dowle et al, 2018). Several studies have shown that socio-demographic factors can either influence low birth weight directly or indirectly through intermediate factors, for example antenatal care or maternal health care (Acharya *et al*, 2018). This could be the explanation to this finding.

5.4 Factors associated with Neonatal Mortality

The neonatal mortality rate in this study was 0.88 percent (4 deaths). The findings from this study differ with those from a study carried out Singapore that found out a significant association between young maternal age and neonatal mortality (Kang et al, 2015). These findings also differ from those of a study done by (Tekelab et al, (2019) that found out that antenatal care utilization of at least one visit by a skilled health care provider during pregnancy, can reduce the risk of neonatal mortality by up to 39 percent in Sub-Saharan African countries.

The present study findings contradict the findings of a study done by Neal et al, (2018) that found out that babies born by mothers who are below 16 years have a significantly

higher risk of neonatal mortality as compared to those born by older mothers. These findings also differ from those of a study done in Ethiopia that revealed that the risk on neonatal mortality was significantly associated with mothers who had no antenatal care visit during pregnancy (AOR = 1.90 95% CI 1.11, 3.25), (Wolde et al, 2019). The findings also differ from a study done in Nepal that found out that young maternal age, short birth interval, primi gravida, low maternal education and economic status and multiple pregnancy were significantly associated with neonatal mortality (Houweling et al 2019).

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATION

6.1: Conclusion

From the study, prematurity was the commonest adverse neonatal outcome. This rate was higher than the national prevalence rate reported for the country. Low birth weight was the second highest prevalence rate in this study and the rate was also higher than the rate reported nationally. Neonatal mortality rate was third in this study; however, the rate was lower than that for the national level.

HIV status of the teens, urban residence and student status were the common factors associated with this crisis. It was established that inadequate prenatal care for teenage mothers was a major cause of neonatal mortality and morbidity.

This study did not find any association between the variables and preterm births and neonatal mortality.

6.2 Recommendations

To address the social and health issue that is teenage pregnancy and its adverse neonatal implication, the County Government of Trans Nzoia, KCRH, and other stakeholders must take the following action;

6.2.1. At the Social Level

The community tends to have a massive impact on the quality of health. Therefore, to improve health outcomes in terms of reduced teenage pregnancies, the community must be involved in the change. At the social and community level, parents should be sensitized to openly talk with their children and not shy away from counseling them on

the effects of early pregnancies and the enormous responsibility that comes with it. The community should also undertake programs and youth strategies to reach as many adolescents in the community as possible, targeting youths with a dire need for prevention programs. We recommend organizing activities such as sports events and other youth empowerment programs that could be used as an avenue for delivering important information regarding sexual health.

Also, schools and religious organizations should actively be involved in reducing the prevalence of adolescent pregnancies. In essence, they should use effective training materials and resources to help reduce the risk of sexual behaviors among teens. For example, these institutions should integrate reproductive health information that is relevant to reducing teen pregnancies into their curriculum. Moreover, the education system is one of the most effective and sustainable platforms for getting the correct sexual reproductive health information to the youths. On the other hand, leaders in religious institutions should empower and mentor the youth on matters surrounding sexual reproductive health. Also, they should empower parents by teaching them how to communicate sexuality matters to their children effectively.

The sexual reproductive health programs should not overlook men as they play an essential role in reducing adolescent pregnancies. Sexual reproductive health educators must present teen pregnancy prevention as the job of both girls and boys. Moreover, young men who engage in unprotected intercourse also tend to engage in other risky behaviors such as smoking, using and abusing drugs, drinking alcohol, attempting suicide, etc. We recommend recognizing that sexual expression is part and parcel of adolescent development. Therefore, sexual health providers should focus on delivering accurate information about sex and ensure that young men can also access reproductive

health services to allow them to express their sexuality in safe and healthy ways. This will, in turn, help reduce the prevalence of adolescent pregnancy.

Other recommendations at this level include regulating the media. Media plays a massive role in influencing behavior. Therefore, media would be equally effective if used as a source of education for sexual reproductive health. Thus, the community should advocate for the closing of media houses or shows that air pornographic or sexually explicit content to children and teens. Also, media should include talk shows that sensitize adolescents against teen sex and its consequences.

6.2.2. At the Government and County Government Level

At the government level, necessary investments should be made to ensure a smooth transition from childhood into adolescence, especially for girls. We would recommend that the government glasses measures to ensure that all girls have access to pads since their lack is a primary barrier to education. Also, the government should develop policies to support teenage girls who drop out of school due to pregnancy to go back to school and complete their education.

Also, it is crucial for various government organizations placed in charge of enforcing and implementing policies to do their due diligence. Already, Kenya has developed adequate laws and regulations that, if properly enforced, can effectively reduce adolescent pregnancies and motherhood. These laws include the Children Act of 2011, the Education Sector Policy on HIV and AIDS of 2013, the Sexual Offences Act of 2006, the Population Policy for National Development, the National Adolescent Sexual Reproductive Health Policy of 2015, and the Population Policy for National Development. The effectiveness of these policies can also be achieved by ensuring that the perpetrators of child marriages and engaging in sex with adolescents suffer optimal

punishments. Also, local administrators and government officials should commit to educating the public about the laws and policies' provisions.

At the county level, the government should initiate community dialogues and campaigns that focus on addressing and mitigating harmful cultural practices that drive teen pregnancies. Such harmful cultural practices include female genital mutilation (FGM) and child marriages, which are the leading causes of adolescent pregnancies. In addition, the government should have strict policies against businesses and suppliers that sell drugs and substances to teens. Specifically, we recommend the county government (Trans-Nzoia County) to institute school-based programs to educate the girls and boys on the dangers and adverse outcomes associated with teenage pregnancy. Also to those teenagers already pregnant to have the knowledge on the importance of early and focused antenatal care.

6.2.3. At the Economic Level

One of the leading causes of teen pregnancies is poverty. Some parents lack the means or money to provide basic needs such as food, sanitary pads, and education. In most cases, their children resort to early marriages as a means to escape poverty. Also, these children are easily lured into engaging in sexual activity in exchange for money to afford their basic needs. In extreme cases, the economic pressure may push teen girls into prostitution, further increasing the risk of early pregnancy.

To address the economic challenges, we recommend creating schemes to increase job opportunities for parents. Consequently, it will allow them to efficiently support their children's needs, thus preventing the need to use sexual means of meeting these needs. Also, the government should introduce vocational training in school and give incentives go girls that participate and utilize the acquired skills. Other than keeping the young

girls interested in school, these vocational training programs will equip the girls with practical skills that they can use to earn money when not attending school. In essence, this will provide financial empowerment that helps to delay their urge to engage in sex.

6.2.4. At the Public Health Level

At the public health level, necessary investments should be made to ensure that health facilities are friendly to adolescents and youths in general. This will help eliminate the barriers preventing youth from accessing sexual reproductive health services. Thus, Health care providers should be trained to provide teen-friendly services. Also, health institutions should have a dedicated team of staff that responds to the adolescents. In addition, the government should ensure that there is an adequate supply of both short-term and long-term contraceptives and that they are readily available for free to all young people who are sexually active.

Also, with regard to the moderately high preterm and low birth weight prevalence, there is need for healthcare providers in Kitale County Referral Hospital to put more emphasis on focused antenatal care to ensure risk of preterm delivery and low birth weight is detected early and treated appropriately, especially among mothers with a positive HIV status, student status and of urban residence.

6.2.5. Further Research

We recommend further research with a bigger sample size to identify the causal mechanisms that link young maternal age with the outcomes in teenage pregnancy.

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APPENDICES

APPENDIX I: IREC APPROVAL



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ELDORET
Tel: 33471/2/3
29th August, 2019

Reference: IREC/2019/186
Approval Number: 0003411

Cecilia Mukiri Douglas,
Moi University,
School of Nursing,
P.O. Box 4606-30100,
ELDORET-KENYA.

INSTITUTIONAL RESEARCH & ETHICS COMMITTEE
29 AUG 2019
APPROVED
P. O. Box 4606 - 30100 ELDORET

Dear Ms. Mukiri,

FACTORS ASSOCIATED WITH ADVERSE NEONATAL OUTCOMES AMONG TEENAGE MOTHERS IN KITALE COUNTY REFERRAL HOSPITAL

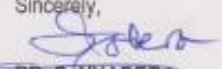
This is to inform you that **MU/MTRH-IREC** has reviewed and approved your above research proposal. Your application approval number is **FAN:0003411**. The approval period is **29th August, 2019 – 28th August, 2020**.

This approval is subject to compliance with the following requirements;

- i. Only approved documents including (informed consents, study instruments, MTA) will be used.
- ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by **MU/MTRH-IREC**.
- iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to **MU/MTRH-IREC** within 72 hours of notification.
- iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to **MU/MTRH-IREC** within 72 hours.
- v. Clearance for export of biological specimens must be obtained from relevant institutions.
- vi. 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.
- vii. Submission of an executive summary report within 90 days upon completion of the study to **MU/MTRH-IREC**.

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) <https://oris.nacosti.go.ke> and also obtain other clearances needed.

Sincerely,



DR. S. NYABERA
DEPUTY-CHAIRMAN
INSTITUTIONAL RESEARCH AND ETHICS COMMITTEE

cc	CEO -	MTRH	Dean -	SOP	Dean -	SOM
	Principal -	CHS	Dean -	SON	Dean -	SOD

APPENDIX II: NACOSTI APPROVAL

 REPUBLIC OF KENYA	
Ref No: 147821	Date of Issue: 30/September/2019
RESEARCH LICENSE	
	
<p>This is to Certify that Ms.. Cecilia Douglas of Moi University, has been licensed to conduct research in Transzoia on the topic: FACTORS ASSOCIATED WITH ADVERSE NEONATAL OUTCOMES AMONG TEENAGE MOTHERS IN KITALE COUNTY REFERRAL HOSPITAL for the period ending : 30/September/2020.</p>	
License No: NACOSTI/P/19/1547	
147821	
Applicant Identification Number	Director General NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
	Verification QR Code
	
<p>NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.</p>	

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 clearance from relevant Government Agencies
5. The License does not give authority to transfer 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 III: PERMISSION TO COLLECT DATA

**REPUBLIC OF KENYA
COUNTY GOVERNMENT OF TRANS NZOIA**

TEL: 054-30301;
054-30302
Fax:
EMail:

P.O BOX 4211-30200
KITALE



OFFICE OF THE CHIEF OFFICER HEALTH

Our Ref: CGTN/HS/HR/2014009737[106] **Date: 1st October 2019**

CECILIA MUKIRI DOUGLAS,
P.O BOX 10738,
MOI UNIVERSITY,
ELDORET,
TEL: No. 0726436719- ID No27531892.


RE: PERMISSION TO COLLECT DATA IN THE RECORDS DEPARTMENT.


Reference is made to your letter dated 1st October, 2019 on the above subject and wishes to inform you that your request has been accepted.

You are hereby granted one (1) year research period at Kitale County Hospital in the Department of Records with effect from 2nd October 2019 to 2nd October 2020.

Please note that you will be required to strictly adhere to the Human Resource Regulations as stated in the Human Resource Manual for the County Civil Servants. Kindly note that, during this period you will not be entitled to any salary or allowances from the County Government. After the end of your Research, you will be expected to give a report to the County through this office.

N/B: You will always be expected to observe the official dress code while conducting your research.


Emmanuel Makhanu



FOR: CHIEF OFFICER- HEALTH CORPORATE SERVICES

Cc

- Medical Superintendent Kitale County Hospital

APPENDIX IV: DATA COLLECTION TOOL
ASSESSMENT OF NEONATAL OUTCOMES AMONG TEENAGE
MOTHERS IN KITALE COUNTY REFERRAL HOSPITAL.

TOOL NO:

1. INDIVIDUAL CHARACTERISTICS

1.1 AGE

1.2 MARITAL STATUS

1.3 URBAN RESIDENCE / RURAL RESIDENCE

1.4 PARITY

1.5 OCCUPATION

1.6 HIV STATUS

1.7 EDUCATION LEVEL

1.8 ALCOHOL USE / TOBACCO USE

2. MATERNAL HEALTH CARE & HEALTH SYSTEM FACTORS

2.1 NUMBER OF ANTENATAL VISITS

2.2 INTERPREGNANCY INTERVAL

2.3 HOURS SPENT IN LABOUR

2.4 MODE OF DELIVERY

3. BIOLOGICAL FACTORS

3.1 MULTIPLE PREGNANCY

4. OUTCOME

4.1 LOW BIRTH WEIGHT

4.2 PRETERM

4.3 NEONATAL MORTALITY

(Developed by author)