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TEENAGE PREGNANCIES AND HEALTH OUTCOMES AT MUTOKO DISTRICT HOSPITAL, MASHONALAND EAST PROVINCE, ZIMBABWE

BY

PATIENCE GAPARA

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF PUBLIC HEALTH IN THE COLLEGE OF HEALTH, AGRICULTURE AND NATURAL SCIENCES

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Abstract

Different efforts and initiatives have been put in place including commitments on targets, interventions and guidelines to reduce health risks and life-threatening dangers to women during pregnancy and child-birth. Teenage mothers are at greatest risk of pregnancy related complications. This study explored linkages to care for teenage pregnant mothers and the associated barriers as well as describing the health outcomes of teenage mothers giving birth at Mutoko District Hospital, Mashonaland East Province. An analytical cross-sectional study was conducted at Mutoko District Hospital in January and February 2020 using the mixed method approach. Quantitative data was collected from patient records using a standardized questionnaire which included information on age, utilization of ante natal care services, mode of delivery and fetal outcomes. A total of 259 women were included in the study. Qualitative data was collected using a key informant interview guide with trained staff from the maternity ward. Analysis of data was done using Epi Info. Overall, 30.9% of teenage mothers reported to have visited ante-natal care services less than 4 times. The majority (68.8%) of the teenage mothers who visited ante-natal care services for more than 4 times were in the 17-19 age category. Iron supplementation was given to almost all of the teenage mothers (98.1%) with the exception of 5 (1.9%) of the mothers who were not booked. About half (48.6%) of study participants delivered their babies with a gestational age of 37-40 weeks. The majority (80.3%) of teenage mothers delivered through normal vertex delivery with 24 (9.3%) undergoing caesarian section. All teenage mothers in the less than 17 years age category gave birth to babies with an Apgar score greater than 7 at 5 minutes. Findings from this study indicate that many opportunities for ante-natal care services were being enjoyed by most of the teenage mothers in Mutoko including accessing services like iron and folate supplementation during pregnancy which benefitted both the mother and the baby for favorable obstetric and birth outcomes. Youth friendly health services need to be established. Contrary to popular belief that teenage mothers are at a greater risk of adverse birth outcomes, this study found positive outcomes for both mother and baby when given access to ANC services.

Key words: Teenage pregnancy, supplementation, obstetric outcomes

Declaration page

I declare that this dissertation is my original work except where sources have been cited and acknowledged. The work has never been submitted, nor will it ever be submitted to another university for the award of a degree

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 **05/04/2021** — Student's Signature

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Dedication

To the Lord God Almighty who gives us the ability to conduct research. This dissertation is also dedicated to all my family and friends who provided me with much needed support for me to accomplish my work. I hope this dissertation will inform public health with information on this special group of teenage pregnant mothers.

List of acronyms and abbreviations

AU	Africa University
AUREC	Africa University Research Ethics Committee
DMO	District Medical Officer
DHIS 2	District Health Information System 2
LBW	Low birth weight
LMICs	Low and medium income countries
MoHCC	Ministry of Health and Child Care
PPH	Post-partum hemorrhage
SDOH	Social Determinants of Health
SGA	Small for gestational age
UNFPA	United Nations Population Fund
WHO	World Health Organisation
ZNFPC	Zimbabwe National Family Planning Council

Definition of key terms

Teenager –time period between 10 to 19 years old

Low birth weight- weight less than 2500g after birth preferably measured within 1 hour of life before any physiological changes occur

Preterm birth- birth of a live baby before 37 weeks gestation

Gestational age- age from the last menstrual period in completed weeks

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Chapter 1 Introduction

1.1 Introduction

Adolescence defined by the World Health Organization (WHO, 1999) as the time period between the ages of 10 and 19 years, is a critical period in human, physical and psychosocial development when an individual progresses from an immature state to a mature state capable of reproduction. This is the period when structural, functional, and psychosocial developments occur in a child to prepare her for assuming the responsibility of motherhood. Adolescents are not a homogenous population but exist in a variety of circumstances and have diverse needs. They number 1.2 billion in the world today, making up 16 per cent of the world's population (United Nations Children's Fund [UNICEF], 2019).

Pregnancies in this stage of life account for 23% of the burden of disease arising from pregnancy and childbirth, despite only representing 11% of all births worldwide (United Nations Population Fund [UNFPA], 2015). Approximately 16 million girls aged 15 to 19 years and 2.5 million girls under 16 years give birth each year in developing countries (Darroch, Woog, Bankole & Ashford, 2016).

Maternal and child health issues take a pivotal role in the global health agenda with the concerted efforts of many different players and a number of initiatives. This has been followed by a corresponding commitment on targets, interventions and guidelines to avert health risks and life threatening dangers to women in pregnancy and childbirth like the

Millennium development goals which were modified to the Sustainable development goals which have goals on reducing maternal and neonatal mortality. Targeted public health interventions such as intermittent preventive treatment of malaria in pregnancy (IPT), provision of long lasting insecticide treated nets (LLITNs), micronutrient supplementation, prevention of mother to child HIV transmission and improved frequency and quality of gynecological and obstetric health care are the cornerstones of current strategies to reduce adverse pregnancy outcomes in Africa.

Despite the efforts of many global health players, data from the World Health Organization (WHO), the Global Health Observatory (GHO) 2015 data, and the United Nations Millennium Development Goals 2015 report show that pregnancy-related complications are still the leading causes of death amongst women in the reproductive age group in developing countries With 44% of its population aged below 15 years of age, sub-Saharan Africa, of which Zimbabwe is one, is the youngest region in the world but research in the adolescent period is largely neglected both from a medical and public health perspective. Very few epidemiological studies in Africa focus on this very important period of life. There is also a lack of targeted public health programs addressing the most important challenges for adolescent health and well-being (WHO, 2015).

The risk of a woman in a developing country dying from a maternal-related cause during a lifetime is about 33 times higher compared to a woman living in a developed country

even though most of these complications are preventable with improved access to quality health care service (WHO, 2015).

Teenage pregnancy is often not the result of a deliberate choice, but usually is caused by the absence of choices which include little or no access to schooling, lack of information that positively influence behavior or quality health services, and lack of empowerment, among others. According to some studies in some parts of the world, most notably in sub-Saharan Africa, 35% of pregnancies among adolescents are unplanned or unwanted and resulted due to unsafe sexual practices and lack of awareness on results and risks of early sexual debut (Mchunu, Peltzer, & Tutshana, 2012)

Complications during pregnancy and child birth are the leading cause of death for 15 to 19 year-old girls globally. International studies have shown that early child bearing is the biggest challenge to young people, as it is associated with increased vulnerability to poor health as well as a long lasting impact on social, livelihood, education, physical, mental health, including risks of maternal death (WHO, 2016).

Teenage pregnancy is often not the result of a deliberate choice, but rather the absence of choices which include little or no access to schooling, lack of adequate information that positively influence behavior or quality health services, and lack of empowerment, among others. Adolescent mothers aged 10 to 19 years face higher risks of eclampsia, puerperal endometritis and systemic infections than women aged 20 to 24 years (WHO, 2016).

Sexual and reproductive health is arguably among the most vital health challenges for adolescents in sub-Saharan Africa.

Parenting at any age can be challenging, but is especially difficult for adolescent parents. Childbearing during adolescence negatively affects the parents, their children and society. Compared with their peers who delay childbearing, teen girls who have babies are less likely to finish school, more likely to be poor as adults and more likely to have children who have poorer educational, behavioral and health outcomes over the course of their lives than do children born to older parents as has been shown (Hoffman & Maynard, 2008). There is also a vicious cycle of malnutrition that occurs when a malnourished teenage mother gives birth to a malnourished baby, who grows up to be a malnourished child into a malnourished teenager who if she becomes pregnant early, will again give birth to a malnourished baby (UNICEF, 2014).

A crucial question to be asked relates to whether the adverse outcomes experienced by some mothers and children of teenage pregnancies are causally related to the age of the mother, or whether there are other intrinsic and extrinsic factors which lead to the adverse outcomes experienced by teenage mothers and their children. Several studies have found that teenage pregnancy is associated with adverse outcomes for both mother and baby. These include low birth weight, prematurity, increased perinatal and infant mortality and poorer long term cognitive development and educational achievement for both mother and child according to a study (Fraser, Brockert, & Ward, 1995).

However, studies which have aimed to address the underlying causes of these adverse outcomes by controlling for additional factors have produced conflicting results. Some suggest that adverse outcomes remain even after controlling for maternal socio economic status and other confounding factors, some find that age has no effect, whereas other studies report that once maternal socioeconomic position and smoking are taken into account young age is actually associated with better outcomes according to a study (Reichman & Pagnini, 1997).

1.2 Background to the Study

Adolescent pregnancies are a global health problem that occurs in high, middle, and low income countries. Around the world, adolescent pregnancies are more likely to occur in marginalized communities, commonly driven by poverty and lack or very low levels of education and employment opportunities (UNFPA, 2015). Each year, an estimated 21 million girls aged 15 to 19 years and 2 million girls aged below 15 years become pregnant in developing countries. Approximately 16 million girls aged 15 to 19 years and 2.5 million girls under the age 16 years give birth in developing regions (Darroch et al., 2016) of which Zimbabwe is one.

Each year 4.4 million children, including 1.2 million newborns and 265 000 mothers die in sub-Saharan Africa which translates to 13 000 deaths per day or almost nine deaths every minute. Sub-Saharan Africa, of which Zimbabwe is one, has half of the world's

maternal, newborn and child deaths despite being home to just 11% of the world's population. Pregnancy and child birth complications, newborn illness, child hood infections, malnutrition ad HIV/AIDS are the five biggest challenges for maternal, newborn and child health in sub-Saharan Africa (Kinney et al., 2010).

In Zimbabwe 62% of the population is made up of youths of which 17% of the youth population aged between 15 and 19 years are already mothers (Zimbabwe National Family Planning Council [ZNFPC], 2018). There is a growing concern about the multiple consequences of teenage child bearing particularly in sub-Saharan Africa where teenage pregnancy rates are the highest in the world as cited by UNFPA (2015). Worldwide, the rate of teenage pregnancy ranges from 143 per 1 000 in some sub-Saharan African countries to 2.9 per 1 000 births in South Korea (UNFPA, 2015).

Mutoko district has experienced a surge in teenage pregnancies in recent years. The district has a total population of 156 668 people of which 80 527 are the female population. Women of child bearing age are 39 324 with expected pregnancies of 5 013. Teenagers, who are less than fifteen years of age are 62 981 of the total district population according to projections from the 2012 national census. Among this age group is where teenage pregnancies are happening on an upward trend each year.

In developing countries like Zimbabwe, the upward trend in teenage pregnancy rates has been attributed to widely accepted early age of marriage which is usually due to religious

beliefs and cultural permissiveness, low socioeconomic status of parents, lack of knowledge on the part of teenagers, and or ineffective use of contraceptives and family instability and disorganization which may be caused by poverty. The unmet need for contraception is another big factor to teenage pregnancy as teenagers are afraid to be seen asking for such services as it is considered taboo by the community (Were, 2007).

1.3 Statement of the Problem

In Mutoko District, according to the District Health Information System 2 (DHIS 2), 51 girls under the age of 16 gave birth in 2017 at a health facility and the number increased to 74 in 2018. This number is not inclusive of the 16 to 19 age group who are also at risk through early pregnancy. This number also excludes teenage pregnant mothers who do not seek medical attention due to religious reasons where child marriages are rampant. This is a cause for concern with the associated increased complications of eclampsia, puerperal endometritis and systemic infections attributed to pregnancies in the less than 19-year-old age group. The research sought to find out if teenage mothers in Mutoko are succumbing to the adverse birth and obstetric complications associated with this age group.

1.4 Research Objectives

Broad objective

The broad objective of the study was to establish the health outcomes associated with teenage pregnancies in Mutoko District in 2018.

Specific Objectives

The study sought specifically to:

1. To explore linkages to care like antenatal care visits for teenage pregnant mothers and the associated barriers at Mutoko District Hospital.
2. To describe the health outcomes of teenage mothers giving birth at Mutoko District Hospital.
3. To describe the birth outcomes like low birth weight, Apgar score and pre-term delivery of babies of teenage mothers giving birth at Mutoko District Hospital in 2018.

1.5 Research Questions or Hypothesis

1. What are the linkages to care and the associated barriers for teenage mothers giving birth at Mutoko District Hospital?
2. What are the health outcomes experienced by teenage mothers and their babies at Mutoko District Hospital?

1.6 Significance of the study

Teenage pregnancy is associated with a number of complications for both mother and baby which include maternal and infant mortality, pre-term labour, low birth weight

babies, anemia, preeclampsia and systemic infections. There are various factors that have been linked to teenage pregnancy which include inadequate access to health and reproductive services, poverty, inadequate knowledge about sex and the related consequences and cultural permissiveness. Since teenage pregnancy is also experienced in Mutoko District, with an increasing trend in recent years, the study seeks to find out the extent of the problem, the associated linkages to care and their barriers and its associated health outcomes for future interventions.

1.7 Delimitation of the study

The study was conducted at a rural district hospital in Zimbabwe and the findings can be extrapolated for the other 8 district hospitals in Mashonaland East province as they are also all rural hospitals.

1.8 Limitations of the study

Mutoko District Hospital maternity department has a very busy ward which is always full to capacity and hence to accommodate all patients, clients who would have given birth without any complications are discharged within 24 hours of delivery instead of the recommended 72 hours. This meant complications that occurred after the one-day stay in the hospital were not captured in the study.

1.9 Summary

This study seeks to explore linkages to care like antenatal care visits for teenage pregnant mothers and the associated barriers and also find out the health outcomes of

teenage mothers and their babies who gave birth at Mutoko District Hospital in the year 2018. Specific and strategic interventions are informed by research and this research seeks to provide that information. This chapter focused on the introduction to the study, the statement of the problem, the objectives and research questions as well as the limitations and delimitations to the study.

Chapter 2 Review of Related Literature

2.1 Introduction

This chapter will look at the various aspects of the topic with special emphasis on the different care services offered for teenagers and the related barriers and the different health outcomes for both the teenage mother and her baby. The occurrence of teenage pregnancies and the associated factors will also be expanded on in this chapter.

2.2 Theoretical framework and variables

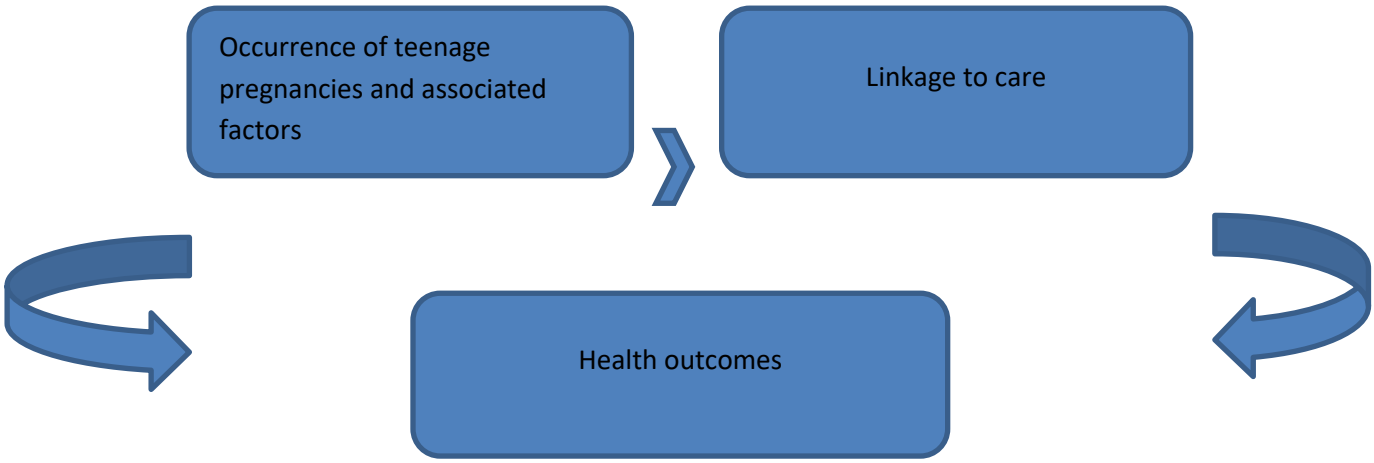

Figure 1: Conceptual framework for teenage pregnancy health outcomes

2.2.1 Occurrence of teenage pregnancies and associated factors

Improving maternal and neonatal health is among Africa's most urgent challenges in public health and this is also especially so in sub-Saharan Africa. The higher levels of maternal and neonatal morbidity and mortality in these countries are derived from a number of causes which include malnutrition and micronutrient deficiencies, endemic

infectious diseases, gynecological and obstetric complications with suboptimal antenatal and perinatal care as well as often inadequate post-natal care caused by a lack of adequate financial and logistic resources.

Despite different interventions to reduce teenage pregnancies and their related adverse health outcomes, ninety-five percent of the 16 million adolescent pregnancies that occur each year are in low- and middle-income countries (LMICs) according to (WHO, 2015), and this is where the burden of small gestational age (SGA) and stunting is concentrated as described in a study (Lee et al., 2010).

Some different factors have strongly influenced the teenage pregnancy rate in recent decades. The first factor is the declining age at menarche with historical data from the United States and several European countries showing a clear secular trend, with age at menarche declining at a rate of 2–3 months per decade since the 19th century, resulting in overall declines of about 3 years. This decline in the age of menarche is attributed mostly to improved health and nutrition. The second factor is that the first sexual debut is initiated at a much younger age. The youth risk behaviour study (YRBS) suggested that almost one-half of the United States high school students have had sexual intercourse in their lifetime, while ∼7% initiated sexual intercourse before the age of 13 years (Centres for Disease Control [CDC],2001).

The third factor is the low rate of use of contraception among teenagers. Although knowledge and use of contraception has been increasing globally, many teenagers have inadequate protection against pregnancy and contraception use among teenagers is still very low. For example, in 2005, only 51.8% of adolescents consistently used contraception in Italy and the figure is much less in Africa. This may be related to less education awareness about contraception, and less access to contraceptives and emergency contraception (UNFPA, 2015).

The WHO Multi-Country Survey of Maternal and Newborn Health has authors of one paper reporting higher rates of various pregnancy and childbirth outcomes (including low birth weight) in adolescents aged 10–19 years, compared with young adults aged 20–24 years, and concluded that 'interventions are crucial to reduce adverse pregnancy outcomes among adolescent women in low to medium income countries'. A study examining the economic and social consequences of teen pregnancy study (Hoffman & Maynard, 2008) discovered that compared with their peers who delay childbearing, teen girls who have babies are more likely to have children who have poorer educational, behavioral and health outcomes over the course of their lives than do children born to older parents (Hoffman & Maynard, 2008).

The increased risk of adverse birth outcomes in pregnant adolescents compared with pregnant young adults could be due to the fact that adolescents are smaller because they are still growing. 'Nutrient partitioning' occurs in which there is competition for nutrients

between the still growing adolescent mother and her rapidly developing fetus which may result in the growth and development of the mother and/or fetus being compromised. Additionally, optimal fetal development could be traded off as a result of gynecological immaturity in adolescence to allow for safe delivery. This can result in a malnourished mother and a low birth weight baby.

Young maternal age characterized by teenage mothers is probably a marker for one or more postulated that young maternal age was associated with adverse neonatal outcomes, particularly other maternal risk factors associated with adverse birth outcomes rather than only an indication of incomplete maternal growth who saw an increased incidence of low birth weight which is a weight less than 2500g at birth, and neonatal mortality. Very young teenage mothers below the age of 15 years and multiparous adolescents were also found to be particularly at risk (McAnarney, 1987).

There is a controversy on whether the observed association between teenage pregnancy and adverse birth outcomes simply reflects the deleterious socio demographic environment that many pregnant teenagers line in or whether biological immaturity is also causally related. In a study (Mahfouz, el-Said, al-Erian & Hamid, 1995) thought that pregnant teenagers were not a high-risk group if good prenatal care was provided. In a study (Jurisicova, Rogers, Fasciani, Casper & Varmuza, 1998) found that young maternal age was not an independent risk factor for adverse birth outcomes. The increased risk probably was attributable to other factors that were related to teenage pregnancy such as

being black, unmarried, low socioeconomic status and inadequate prenatal care (Jurisicova, Rogers, Fasciani, Casper & Varmuza, 1998).

According to a study (Satin et al., 1994) teenage pregnant mothers aged between 16 and 19 years had no risk for intrinsic maternal youth and the obstetric risk increased only in teenage mothers less than 16 years of age, while (Fraser et al., 1995) suggested that young age conferred an increased risk of adverse pregnancy outcome that was independent of important confounding socio demographic factors which was intrinsic to maternal youth (Fraser et al., 1995).

2.2.2 Vulnerability of teenagers

Adolescent girls and young women are also especially vulnerable to contracting the human immuno deficiency virus because of a number of issues. These adolescents enter into marriage early and studies show that 15 million girls are married before 18 years of age every year and 90% of births aged 15-19 years occur within marriage. Because of early pregnancy, most of these girls do not complete their education which adversely affects their future economic situation. In sub-Saharan Africa, 75% of girls start primary education but only 8% finish secondary school. Teenagers are 6 times more likely to be a child bride without secondary education (UNAIDS, 2017).

There is poor access, uptake and use of contraception among teenagers. This particularly exposes them to HIV infection as 65% of new HIV infections in the 10-24-year-old age

group are reported to be in the adolescent group as highlighted by the UNAIDS fact sheet on HIV and children (2017).

Pregnancy prevention in adolescents is especially difficult because of the unmet need for modern contraception in this age group which is projected at 23 million girls aged 15 to 19 years in developing regions of which Zimbabwe is one. Half of all adolescent pregnancies are unintended and this could be a result to barriers to contraception use by this age group. The most common barriers are health care worker bias and lack of adolescent friendly services, restrictive laws, sexual violence and adolescent knowledge, transportation, stigma and pressure to have more children according to the World Health Organization pregnancy fact sheet (2018).

2.2.3 Immaturity and its effect on pregnancy

Some studies have suggested that a young gynecological age which is conception within two years after menarche and the effect of a teenager's becoming pregnant before her own growth has ceased might be associated with the increased risk of adverse outcomes in teenage pregnancy. Immaturity of the uterine or cervical blood supply in teenage pregnancy could increase the risk of subclinical infection and prostaglandin production, and lead to increased risk of pre-term delivery. Teenage mothers who themselves continued to grow during pregnancy could compete with the developing fetus for nutrients, which has been supported by some studies that weight gain during pregnancy

might be more critical for teenage mothers than for older mothers as this may ensure the birth of a normal baby (Hediger, Scholl, Belsky, Ances & Salmon, 1989).

Studies in Bangladesh and Mexico have suggested that adolescent girls aged 12–19 years and 13–17 years, respectively stop growing in response to pregnancy: the change in height (from the first trimester to six months postpartum in the study from Bangladesh, and from <20 weeks of gestation to one month postpartum in the study from Mexico) was approximately zero in pregnant adolescent girls, but was positive and significant in non-pregnant adolescent girls matched on age and menarcheal age as cited in a study (Casanueva, Rosello-Soberon, De-Regil, Arguelles & Cespedes, 2006) as well as the study (Rah, Christian Shamim, Arju, Labrique & Rashid, 2008).

An assumption often made is that the increased risks of obstetrical disorders associated with teenage pregnancies are due to social factors and inadequate ante natal care, rather than maternal age per se. In 1990, the National Center for Health Statistics in Atlanta, Georgia concluded from a decade-long study (1976–1986) that the risk of both preeclampsia and eclampsia sharply increases in pregnancies in women under the age of 20 years and hence called for improved antenatal care for teenagers so that they could have better gynaecological and obstetric outcomes as postulated in a study (Saftlas, Olson, Franks, Atrash & Pokras, 1990).

A similar call for better antenatal and social care for adolescent mothers was made in Europe after a study on the evaluation of the social surroundings, ante natal care, intra partum surveillance and perinatal outcome (Orvos, Nyirati, Hajdú, Nyári & Kovács, 1999). They deduced that teenage mothers need improved prenatal care and increased observation when they are in labour. The study also recommended for the improvement of the social environment of adolescents and the prevention of teenage pregnancies (Orvos, Nyirati, Hajdú, Nyári & Kovács, 1999).

Others, however, pointed to biological immaturity in very young mothers as the cause of adverse pregnancy outcome. In a study (Frisancho, Matos & Bollettino, 1984) of 412 Peruvian mothers aged between 13 and 15 years, the subjects were classified as either still growing or growth completed, based on anthropometric measurements of their mothers which included height and mid upper arm circumference. They found a significant reduction in birth weight among still-growing adolescents, which they attributed to decreased net availability of nutrients and/or placental insufficiency (Frisancho, Matos & Bollettino, 1984).

Although poor outcomes in teenage pregnancies have been traditionally attributed to the biological immaturity of the young mothers, the role of young maternal age in adverse pregnancy outcomes is controversial. A large body of evidence suggests that the observed association between adolescent pregnancy and poor perinatal outcomes is confounded by the social and economic conditions of poverty faced by the young mothers. The social

determinants of health (SDOH) perspective have been extensively used to frame adverse teenage pregnancy outcomes mediated by social inequalities. The World Health Organisation (WHO) defines social determinants of health as 'conditions in which people are born, grow, live and age'.

2.2.4 Social determinants of health

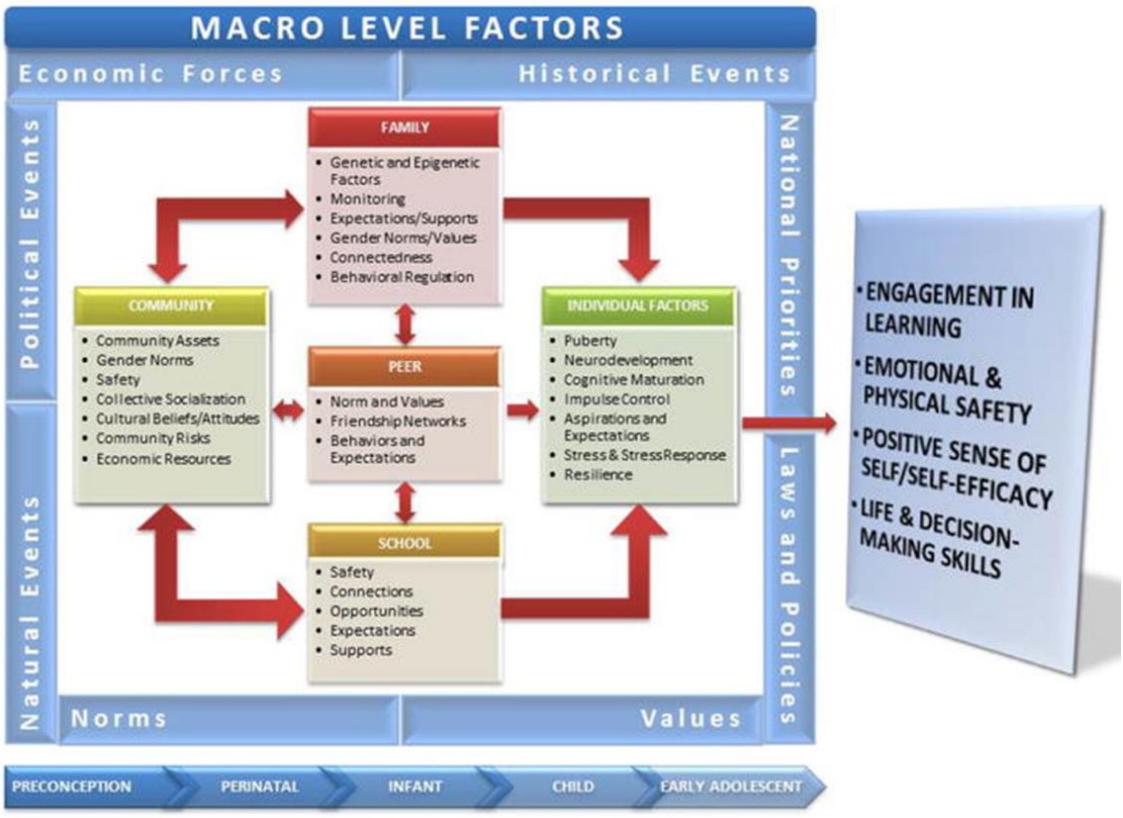

Figure 2: A conceptual framework for healthy early adolescence

The Ottawa Charter was the first to recognize the role of broad societal conditions on population health. It recognized that complex interconnected societal resources such as education, employment opportunities and community networks shape social hierarchies and the resulting health disparities. Societal factors at macro level like neighborhood poverty and socio economic disadvantage have been repeatedly linked with poor teenage pregnancy outcomes (Sana et al., 2018).

The health of adolescents is strongly affected by social factors at personal, family, community, and national levels. The national level present young people with structures of opportunity as they grow up. The way that social determinants of health affect adolescent health are crucial to the health of the whole population and the economic development of nations since health and health behaviors correspond strongly from adolescence into adult life. During adolescence, developmental effects related to puberty and brain development lead to new sets of behaviors and capacities that enable transitions in family, peer, and educational domains, and in health behaviors. These transitions modify childhood trajectories towards health and wellbeing and are modified by economic and social factors within countries, leading to inequalities (Sana et al., 2018).

The strongest determinants of adolescent health worldwide are structural factors which include national wealth, income inequality and access to formal education. Furthermore, safe and supportive families, safe and supportive schools together with positive and supportive peers are crucial to helping young teenagers develop to their full potential and

attain the best health in the transition to adulthood. Improving adolescent health worldwide requires a concerted effort which includes improving young people's daily life with families and peers and in schools, addressing risk and protective factors in the social environment at a population level, and focusing on factors that are protective across various health outcomes. The most effective interventions are probably structural changes to improve access to education and ensuring that the teenagers stay in school and employment for young people and to reduce the risk of transport-related injury as postulated in a study (Viner et al., 2012).

Recent research evidence shows that traditional approaches to reducing teenage pregnancy rates such as providing sex education and better sexual health services are not effective on their own (Henderson et al., 2007). This evidence has generated increased interest in the effects of interventions that target the social disadvantage associated with early pregnancy and parenthood. Social disadvantage refers to a range of social and economic difficulties an individual can face such as unemployment, poverty and discrimination. Social disadvantage is distributed unequally on the basis of socio-demographic characteristics such as ethnicity, socioeconomic position, educational level, and place of residence (Henderson et al., 2007).

The PROGRESS-Plus framework as recommended by Campbell and Cochrane Equity Methods Group is usually used as the conceptual model for assessing the social determinants of health. PROGRESS is an acronym for place of residence, race,

occupation, gender or sex, religion, education, socio-economic status (SES), and social capital as highlighted in a study (O'Neill, Tabish & Welch, 2014). These categories highlight the multidimensional factors that influence potentially avoidable health inequalities across communities. The PROGRES-Plus framework outlines that social determinants of health are the basis of the creation of social hierarchies and distinctions between privileged and disadvantaged groups (O'Neill, Tabish & Welch, 2014).

In Malaysia in a study done in 2008 by Sulaiman S on obstetric and perinatal outcome in teenage pregnancies, the birth rate for 15 o 19-year-old was an alarming 12.7/1000 population. Factors that may have contributed to this problem are lack of education and information about reproductive and sexual health, lack of access to ways to prevent pregnancy, adolescent sexual behavior and even certain customs and traditions which may have been widely accepted by the community (Sulaiman, 2008).

The underdeveloped pelvis in younger adolescents can mean that they have more difficulties in child birth than adult or mature adolescents who have fully developed bone structure. Research also indicate that pregnant adolescents are less likely to seek health services and receive ante natal care, only seeking it only in the third trimester if at all. Low birth weight in the Malaysia study was linked to non-utilization of ante natal care rather than biological age.

In a study entitled Adolescent pregnancy and associated factors in South African youth (Mchunu, Peltzer, Tutshana & Seutlwadi, 2012), the results showed that 19.2% of the female youth said that they had an adolescent pregnancy, while 5.8% of male youth indicated that they had impregnated a girl when they were an adolescent (12-19 years), of the female population, 16.2% of them indicated that they ever had an unwanted pregnancy and 6.7% had ever terminated a pregnancy. In multivariable analysis among women it was found that being employed or unemployed, greater poverty, having higher sexually permissive attitudes and scoring higher on the contraceptive or the condom use index was associated with adolescent pregnancy, and among men wanting the pregnancy and having a sense of the future were associated with adolescent pregnancy (Mchunu, Peltzer, Tutshana & Seutlwadi, 2012).

In another study of seven countries in South Asia, most of which were related to Nepal, Bangladesh, India and Sri Lanka, socio-economic factors, low educational attainment, cultural and family structure were all consistently identified as risk factors for teenage pregnancy. The majority of teenage girls were reported to have basic knowledge on sexual health. However, very few of them had used the knowledge into practice. Both social and medical consequences of teenage pregnancies are reported consistently along most of the studies. Utilization of health services, which is a protective factor, remains low and consistent maybe due to social stigma. However, teenagers agreed to delay the indexed pregnancy if they would know its consequences.

2.2.5 Acceptability of teenage pregnancy

Child marriage and early confinement is a long established and accepted custom in India, with poverty and ignorance magnifying the problem according to a study (Nitwe, 2012) entitled Teenage pregnancy: A health hazard. In India, teenage pregnancies after marriage, in contrast to unwed pregnancies in developed countries, have social approval but have an adverse impact on maternal mortality and perinatal morbidity. Several medical complications like preterm birth, poor maternal weight gain, pregnancy-induced hypertension, anemia, and sexually transmitted diseases are strongly associated with teenage pregnancy. Preserving the health of women has been given high priority in the Reproductive and Child Health Program of India as well as that of many developing countries of which Zimbabwe is one (Atwood & Hussain, 1997).

In India, early marriage is perpetuated by traditional beliefs regarding preserving a girl's chastity and family needs to reduce expenditure and these women actually pay their husband's families what is known as dowry upon marriage as explained in a study (Atwood & Hussain, 1997) on adolescent motherhood. Teenage pregnancy is therefore coming up as one of the most important social and public health problems. A large proportion of adolescent girls in rural areas being illiterate are not aware of the different family planning methods they can use, and even if they are aware they do not have easy access to family planning services or fail to utilize them due to inhibitions or pressure to attain motherhood to satisfy their mothers in law or husbands as having children is highly regarded in society. (Atwood & Hussain, 1997)

Pregnancy in very young women is generally considered to be a very high risk event, because teenage girls are physically and psychologically immature for reproduction. In addition, there are some extrinsic factors such as inadequate prenatal care, illiteracy, and poor socio-economic conditions that affect the outcome of pregnancy in teenage girls as posited by Bhaduria (1991) in his study entitled Teenage pregnancy: A retrospective study. Knowing the burden of pregnancy in teenagers will go a long way in advocacy and devising appropriate intervention measures (Bhaduria, 1991).

In contrast to the India experience, teenage pregnancy in developed countries usually occurs outside marriage, and in many communities and cultures carries a social stigma. In one study in Kuala Lumpur, Malaysia, (Sulaiman, Othman, Razali & Hassan, 2012) the majority of teenage mothers were over 18 years old and were married and lived with their husbands or parents. These girls tended to fall into the group who attended several ante natal care visits and this proved to have a positive impact on the health outcome of both mother and baby (Sulaiman, Othman, Razali & Hassan, 2012).

Most continental West European countries have very low teenage birth rates and this has been attributed to good sex education, high levels of correct contraceptive use, traditional values and social stigmatization of teenage pregnancy. Clear differences exist between those from advantaged backgrounds and those from a disadvantaged background in terms of their attitudes towards abortion and teenage pregnancy. Much of the difference could

be accounted for by the ways in which the young women view their future prospects, with the advantaged women putting much greater emphasis on the importance of having a career, university, money and personal development and independence (Jewell, Tacchi & Donovan, 2000).

Most disadvantaged women felt that the best age for starting a family was between 17 and 25 years whilst they were still young, whereas the advantaged women felt it should be rather later, in their late twenties or early thirties. The two groups, the advantaged and the disadvantaged groups revealed striking differences in attitudes to teenage pregnancy in general. Although early motherhood was less acceptable as an option for advantaged women, their attitude towards those who become young mothers was often tolerant and described them as brave according to a study in the United Kingdom (Jewell, Tacchi & Donovan2000).

2.2.6 Youth friendly care services

Teenagers are unique. They need quality health services that recognize that they want to have a say in decisions about their health, respect their privacy, do not treat them like children and may not want their parents to know. The health services must be accessible, acceptable, equitable, appropriate and effective as posited in a study (Lisa & Abuogi, 2018). Youth friendly health care services are those that attract young people, respond to their needs, and retain the young clients for continuing care. In contrast to being based only on what the health care providers believe the youth need, youth friendly health

services re based on a comprehensive understanding of what young people want and need (Lisa & Abuogi, 2018).

For developmental as well as epidemiological reasons, young people need youth-friendly models of primary health care. Over the past two decades, much has been written about barriers faced by young people in accessing health care. Worldwide, initiatives are emerging that attempt to remove these barriers and help reach young people with the health services they need. The goal of youth friendly services is to provide all young people with services they trust and which they feel are designed for them. Key components of youth-friendly health care services include providing accessible location and hours, creating a warm and respectful environment, maintaining confidentiality, ensuring opportunities for private conversations, providing age-appropriate explanations for adolescents to give informed consent for services, offering comprehensive services and encouraging youth to involve parents/guardians while respecting their privacy.

Young people in Zimbabwe have a need for sexual and reproductive health information and services that is not currently being met. Efforts to improve young people's health should include the provision of youth-friendly primary care services; the International Conference on Population and Development Plan of Action, the Maputo Plan of Action and the World Health Organisation (WHO) have called for the development of these services worldwide, and their provision has been defined as a key goal for reducing the vulnerability of youth to HIV and AIDS according to the African Union Commission

(2006). Whilst there are some examples of successful, small-scale youth-friendly services worldwide, these projects often have limited coverage or limited periods of implementation or follow up.

To generate significant improvements in young people's use of health services, and in their sexual and reproductive health, such interventions will need to be scaled up and implemented over longer time frames whilst at the same time providing a wide range of different services. This reinforces the need for evidence on the sustainability of youth-friendly health services interventions, on barriers to and facilitators of the scale-up and implementation of these interventions, and their impact on young people's health and use of health services. Fear of judgmental attitudes of healthcare workers has been reported as a barrier to young people's use of a range of health services in South Africa in a study (Alli, Maharaj & Vawda, 2013) on interpersonal relations between health care workers and young clients.

The interpersonal relations between health care providers and young clients have long being cited as an important element for improving client up take of services, satisfaction and overall health outcomes. In an era of HIV and AIDS and in the special case of teenage pregnancy, this important relationship forms a critical determinant to young people accessing sexual and reproductive health care. While young people are aware of the importance of making use of STI, HIV and family planning services, they experienced

barriers in their relationship with providers. This served as a deterrent to their accessing and use of the health facilities.

Adequate training in interpersonal relations for youth-friendly service provision is essential in helping overcome communication problems and enabling providers to interact with young clients at a more personal level and hence avoiding judging or shunning them (Tylee, Haller, Graham, Churchill & Sanci, 2007).

Two main barriers were reported to the provision of youth friendly health services in different studies in Zambia and Tanzania. All health workers interviewed identified lack of staff training on how to provide youth-friendly health services and five of the eight suggested that young people need a dedicated space at the clinic, as reported by other studies (Mmari & Magnani, 2003). The finding that facilities where some staff had received training in Youth Friendly Services still identified limited numbers of trained staff as a barrier to implementing this programme, indicates a need to train more, or ideally all, healthcare workers in each health facility (Mmari & Magnani, 2003).

All health facilities under the study also reported providing health services to young people and maintaining confidentiality, however, at half of the clinics, the right of the adolescents to legally access health services without parental consent from 12 years of age was not being upheld and breaches of confidentiality to parents were reported in two interviews with health workers feeling that the parents had the right to know what was

going on with their children in regards to their health and well-being. Health workers should be trained on client centered care and knowledge imparted on policies supporting the sexual and reproductive health rights of adolescents.

Lack of privacy at health facilities whilst seeking health care services was seen as another major barrier to adolescents seeking and accessing reproductive health services. Whilst a lack of space can affect service delivery for all ages by limiting privacy, these facilities and many rural as well as some urban health facilities in South and sub-Saharan Africa are small and have a relatively low patient throughput and hence are hardly ever over crowded. The need for a separate youth friendly space is therefore unlikely to be justifiable, feasible or necessary. However, lack of clean, piped water, at some health facilities, should be addressed to facilitate the provision of hygienic health services. Judgmental attitudes in relation to young people's sexual activity were identified and they were branded as loose and naughty which then deterred some from seeking services there (Mmari & Magnani, 2003).

2.2.7 Effective referral systems for teenagers

An effective referral system is very important in the success of youth friendly services. A referral system is a set of resources and processes designed to increase youth awareness of school based like the school health programs and community based health service providers like local clinics and village health workers or community based health promoters, increase referral of youth to school based and community based health service

providers and increase the number of adolescents receiving youth friendly health care services.

The different types of services to consider including for an affective youth friendly referral system include reproductive health services like family planning, sexually transmitted infections testing and treatment, mental health eg on depression and suicide, primary care like wellness checks and immunizations like human papilloma virus vaccinations, substance abuse and also non health care services like housing, education and job training according to the Centre for Disease Control guidelines on providing teen friendly health services.

Young motherhood in teenagers results in up to 33% of girls who drop out of school and they lack social and counseling support to return to school. The pressures of the new situation the teenagers find themselves in leads to mental health issues with increased distress and this puts them at an increased risk for depression. Repeat pregnancies may also quickly follow because of lack of contraception and social pressure to have more children.

To help prevent adverse outcomes of pregnancy, the World Health Organization recommends that all pregnant women should attend at least four ante natal care visits as a minimum with a skilled attendant throughout pregnancy, commencing as early as possible in the first trimester. Zimbabwe adopted this guideline and it was the one in use

in 2018. Free primary health care (PHC) services are provided for pregnant women and children under five years in all public health facilities throughout the country to provide quality health service that is equitable and more accessible to everyone under the Result based financing programme.

In a study entitled Maternal and child health programme effectiveness evaluation at John Taolo, Gaetswe District (Worku, 2015), it was found out that despite increased health facility coverage in the country, many of the ante natal care visit opportunities were missed, particularly by teenage pregnant women. Late ante natal care booking by teenage mothers was also very common and there was concern on how to strengthen the ante natal care uptake as recommended in the national guidelines. Previous studies elsewhere indicated that late booking and inadequate number of ante natal care visits were caused by multiple factors and expose pregnant women to higher pregnancy related risks and complications (WHO, 2015).

The practice of family planning is still very limited in the adolescent group. Most adolescent girls in rural areas, in addition to being illiterate are not aware of family planning methods, and even if they are aware they do not have easy access to family planning services or fail to utilize them due to inhibitions or pressure to attain motherhood to satisfy their mothers-in-law or husbands as described by a study (Pathak, 1993). Childbearing has been on an upward increase in rural areas and its decline has stalled in

urban areas in Zimbabwe with rural adolescents giving birth at twice the rate of urban adolescents.

Across countries and cultures, especially in the low to medium income countries, women have been victims to social pressure and are often in a position to neither regulate their pregnancy nor make decisions regarding their reproductive performance. Husbands and mothers-in-law are the primary decision-makers. In many cases, this decision making structure appears to be driven by a woman's lack of economic independence. Even access to the most effective services is highly dependent on the involvement of influential family members, which usually leaves out the adolescent mothers according to an analysis (Elul, Bracken, Verma, Singhi & Lockwood, 2011) on unwanted pregnancy and induced abortion in Rajasthan, India. As a result, early pregnancy and its complications continue to remain highly prevalent.

2.3 Health outcomes

There are many documented adverse health outcomes of teenage pregnancies both for mother and baby and some are sited below:

Complications from pregnancy and child birth are the leading cause of death for 15-19 year old girls globally

Higher risks of				
Eclampsia	Sepsis	Low birth weight	Preterm delivery	Severe neonatal conditions

Fig 2: Pregnancy and child birth outcomes among adolescent mothers

The concern about adolescent pregnancies stems from the well documented fact that they exhibit well known negative health and socioeconomic consequences. Several medical complications like preterm birth, poor maternal weight gain, pregnancy-induced hypertension, anemia, sudden infant death syndrome, low birth weight babies cephalopelvic disproportion and sexually transmitted diseases are strongly associated with teenage pregnancy. Teenage mothers also have a higher analgesia requirement according to a study (Ezegwui, Ikeako & Ogbuefi, 2007). It also adversely affects the status of women. Preserving the health of women and their children has been given high priority in most Reproductive and Child Health Programs of many countries (Ezegwui, Ikeako & Ogbuefi, 2007).

Teenage pregnancies are a common public health concern, in both developed and developing countries but more so in developing countries where health care services are not adequate. Adolescent pregnancy increases the risk of pregnancy complications, low birth weight (LBW), and infant mortality. Complications include urinary tract infections,

acute pyelonephritis and preeclampsia. Obstetric complications include pre-term labor, cephalopelvic disproportion, anemia, fetal distress, premature rapture of membranes (PROM), abnormal presentation, placenta previa, preeclampsia, multiple gestation and post-partum hemorrhage (PPH).

In literature in general, some authors demonstrated an increase in maternal and fetal complications at all stages of the gestational cycle among adolescent mothers. In some studies, observations that the complications associated with adolescent pregnancy most recurrent in literature were more often associated with the newborn than with the mother herself, with a predominance of articles emphasizing prematurity, LBW, and mortality was demonstrated.

The occurrence of premature births, low-weight newborns, or infants with very low weight and mortality was significantly greater among babies of adolescent mothers. These complications may be correlated with the low number of prenatal visits, late initiation of prenatal care, inappropriate prenatal care, and other factors, such as race, marital status, low level of schooling, smoking, and poverty. In a study (Santos, Amorim, Costa, Oliveira & Guimarães, 2012) observed a relation of the LBW with pre-gestational weight, pre-gestational body mass index, and gestational weight gain.

Supplementary literature suggests that the socioeconomic and cultural environments in which the young mother is inserted are associated with the increased frequency of low-

weight and premature newborns. Additionally, it is known that prenatal care tends to be inadequate among adolescent mothers which shows the importance of prenatal visits to decrease complications of pregnancy in this age group.

2.3.1 Low birth weight

Low birth weight is a birth weight below 2500g of the fetus or newborn after birth, preferably measured within the first hour of life before significant postnatal weight loss has occurred. Low birth weight can be caused by pre-term birth, which is birth before 37 completed weeks of gestation, or of restricted fetal (intrauterine) growth. Restricted fetal growth results in small for gestational age babies that are babies born with birth weight below 10^{th} centile for that gestation, both of which factors are associated with adolescence.

Some low birth weight babies are born early, some are born growth-restricted, and others are born both early and growth-restricted. It is generally recognized that being born with low birth weight is a disadvantage for the baby. Majority of low birth weight babies are born premature. Preterm birth is the main cause of death, morbidity, and disability.

A recent publication of the Consortium of Health Orientated Research in Transitioning Societies group found that adolescent pregnancy which are ages ≤ 19 years, compared to young adulthood pregnancy which are ages 20–24 years, was associated with a 1.46 increased risk of stunting at age 2 years and higher adulthood fasting glucose

concentrations in the offspring which is a predisposing factor to diabetes. The majority of risk factors for teenage pregnancy have differential effects on birth weight depending on the level of the associated factors. For example, low maternal age and low pre-pregnancy body mass index are associated with both increased risk of low birth weight and poor infant survival.

In the study (Radha, 2013) on whether maternal age was a risk factor for low birth weight, it was posited that low birth weight are not only related to the mother's age but also the woman's health behaviors during pregnancy or her biologic characteristics, ethnicity, poverty status, age at menarche, maternal height, net maternal weight gain and smoking during pregnancy (Radha, 2013).

In a study (Donna & Ensminger, 1995) conducted on infants born to United States teenage mothers, the birth weights of infants of mothers aged 14-17 years and 18-19 years were 133g and 54 g less than for infants born to mothers aged 23-25 years. The results indicated that the reduced birth weights of infants born to young mothers, particularly women aged 14-17 years were related to their disadvantaged social environment. There were no maternal age differences in birth weight when adjustments were made for poverty and minority status (Donna & Ensminger, 1995).

In a retrospective study of case records of pregnancies from August 2000 to July 2001 in a government hospital in Sangli, India which is a teaching hospital in a rural setting

with an annual delivery rate of over 3 500 conducted by (Mahavarkar, Madhu & Mule, 2008), girls aged less than or equal to19 years were compared with pregnancy outcomes in older women (19–35 years) in the same hospital. A total of 386 teenage pregnancies were compared with pregnancies in 3 326 older women. Variables under study included socio economic data, age, number of pregnancies, antenatal care and complications, mode of delivery, and neonatal outcomes. The incidence of teenage pregnancy in the study was 10% (Mahavarkar, Madhu & Mule, 2008).

A significant proportion of teenage pregnant mothers were in their first pregnancies. The teenage mothers were nearly three times more at risk of developing anaemia (OR = 2.83, 95% CI = 2.2–3.7, $p < 0.0001$) and delivering pre term babies (OR = 2.97, 95% CI = 2.4–3.7, $p < 0.0001$). Teenage mothers were twice as likely to develop hypertensive problems in pregnancy (OR = 2.2, 95% CI = 1.5–3.2, $p < 0.0001$) and were more likely to deliver through normal vaginal delivery with no significant increase in the risk of assisted vaginal delivery or caesarean section. Young mothers were found to be nearly twice as much at risk of delivering low birth weight babies (OR = 1.8, 95% CI = 1.5–2.2, $p < 0.0001$) and 50% less likely to have normal birth weight babies (OR = 0.5, 95% CI = 1.2–2.9, $p < 0.0001$ (Mahavarkar, Madhu & Mule, 2008)

The outcome of that study showed that teenage pregnancies are still a common occurrence in rural India in spite of various legislations and government programmes aimed at preventing them and teenage pregnancy is a risk factor for poor obstetric outcome in rural

India. Cultural practices, poor socioeconomic conditions, low literacy rate and lack of awareness of the risks associated with teenage pregnancy are some of the main contributory factors. Early booking for ante natal services, good care during pregnancy and delivery and proper utilisation of contraceptive services can prevent the incidence and complications in this high-risk group.

2.3.1.1 Causes of low birth weight

Many studies have showed that childbearing during the adolescence stage carries an increased risk of poor reproductive outcome, including low birth weight, preterm birth and neonatal mortality. There are different explanations proposed for these adverse birth outcomes. They could be biological meaning that a pregnant teenager who is still growing may be competing for nutrients with the fetus inside her body or that pregnancy within two years of a girl starting her period increases the risk of preterm delivery. Psychological factors may also be involved since many teenage pregnancies are unplanned, unwanted or are discovered late in their gestational period. In addition, there also may be selection bias present since teenagers who become pregnant are more likely than others to be poor, to be under educated and to live in areas with limited access to resources and health services.

In addition to pre-existing pregnancy complications suffered by adolescents, it has been suggested that adolescents suffer from hormonal imbalances and deficiencies and together with the physical immaturity this increases uterine irritability and sensitivity to

dehydration, and adversely affect adaptation to the physiologic demands of pregnancy, compromise the growth of the utero-placental vascular bed, and promote maternal development at the expense of fetal well-being leading to low birth weight babies.

According to a study (Dos Santos, Martins & Sousa, 2008) on teenage pregnancy and factors associated with low birth weight, in the analysis of low birth weight as end variable, there was a clear association with low number of pre-natal appointments, late onset of pre-natal visits and lower levels of schooling. This could have resulted in less knowledge by the teenage mothers on how to properly take care of themselves so as to avert giving birth to low birth weight babies (Dos Santos, Martins & Sousa, 2008).

In another study (Dos Santos, Martins & Sousa, 2009) on teenage pregnancy and factors associated with low birth weight, 25.4% of deliveries in adolescents was observed and they presented low level of schooling, no significant other, low number of pre-natal appointments, late onset of pre-natal assistance, low birth weight and prematurity. In the analysis of LBW as end variable, associated to prematurity with an odds ratio of 29, it was clear the association with low number of pre-natal appointments (OR=2.98; 95%CI=2.23-4.00), pre-natal late onset (OR=1.91; 95%CI=1.3-2.6) and low schooling (OR=1.95; 95%CI=1.4-2.5) related to adolescence (OR=1.50; 95%CI=1.1-1.9).

Similar results were obtained when the prematurity variable was excluded. Adolescents showed lower incidence of caesarean section (33.3%) than adults (49.4%), a significant

difference, besides lower association with pre-eclampsia and cephalo-pelvic disproportion (Dos Santos, Martins & Sousa, 2009).

In the study (Ezeqwui et al., 2006), the complications most observed in teenage pregnant mothers were similar to observations made by previous authors from previous studies who cited an increase in the prevalence of caesarian sections, anemia, eclampsia, undiagnosed sexually transmitted infections, higher incidences of induction during labour and delivery, low birth weight and very low birth weight than in babies born to older women. To prevent teenage pregnancy and its complications, the following which include awareness on the fact that one should delay getting married and marry after they reach 20 years, avoidance of pregnancies before the age of 20 years, being alert to find out early complications and to promptly take treatment and to make audits if women or their children die during giving birth (Ezeqwui et al., 2006).

Late preterm newborns are at an increased risk for a number of adverse events, including respiratory distress, hypoglycemia, feeding difficulties, hypothermia, hyperbilirubinemia, apnea, seizures and a higher rate of readmission after initial discharge compared to term infants. In addition, late preterm infants have higher rates of pulmonary disorders during childhood and adolescence, learning difficulties and subtle, minor deficits in cognitive function. They also are at increased risk for acute bilirubin encephalopathy (kernicterus) as well as auditory neuropathy spectrum disorder.

As adults, individuals born preterm and early term have higher blood pressure and more often require treatment for diabetes.

2.3.2 Pre term birth and Apgar score

The Apgar score which was devised in 1952 by Dr Virginia Apgar, is a quick method of assessing the state of the newborn infant. The ease of scoring has led to its use in many studies of outcome and in many maternity homes. Although the Apgar score continues to be a useful tool for reporting the state of the baby and the effectiveness of resuscitation, its most proper use is as a tool for assessing asphyxia and for making prognosis of future neurologic deficit of the new born (Score, 1986).

The Apgar score is comprised of five components: heart rate, respiratory effort, tone, reflex irritability, and color, each of which can be given a score of 0, 1, or 2 and the maximum score a new born can get is 10 (Score, 1986).

Although rarely stated, it is of significant importance to recognize that elements of the score such as tone, color, and reflex irritability are partially dependent on the physiologic maturity of the infant. The normal premature infant may thus receive a low score purely because of immaturity with no evidence of anoxic insult or cerebral depression so that Apgar score will not be truly representative of the new born's condition.

Other variables that can affect getting a true Apgar score are maternal sedation or analgesia which may decrease tone and responsiveness of the new born. Neurologic conditions such as muscle disease or cerebral malformations may decrease tone and interfere with respiration. Cardiorespiratory conditions may also interfere with heart rate, respiration, and tone hence to equate the presence of a low Apgar score solely with asphyxia represents a misuse of the score. An Apgar score of less than 7 is deemed undesirable.

The use of the Apgar scoring system for the assessment of new born infants is still very relevant today as shown in the study (Casey, McIntire & Leveno, 2001) in which for 13,399 infants born before term (at 26 to 36 weeks of gestation), the neonatal mortality rate was 315 per 1000 for infants with five-minute Apgar scores of 0 to 3, as compared with 5 per 1000 for infants with five-minute Apgar scores of 7 to 10. For 132,228 infants born at term (37 weeks of gestation or later), the mortality rate was 244 per 1000 for infants with five-minute Apgar scores of 0 to 3, as compared with 0.2 per 1000 for infants with five-minute Apgar scores of 7 to 10 (Casey, McIntire & Leveno, 2001).

The risk of neonatal death in full term infants with five-minute Apgar scores of 0 to 3 (relative risk, 1460; 95 percent confidence interval, 835 to 2555) was eight times the risk in full term infants with umbilical-artery blood pH values of 7.0 or less (relative risk, 180; 95 percent confidence interval, 97 to 334). Therefore, the Apgar scoring system is still very relevant for the prediction of neonatal survival.

In a study in Nepal (Yadav et al., 2008), it was deduced that pregnancy in teenagers was associated with significantly increased risk ($P<0.05$) of delivery of very preterm and moderately preterm births and Low Birth Weight babies. There was no significant difference in risk of having small for gestational age babies, low Apgar score at birth at 1 min and 5 min, stillbirth, neonatal death, and post-partum hemorrhage. However, the risk of having delivery by episiotomy, vacuum or forceps and Caesarean section was significantly lower ($P<0.05$) among teenage mothers (Yadav et al., 2008).

A large population based study (Chen, Wen, Fleming, Rhoads & Walker, 2007) on teenage pregnancy and adverse birth outcomes indicated that teenage pregnancy was associated with increased risks of very pre-term delivery, pre-term delivery, very Low Birth Weight, Low Birth Weight, Small for Gestational Age and neonatal mortality, with a general tendency of poorer outcomes in younger teenagers. Younger teenage mothers who are less than 18 years of age were associated with very low to low Apgar score at 5 min (Chen, Wen, Fleming, Rhoads & Walker, 2007).

The above study also demonstrated that there was an increased risk of mall for gestational age among infants born to teenage mothers, with the youngest group running the highest risks, which was consistent with previous studies. However, two previous studies found that the risk of small for gestational age was not associated with teenage pregnancy and in both studies, the adequacy of prenatal care was not controlled in the multivariate model,

which was considered as an important confounder in the association between teenage pregnancy and SGA.

2.3.3 Evidence from intervention studies

Evidence from intervention studies carried out in study populations in Brazil, Chile, Nepal and USA where the diet of pregnant adolescents had been supplemented with micronutrients like iron, folate, calcium, zinc and vitamin D and then growth and development-related outcomes measured had provided some evidence of a positive effect of intervention on estimated fetal weight and/or birth weight. Pregnant and lactating women from lower socioeconomic classes in low and middle income countries were shown not to have optimal iron and vitamin A status. Encouraging supplementation programs and food-based interventions are important factors in potentially improving birth outcome and subsequent infant vitamin A status.

In Zimbabwe all pregnant women are supplemented with iron at no cost at all public health care service providers in order to avert anemia as well as improve the growth and development of the fetus which ultimately improves the child's birth weight as clearly outlined in many different studies. The Ministry of Health and child care supports this through their Food and Nutrition security policy.

Most studies from developed and developing countries have consistently reported that teenage pregnancy were at increased risk for pre-term delivery and low birth weight

(WHO,1995) although some studies failed to find such an association like the study (Fall, Sachdev, Osmond, Restrepo-Mendez, Victora & Martorell, 2015).The relation between teenage pregnancy and small for gestational age (SGA) births in teenage mothers has been reported by some studies (WHO, 1995) but not by others like the one by (Christian et al., 2003). Some studies have found increased risk of neonatal mortality among infants born to teenage mothers (Christian et al., 2003) whereas others found no increase as cited by the study (Scholl, Hediger & Schall,1997). Some adverse outcomes that might be associated with teenage pregnancy include low Apgar score and congenital malformations.

2.3.4 WHO response to teenage pregnancy

In response to the problem of teenage pregnancies, WHO published guidelines in 2011 with the UN Population Fund (UNFPA) on preventing early pregnancies and reducing poor reproductive outcomes and these made recommendations for action that countries could take, with 6 main objectives which include reducing marriage before the age of 18 years. Estimates according to a study (Raj & Boehmer, 2013) suggest a 10% reduction in child marriage could contribute to a 70% reduction in a country`s maternal mortality rate. Another objective is creating understanding and support to reduce pregnancy before the age of 20 years.

Increasing the use of contraception by adolescents at risk of unintended pregnancy was another objective. If this need was to be met, 2.1 million unplanned births, 3.2 million abortions, and 5600 maternal deaths could be averted each year according to a study (Darroch et al., 2016). The last three objectives are reducing coerced sex among adolescents, reducing unsafe abortion among adolescents and increasing use of skilled antenatal, childbirth and postnatal care among adolescents (WHO, 2011).

WHO also published documents facilitating implementation and prioritization of adolescent pregnancy prevention in adolescent health, including global standards for adolescent friendly health services and the Accelerated Action for Adolescent Health Guidance (WHO, 2017). To address the health sector response to adolescents, WHO produced Global Standards for Quality Health-Care Services for Adolescents (WHO, 2015) and Core Competencies in Adolescent Health and Development for Primary Care Providers (WHO, 2015).

2.3.5 Summary

Adolescent pregnancy remains a major contributor to maternal and child mortality, and to intergenerational cycles of ill-health and poverty. Pregnancy and childbirth complications are the leading cause of death among 15 to 19 year-old girls globally, with low and middle-income countries accounting for 99% of global maternal deaths of women ages 15 to 49 years according to WHO (2016).

Early teenage pregnancies also pose great risks for the newborns. In low and middle income-income countries, babies born to mothers under 20 years of age face higher risks of low birth weight, preterm delivery and severe neonatal conditions. Newborns born to teenage mothers are also at greater risk of having lower birth weight with long term potential effects as cited in a study (Ganchimeg, 2014).

Chapter 3 Methodology

3.1 Introduction

This chapter outlines the study design, the study setting and the rationale for choosing it and the data collection techniques used by the researcher. Also discussed are sampling techniques used and the validity and reliability of the collected data. Ethical consideration issues during the carrying out of the study are also discussed. This study mainly was a desktop review of patient records zeroing in on the health outcomes of teenage mothers and their babies and exploring the linkages to care like antenatal care visits for teenage pregnant mothers and the associated barriers at Mutoko District Hospital. The expert knowledge of qualified health workers working in the maternity ward was also sought and informed results.

3.2 Study Setting

Mutoko district is one of the nine districts in Mashonaland East Province of Zimbabwe. It has 27 health facilities consisting of one district hospital, two mission hospitals, two rural hospitals and twenty-one rural health centres serving over 156 000 people in the district. Mutoko District hospital was the study site as it is the referral hospital for the other 26 health facilities in the district and all first time mothers are usually referred to give birth at the hospital. It is in a rural setting with most of its inhabitants relying mostly on subsistence farming as a form of livelihood as it is made up mostly of communal areas. There has been an increase each year of teenage pregnancies with 51 girls under the age of 16 giving birth in 2017 and 74 in 2018.

Teenage mothers are usually referred and give birth at Mutoko District Hospital as it is better equipped to handle emergencies with its maternity ward having only qualified midwives working in it in addition to having qualified doctors and a clinical officer resident at the hospital. The hospital's maternity ward has 38 beds and is always almost full to capacity with clients. In 2018, Mutoko District hospital delivered 2 456 babies of which 548 were deliveries by teenagers which make up about 22% of the population.

3.3 The Research Design

An analytical cross sectional study design with extensive desktop review of patient notes was employed. In a cross sectional study exposure and disease are assessed simultaneously in each individual at a given point or snapshot in time. Advantages of a cross sectional study design are that it is quick requiring only a 'one time' examination or interview, it is less expensive than other study designs, it is helpful in programme planning and determining types of health services needed and it is useful in determining associations between variables of interest, thereby generating hypothesis.

However, cross sectional studies do no separate cause-effect relationships in associations established, deals only with survivors, is not useful when rare health conditions are being considered, does not identify risk or future likelihood of occurrence of disease from given characteristic and has limited usefulness for explosive epidemics or acute short duration illnesses such as measles or upper respiratory infections.

The study mainly focused on the patient records of teenage mothers who gave birth at Mutoko District Hospital during 2018. These records mainly provided quantitative data and qualitative data was obtained from interviews carried out with key informants from the maternity ward who comprised of nurse midwives.

3.4 Population and Sampling

Weather & Cook (2000) describe the term "survey population" as the list of population elements from which the sample will be drawn. In practice, it is difficult to find complete lists or records of all of the elements in the survey population. The study population for this study is all women who gave birth at Mutoko District Hospital in the year 2018 and the delivery register was used as the sampling frame as this is where all deliveries done at the hospital are recorded.

Key informants in the maternity ward who are made up of the sister in charge and nurse midwives were also interviewed during the study to get qualitative data on deliveries in the maternity ward, with special bias on teenage pregnant mothers.

Assuming 95% confidence interval and expected prevalence of teenage pregnancies (p) of 20% from previous years and margin of error of 5% using the formulae by Dobson

p=0.2 z=1.96 d=0.05

Sample size $= 1.96^2 * \underline{0.2*0.8}$

$$\frac{0.96 \times 0.04}{0.05^2}$$

$$= 245.8624$$

$$= \mathbf{246}$$

Assuming damaged and incomplete records of 5%, the sample size is **259.**

Systematic random sampling was done with a sampling interval

$$\frac{N}{n} = \frac{2456}{259}$$

$$= 9.48$$

$$= 10$$

Replacement of study participants was done with a previous teenage mother if the sampling interval did not fall on one.

A total of five key informant interviews was carried out with the sister in charge maternity ward and 4 nurse midwives from the maternity ward.

Interviewer administered questionnaires were used to collect data from the five key informants.

3.5 Data Collection Instruments

Both primary and secondary data were used for data collection. Primary data is data that is collected by a researcher from first hand sources, using methods like surveys, interviews or experiments. An advantage of using primary data is that researchers are collecting information for the specific purposes of their study and in essence the questions the researchers ask are tailored to elicit the data that will help them with their study and answer its specific questions. Secondary data is data that has already been gathered by

someone else. These can include information from the national population census or administrative data which include hospital records.

Compared to primary data, secondary data tend to be more readily available and inexpensive to obtain. Administrative data like hospital records teds to have large samples as the data collection is comprehensive and routine. The data is also collected over a long period of time which can enable the researcher to detect change over time.

The following variables were extracted from medical records: maternal age, gestational age at delivery, number of ante natal care visits, route of delivery, obstetric complications like fetal distress, post-partum hemorrhage and neonatal complications including low birth weight, small for gestational age and still birth. Key informant interviews conducted with staff from the maternity ward were also carried out. This type of interview involves interaction between the interviewer and interviewee with the latter becoming the key person with information and his/her views represents the group or organization which s/he belong to.

The principles of validity and reliability are fundamental cornerstones of the scientific method. Together they are at the core of what is accepted as scientific proof by both scientist and philosopher. Validity reflects the truthfulness of findings of a research and is defined as the extent to which an instrument measures what it is meant to measure

whereas reliability speaks to the stability of the findings of a research (Altheide & Johnson, 1994).

Validity measures consistency, repeatability, precision and trustworthiness of a study (Chakrabartty, 2013). The idea behind reliability is that any significant results must be more than a one-off finding and be inherently repeatable. Different researchers must be able to perform exactly the same experiment, under the same conditions and generate the same results. This will reinforce the findings and ensure that the wider scientific community will accept the hypothesis. This prerequisite is essential to a hypothesis establishing itself as an accepted scientific truth.

Validity encompasses the entire experimental concept and establishes whether the results obtained meet all of the requirements of the scientific research method.

Figure 3: Validity and reliability

3.6 Pretesting of instruments

Pretesting is the administration of the data collection instrument with a small set of respondents from the population for the full scale study. The advantage of conducting a pretest before a full scale study is that if problems occur in the pretest, it is likely that similar problems will occur in the full scale study so the purpose of pretesting study instruments is to identify problems with the data collection instrument and find possible solutions. Pre-testing should be conducted in circumstances that are as similar as possible to actual data collection and on population members as similar as possible to those that will be sampled and careful notes should be taken on the problems encountered and possible solutions should be identified.

Pre-testing was done with first quarter administrative data of deliveries for 2019 from Mutoko District Hospital which was taken from the maternity's delivery register and patient records.

3.7 Data Collection Procedure

Data collection is defined as the process of gathering and measuring information on variables of interest, in an established systematic manner that enables one to answer queries, stated research questions, test hypothesis and evaluate outcomes. A checklist found in appendix 4 was used to collect data from Mutoko district hospital's 2018 delivery register from the maternity ward as well as patient records. Variables under investigation included demographic data of the teenage mothers like age, marital status and obstetric outcomes. The key informant guide in appendix 5 was used to interview

some maternity staff on whether they thought teenage pregnancy was a problem and how they thought it could be mitigated.

3.8 Analysis and Organization of Data

Qualitative data was categorized, summarized and analyzed manually using responses from key informant interviews.

Quantitative data like frequencies and means was analysed using Microsoft Excel. This included information on the teenage mother's age, her delivery outcomes and that of her baby. Charts and tables were used to present the data.

3.9 Ethical Considerations

Consent to review patient records was obtained from the District Medical Officer (DMO) Mutoko. Consent to carry out key informant interviews was granted by the interviewed health workers.

Permission to carry out the study was granted by the Provincial Medical Directorate for Mashonaland East and the Africa University Research Ethics Committee (AUREC).

Patient confidentiality was assured at all times during this study. Study subjects were identified by codes and no patient names were used. Access to produced data was restricted through the use of passwords. All hard copies used during the study were kept under lock and key. Access to the research data was only limited to those involved in the

study. The full report of the study was shared with the Mutoko district health executive (DHE) as well as Africa University.

There were no immediate benefits to the teenage mothers or the community from the results of this study but they will be used to come up with specific interventions to deal with teenage pregnancies.

3.10 Summary

This chapter looked at the chosen study design, reasons for choosing Mutoko district hospital as the study setting and the sampling procedures used during the study. The chosen study design and the calculated sample size helped in coming up with findings that were valid and reliable and could be generalized for other teenage pregnant mothers in Zimbabwe. The medical records of women aged up to 19 years who gave birth at Mutoko District Hospital in 2018 were reviewed and analyzed. Confidentiality was assured and maintained at all times during the study for the patients and the interviewed participants. The research was conducted in an ethically sound environment and no adverse outcomes were encountered. The data collection tools used were adequate and effective in collecting the required and relevant data for the study.

Chapter 4 Data Presentation, Analysis and Interpretation

4.1 Introduction

This chapter will revisit the objectives in an attempt to put the research back into perspective before a summary of the major findings is laid out. These findings will literally be juxtaposed with the objectives to ascertain coherence and it will present findings of the study as related to the research objectives. It will then go further to expagorate and explain the findings and link them to similar researches already done, looking at similarities and discrepancies. The first section shows the sample socio demographic data and the related findings. The other sections highlight the care practices of the teenage mothers during pregnancy and the health outcomes of the of tables and charts. Of the 259 sampled records of mothers, all of them managed to participate in the study. All of the five key informant interview participants managed to participate and finish the survey questionnaire which resulted in a 100% of response rate.

4.2 Data Presentation and Analysis

4.2.1 Sample demographic characteristics

The majority (86.5%) of teenage pregnancies was in the 17-19 year age group with the remainder which makes up 13.5% being in the less than 16 year old category. With regards to marital status, most of the teenage mothers were married (70.7%), followed by single mothers (24.3%) and those who had been widowed or divorced who made up 5 % of the sampled population as illustrated by figure 4 below.

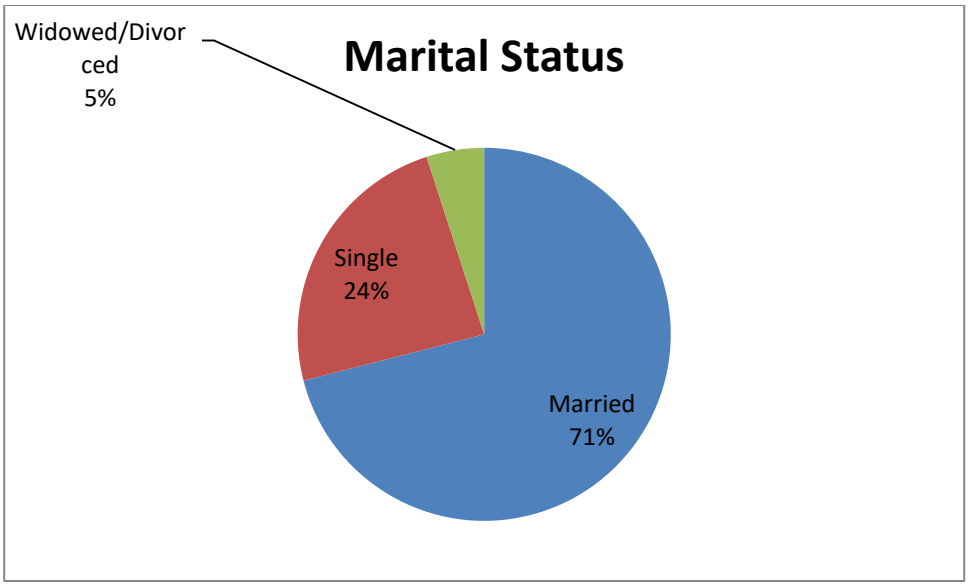

Figure 4: Marital status

This study results showed that 86.5% which was the majority of teenage pregnancies was in the older age group of 17-19 year olds. Married teenagers made up 70.7% of the population, with almost the same distribution in both the less than 17 year old age group (68.6%) and (70.1%) in the 17-19 year old age category. Being married was seen as having both negative and positive outcomes on teenagers in previous studies.

Being married was seen as having a positive influence where the teenager could experience the support of her spouse or in-laws in accessing reproductive health services like the provision of money for transport to get to the nearest health facility where she would get a lot of knowledge on pregnancy and safe child birth. The negative part was that sometimes the decision making power was totally removed from the teenage mother

leaving the husband and in laws to make critical decisions on her behalf, some of which would be detrimental to her health as postulated in the study (Pathak, 1993).

In another study in Kuala Lumpur, Malaysia (Sulaiman et al., 2012) the majorities of teenage mothers was over 18 years old and were married and lived with their husbands or parents. These girls tended to fall into the group who attended several ante natal care visits because of the stable environment they came from and the support they got at home and this proved to have a positive impact on the health outcome of both teenage mother and baby and this could be true as well for this study.

4.2.2 Care services for teenage mothers

In this study, 30.9% of teenage mothers reported to have visited ante-natal care services less than 4 times and the remainder (69.1%) visited ante-natal care services more than 4 times. The majority (68.8%) of the teenage mothers who visited ante-natal care services for more than 4 times were in the 17-19 age category with the most visit by a teenage mother being 10 and the least being 0 recorded for the teenage mothers who were not booked for ante-natal care services. The relatively high level of teenage mothers who sought ante natal care reflected more responsibility and more maternal care from the group.

Iron supplementation was given to almost all of the teenage mothers (98.1%) with the exception of 5 (1.9%) of the mothers who were not booked. All mothers (100%) in the 17-19 age group received iron supplementation during pregnancy as shown in table 1 below.

Table 1: Care services for teenage mothers

Variable	Variable Categories	Respondents	≤16 years %	17-19 years %
Antenatal care visits	n	259	35 (13.5)	224 (86.5)
	<4 visits	80 (30.9)	10 (28.6)	70 (31.3)
	≥4 visits	179 (69.1)	25 (71.4)	154 (68.8)
Iron Supplementation	n	259	35 (13.5)	224 (86.5)
	Yes	254 (98.1)	30 (85.7)	224 (100)
	No	5 (1.9)	5 (14.3)	0

Accessing ante natal care services has been shown to have a positive impact on the health outcomes of both teenage mothers and their babies as described by the study (Lisa & Abuogi, 2018). The World Health Organization recommended that pregnant mothers should have at least 4 ante natal care visits so as to optimize the good health of both mother and baby. Of the entire study sample, 69.1% had 4 or more ante natal visits, with 71.4% coming from the less than or equal to 16 years age group and 68.8% coming from the 17-19 years old age group. The percentage of teenage mothers who had 4 or more

ante natal visits almost corresponds to the 70.7% of teenage mothers who reported that they were married and hence assumed to have support from their spouses or mother in laws to attend ante natal care services and get the vital information and help hat they need to have safe and healthy pregnancies which translate to safe and healthy deliveries.

Iron and folate supplementation which is essential for the normal growth and development of the fetus as well as preventing anemia in the teenage mother was given to 98.1% of the teenage mothers with the exception of 5 teenage mothers in the less than 17 years age group who did not book for ante natal care services and hence did not have access to them. Only a single teenage mother presented with anemia. The very low levels of anemia in the study group which is almost zero percent indicate to the effectiveness of the iron and folate supplementation program being run by the government of Zimbabwe in all of its public health institutions at no cost to the teenage mother. The iron and folate supplementation is given as soon as the mother books for ante natal care services and is given for at least 3 months during pregnancy.

It could also indicate to the good nutritional choices that the teenage mothers are making involving eating a four star diet as well as an extra meal, all information they get when they visit the ante natal clinic. This is one of the high impact nutrition specific interventions which has been shown to be highly effective in many studies for producing desirable obstetric and gynecological outcomes.

4.2.3 Health outcomes for teenage mothers

About half (48.6%) of study participants delivered their babies with a gestational age of 37-40 weeks. Only 1.9% delivered at less than 32 weeks gestation with only 2.7% delivering at the other extreme of greater than 42 weeks gestation. Of all the study participants, 47 (18.1%) did not know their gestational age with the l6 years and younger age group making up the minority with 6 (12.8%) and the 17-19 year age group accounting for the remainder 41 (87.2%).

Table 2: Gestational age

Variable	Variable Categories	Respondents	≤16 years %	17-19 years %
Gestational age	n	259	35 (13.5)	224 (86.5)
	<32 weeks	5 (1.9)	1 (2.9)	4 (1.8)
	32-34 weeks	5 (1.9)	2 (5.7)	3 (1.3)
	35-37 weeks	29 (11.2)	1 (2.9)	28 (12.5)
	38-40 weeks	126 (48.6)	16 (45.7)	110 (49.1)
	41-42 weeks	40 (15.4)	8 (22.9)	32 (14.3)
	>42 weeks	7 (2.7)	1 (2.9)	6 (2.7)
	Don't know	47 (18.1)	6 (17.1)	41 (18.3)

Delivery of pre-term babies by the teenage mothers was at 15% of all deliveries. This corresponds to the study (Yadav et al., 2008) which deduced that teenage women were more likely to have preterm births and low birth weight babies. However, they were less

likely to have delivery by episiotomy, forceps or vacuum and Caesarean sections and this finding was also made in this study. In other respects, there were no significant differences between the two different age groups of teenage mothers.

The majority (80.3%) of teenage mothers delivered through normal vertex delivery with 24 (9.3%) undergoing caesarian section of which represented only 8.6% of the less than or equal to 16 years age group (Figure 5). Caesarian section was also only done on 21 (9.4%) 0f the 17-19 age group. Episiotomy was only performed on 2 (5.7%) of the 16 years and younger age group and 24 (10.7%) of the 17-19 year old teenage mothers. There was only one child presenting as a breech in the 17-19 year old teenage group as opposed to none in the less than 16 years group.

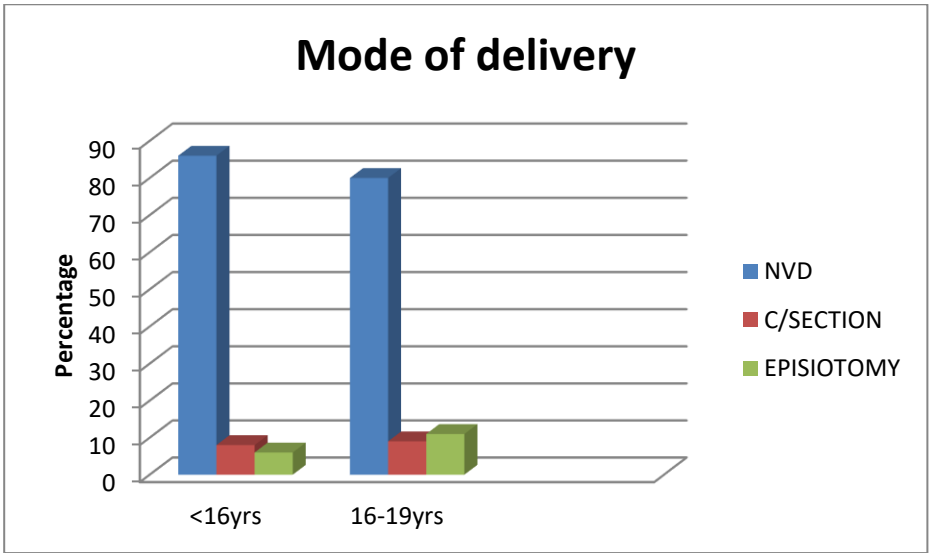

Figure 5: Mode of delivery

Normal vertex delivery was the major mode of delivery experienced by the teenage mothers with the less than 17 year old age group recording 85.7% NVD as compared to 79.5% by the 17-19 year old age group. Most of these only experienced a first degree tear during delivery. The rate of caesarian section was almost the same in the 2 age groups with the less than 17 years having 8.6% and the 17-19 year age group having 9.4%. This is consistent with the study by Dos Santos et al (2009) which showed that adolescents had a lower incidence of caesarian sections than adults. The low levels could be attributed to the health seeking behavior of the teenagers which could have led to them to accessing reproductive health knowledge that helped in reducing health complications associated with teenage pregnancies.

However, episiotomy was performed twice as much in the 17-19 years age group as to the less than 17 year olds which is contrary to some studies which pointed to episiotomies being more prevalent in the younger age groups because of their physical immaturity.

All teenage mothers in the less than 17 years age category gave birth to babies with an Apgar score greater than 7 at 5 minutes. Of teenage mothers in the 17-19 years age group, 7 (2.8%) gave birth to children with less than 7 Apgar score at 5 minutes post-delivery.

Table 3: Fetal outcome

Variable	Variable Categories	Respondents	≤16 years %	17-19 years %
Apgar score	n	259	35	224
	<7	7 (2.7)	0 (0)	7 (2.8)
	>7	252 (97.3)	35 (100)	217 (96.9)
Birth weight	<2 500g	32 (12.4)	5 (14.3)	27 (12.1)
	≥2 500g	227 (87.6)	30 (85.7)	197 (87.9)

The Apgar score for the babies of teenage mothers was greater than 7 at 5 minutes in all mothers less than 17 years old and was also relatively high at 96.9% in teenage mothers 17-19 years old. This again points to the success of the reproductive health program being run as well as functional social support services. A high percentage of babies were born with a normal birth weight in both age groups, 85.7% in the less than 17 years age group and 87.9% in the 17-19 age group. Low birth weight was 2.2% higher in the less than 17 years age group as compared to the 17-19 years age group which is consistent with previous studies.

Chapter 5 Summary, Conclusions and Recommendations

5.1 Introduction

This final chapter will look mostly on the conclusion to the findings of the study as well as the recommendations thereof. Limitations to the study as well as implication to practice will also be dealt with in this chapter. Conclusions will follow which will mainly be the answers to all the objectives before recommendations are done based on the conclusions reached.

5.2 Discussion

Obstetric and gynaecological outcomes of teen mothers for the population under study were not adversely affected by the mother's age. The teen mothers had safe deliveries with only minor complications and their babies were healthy and this group did not encounter any maternal or neonatal mortality during the year under study.

5.3 Conclusions

Social determinants of health are very important in determining the health outcomes of teenage mothers. Being married and having access to ante natal care services was seen to have a positive impact on health outcomes of both teenage mothers and their babies. Most normal vertex deliveries experienced a first degree tear but episiotomy was performed twice as much in the older 17-19 year old age group as compared to the less than 17 year old age group.

Findings from this study indicate that many opportunities for ante-natal care services are being enjoyed by most of the teenage mothers in Mutoko district. These include accessing services like iron and folate supplementation during pregnancy which benefit both the mother and the baby for favorable obstetric and birth outcomes. The study found out that teenage mothers did not experience adverse obstetric and birth outcomes but had healthy babies.

5.4 Implications

Teenagers require supportive youth friendly health services both at school and in the communities in which they live. Safe reproductive health services like the availability of condoms readily and knowledge on consequences of early pregnancy need to be taught to teenagers so that they make informed decisions about their health and that of their babies.

5.5 Recommendations

The following recommendations were drawn from the study:

1. This study recommends that effective referral systems for youth friendly health services should be put in place in both schools and at community level so that adolescents quickly access the health services they require for optimal health. These youth friendly services should offer a wide variety of services including contraceptives, reproductive health education as well as peer to peer support groups.

2. Health workers in all health facility should be trained on the youth friendly health service package including the corresponding policies and rights that these adolescents should enjoy.
3. Destigmatisation of teenage pregnancy should also take priority and programs to reintegrate teenage mothers back into the community and empowering them to have a better standard of living should be done.

5.6 Suggestions for further research

Further research needs to be put into a cohort study following up on young teenage mothers from pregnancy until their children reach at least 2 years of age to find out if they are any medium or long term complications to both the mother and her child and also looking more widely into the social determinants of health and how they would be affecting this cohort.

List of references

African Union Commission. (2006). Plan of action on sexual and reproductive health and rights (Maputo plan of action). *Addis Ababa: African Union*.

Alli, F., Maharaj, P., & Vawda, M. Y. (2013). Interpersonal relations between health care workers and young clients: barriers to accessing sexual and reproductive health care. *Journal of Community Health*, *38*(1), 150-155.

Atwood, S.J & Hussain J (1997). Adolescent motherhood: Priorities and next steps. *Journal of Family Welfare, 43* (2), 8–14.

Bhaduria, S., Singh, S., & Sarkar, B. (1991). Teenage pregnancy: A retrospective study. *J Obstet Gynecol India. 41*(4), 454–56.

Casanueva, E., Rosello-Soberon, M.E., De-Regil, L.M., Arguelles, M.C., Cespedes, M.I. (2006). Adolescents with adequate birth weight newborn diminish energy expenditure and cease growth. *The Journal of Nutrition, 136*(10), 2498-2501.

Casey, B. M., McIntire, D. D., & Leveno, K. J. (2001). The continuing value of the Apgar score for the assessment of newborn infants. *New England Journal of Medicine*, *344*(7), 467-471.

Chen, X. K., Wen, S. W., Fleming, N., Demissie, K., Rhoads, G. G., & Walker, M. (2007). Teenage pregnancy and adverse birth outcomes: a large population based retrospective cohort study. *International Journal of Epidemiology*, *36*(2), 368-373.

Darroch, J. E, Woog, V., Bankole, A., Ashford, L.S, (2016). Adding it up: Costs and benefits of meeting the contraceptive needs of adolescents. New York: *Guttmacher Institute.*

Donna, M.S., Ensminger, M.E. and Young, J.K., (1995). Mechanisms for maternal age differences in birth weight. *American Journal of Epidemiology*. p504-514

Dos Santos, G.H., Martins, M.G., Sousa S (2008). Teenage pregnancy and factors associated with low birth weight. *Revista Brasileira de Ginecologia e Obstetricia.* 30(5) pp 224-231

Ezegwui, H.U., Ikeako, L.C & Ogbuefi, F. (2012). Obstetric outcome of teenage pregnancies at a tertiary hospital in Enugu, Nigeria. *Nigerian Journal of Clinical Practice, 15*(2), 147-150.

Gilbert, W., Jandial, D., Field, N., Bigelow, P., Danielsen, B. (2004). Birth outcomes in teenage pregnancies, *The Journal of Maternal-fetal Neonatal Medicine*, *16*(5), 265-270.

Fall, C., Sachdev, H.S., Osmond, C., Restrepo-Mendez, M.Z., Victora, C and Martorell, R. (2015). Association between maternal age at childbirth and child and adult outcomes in the offspring: a prospective study in five low-income and middle-income countries (COHORTS collaboration). *The Lancet Global Health*, *3*(7), e366-e377.

Fraser, A.M., Brockert, J.E., & Ward, R.H. (1995). Association of young maternal age with adverse reproductive outcomes, *New England Journal of Medicine, 332(17),* 1113-1118.

Frisancho, A. R., Matos, J., & Bollettino, L. A. (1984). Influence of growth status and placental function on birth weight of infants born to young still-growing teenagers. *The American Journal of Clinical Nutrition*, *40*(4), 801-807.

Ganchimeg, T. (2014). Pregnancy and childbirth outcomes among adolescent mothers: a World Health Organisation Multicountry Study. BJOG: *An International Journal of Obstetrics & Gynaecology,* 121, 40-48.

Gortzak-Uzan, L., Hallak, M., Press, F., Katz, M., Shoham-Vardi, I. (2001). Teenage pregnancy: risk factors for adverse perinatal outcome. *Journal of Maternal-Fetal Medicine,* 10(6), 393-397.

Hediger, M.L, Scholl, T.O, Belsky, D.H, Ances, I.G, Salmon, R.W, (1989). Patterns of weight gain in adolescent pregnancy: effects on birth weight and pre-term delivery. *Obstetrics and Gynecology, 74*(1), 6-12.

Henderson, M., Wight, D., Raab, G. M., Abraham, C., Parkes, A., Scott, S., & Hart, G. (2007). Impact of a theoretically based sex education programme (SHARE) delivered by teachers on NHS registered conceptions and terminations: final results of cluster randomised trial. *The British Medical Journal*, *334*(7585), 133.

Hoffman, S. D., & Maynard, R. A. (Eds.). (2008). *Kids having kids: Economic costs and social consequences of teen pregnancy* (2nd ed.). The Urban Institute.

Igwegbe, A.O., Udigwe, G.O. (2001). Teenage pregnancy: still an obstetric risk, *Journal of Obstetrics and Gynaecology, 21(5),* 478-481.

Jewell, D., Tacchi, J., & Donovan, J. (2000). Teenage pregnancy: whose problem is it?. *Family Practice*, *17*(6), 522-528.

Jolly, M.C., Sebire, N., Harris, J., Robinson, H.S., Regan, L. (2000). Obstetric risk of pregnancy in women less than 18 years old, *Obstetrics & Gynecology, 96(6),* 962-966.

Jurisicova, A., Rogers, I., Fasciani, A., Casper, R. F., & Varmuza, S. (1998). Effect of maternal age and conditions of fertilization on programmed cell death during murine pre implantation embryo development. *Molecular Human Reproduction*, *4*(2), 139-145.

Kinney, M. V., Kerber, K. J., Black, R. E., Cohen, B., Nkrumah, F., Coovadia, H., & Lawn, J. E. (2010). Sub-Saharan Africa's mothers, newborns, and children: where and why do they die?. *PLoS Medicine*, *7*(6).

Lee, A.C., Katz, J., Blencowe, H., Cousens, S., Kozuki, N., Vogel, J.P., (2013). National and regional estimates of term and preterm babies born small for gestational age in 138 low-income and middle-income countries in 2010. *The Lancet Global Health, 1*(1), e26-e36.

Lisa, L, Abuogi, M.D., (2018). Young mothers: From pregnancy to early motherhood in adolescence with HIV. 8TH HIV and Women Workshop.

Mahavarkar, S. H., Madhu, C. K., & Mule, V. D. (2008). A comparative study of teenage pregnancy. *Journal of Obstetrics and Gynaecology*, *28*(6), 604-607.

Mahfouz, A. A., el-Said, M. M., al-Erian, R. A., & Hamid, A. M. (1995). Teenage pregnancy: are teenagers a high risk group?. *European Journal of Obstetrics, Gynecology, and Reproductive Biology*, *59*(1), 17–20.

Mchunu, G., Peltzer, K., Tutshana, B., (2012). Adolescent pregnancy and associated factors in South African youth. *African Health Sciences. 12*(4), 426–434.

Mmari, K. N., & Magnani, R. J. (2003). Does making clinic-based reproductive health services more youth-friendly increase service use by adolescents? Evidence from Lusaka, Zambia. *Journal of Adolescent Health*, *33*(4), 259-270.

O'Neill, J., Tabish, H., Welch, V., (2014). Applying an equity lens to interventions: using PROGRESS ensures consideration of socially stratifying factors to illuminate inequities in health. *Journal of Clinical epidemiology, 67(*1), 56-64.

Orvos, H., Nyirati, I., Hajdú, J., Pál, A., Nyári, T., & Kovács, L. (1999). Is adolescent pregnancy associated with adverse perinatal outcome?, *Journal of Perinatal Medicine*, *27*(3), 199-203.

Aras, R.Y. (2013). Is maternal age risk factor for low birth weight? *Archives of Medicine and Health Sciences Journal.* 1(1), 33.

Raj, A., Boehmer U, (2013). Girl child marriage and its association with national rates of HIV, maternal health, and infant mortality across 97 countries. *Violence Against Women, 19*(4), 536-551.

Rah, J.H., Christian, P., Shamim, A.A., Arju, U.T., Labrique, A.B., Rashid, M. (2008). Pregnancy and lactation hinder growth and nutritional status of adolescent girl in rural Bangladesh. *The Journal of Nutrition, 138*(8), 1505-1511.

Reichman, N. E., & Pagnini, D. L. (1997). Maternal age and birth outcomes: data from New Jersey. *Family Planning Perspectives, 29*(6), 268–295.

Saftlas, A. F., Olson, D. R., Franks, A. L., Atrash, H. K., & Pokras, R. (1990). Epidemiology of preeclampsia and eclampsia in the United States, 1979-1986. *American Journal of Obstetrics and Gynecology*, *163*(2), 460-465.

Sana, A., Isaiah, M., Thane, C., Alvaro, O.V., Sujata, C., Don, V., Maria, B.O (2018). Social determinants of health and adverse maternal and birth outcomes in adolescent pregnancies: A systematic review and meta-analysis. *Paediatric and Perinatal Epidemiology, 33*(1). 88-99.

Satin, A. J., Leveno, K. J., Sherman, M. L., Reedy, N. J., Lowe, T. W., & McIntire, D. D. (1994). Maternal youth and pregnancy outcomes: middle school versus high school age groups compared with women beyond the teen years. *American Journal of Obstetrics and Gynecology*, *171*(1), 184-187.

Score, A. (1986). Use and abuse of the Apgar score. *Pediatrics, 78*(6), 1148.

Scholl, T.O., Hediger, M.L., Schall, J.I., (1997). Maternal growth and fetal growth: pregnancy course and outcome in the Camden Study. *Annals of the New York Academy of Sciences, 817*(1), 292-301.

Tylee, A., Haller, D. M., Graham, T., Churchill, R., & Sanci, L. A. (2007). Youth friendly primary-care services: how are we doing and what more needs to be done?. *The Lancet*, *369*(9572), 1565-1573.

UNFPA (2015). Girlhood, not motherhood: Preventing adolescent pregnancy. New York.

United Nations (2016). The Millennium Development Goals Report 2015. Retrieved y http://www.un.org/millenniumgoals/2015_MDG_Report/pdf/MDG%202015%20rev%20(July%201).pdf .

Viner, R. M., Ozer, E. M., Denny, S., Marmot, M., Resnick, M., Fatusi, A., & Currie, C. (2012). Adolescence and the social determinants of health. *The Lancet*, *379*(9826), 1641-1652.

Were M (2007). Determinants of teenage pregnancies: The case of Busia District in Kenya. *Economics & Human Biology*, *5*(2), 322-339.

WHO (2016). Global health estimates 2015: deaths by cause, age, sex, by country and by region, 2000–2015.

World Health Organization (2011). WHO guidelines on preventing early pregnancy and poor reproductive outcomes among adolescents in developing countries. World Health Organization. Geneva.

World Health Organization. (2012). Making health services adolescent friendly: Developing national quality standards for adolescent friendly health services. World Health Organization. Geneva.

World Health Organization. (2017). Global Accelerated Action for the Health of Adolescents (AA-HA!): Guidance to support country implementation. World Health Organization. Geneva.

World Health Organization. (2015). Global standards for quality health care services for adolescents. World Health Organization. Geneva.

World Health Organization. (2015). Global health observatory data on maternal and reproductive health. http://www.who.int/gho/maternal_health/en 2.

World Health Organization. (1999). Programming for Adolescent Health and Development. *Report of a WHO/UNFPA/UNICEF study group on programming for adolescent health*. World Health Organization.

Yadav, S., Choudhary, D., Narayan, K. C., Mandal, R. K., Sharma, A., Chauhan, S. S., & Agrawal, P. (2008). Adverse reproductive outcomes associated with teenage pregnancy. *McGill Journal of Medicine: MJM*, *11*(2), 141.

Appendices

Appendix 1: Planned activities

Planned activities	Dec	Jan	Feb	Mar
Approval of proposal	X			
Pretesting of questionnaire		X		

Data collection		X	X	
Report writing			X	
Submission of draft			X	
Study report to district				X
Submission of final copy				X

Appendix 2: Budget

NN	Item	Quantity	Unit cost (USD)	Total cost (USD)
Stationary	Bond paper	3	20	60
	Staple pins	1 box	10	10

	Pens	4	0.50	2
Allowances				
PHO	Lunch	5	10	50
Research ass	Lunch	5	10	50
Total				322

Appendix 3: Consent form

My name is Patience Gapara, a final year (MPH) student from Africa University. I am carrying out a study on Teenage Pregnancies and their health outcomes. I am kindly asking you to participate in this study by answering some questions.

Purpose of the study:

The purpose of the study is to determine the health outcomes for both mother and baby of adolescents 19 years old and younger. You were selected for the study because you work in the maternity ward where these adolescent women come to deliver their babies.

Procedures and duration

If you decide to participate you will answer some questions. It is expected that this will take about 10 minutes.

Risks and discomforts

There are no foreseeable risks, discomforts or inconveniences to you since permission to carry out the study has been granted.

Benefits and/or compensation

There are no benefits or compensation to you for participating in the study.

Confidentiality

Any information that is obtained in the study that can be identified with you will not be disclosed without your permission. Names and any other identification will not be asked for in the questionnaires.

Voluntary participation

Participation in this study is voluntary. If you decide not to participate in this study, your decision will not affect your future relationship with Ministry of Health. If you choose to participate, you are free to withdraw your consent and to discontinue participation without penalty.

Offer to answer questions

Before you sign this form, please ask any questions on any aspect of this study that is unclear to you. You may take as much time as necessary to think it over.

Authorisation

If you have decided to participate in this study please sign this form in the space provided below as an indication that you have read and understood the information provided above and have agreed to participate.

---------- ----------

Name of Research Participant (please print) Date

Signature of Research Participant or legally authorised representative

If you have any questions concerning this study or consent form beyond those answered by the researcher including questions about the research, your rights as a research participant, or if you feel that you have been treated unfairly and would like to talk to someone other than the researcher, please feel free to contact the Africa University Research Ethics Committee on telephone (020) 60075 or 60026 extension 1156 email aurec@africau.edu

Name of Researcher ----------

Appendix 4: Questionnaire for assessing health outcomes for teenage pregnancies

For the Mother

1. Age
2. Marital status
3. Occupation

4. How many pregnancies has she had before?
5. How many children does she have?
6. Did she book for Ante Natal Care? YES NO
7. Was she taking iron supplementation? YES NO
8. Was she a referred patient? YES NO
9. If Yes above, what was the reason for the referral?
10. Did she have a premature delivery? YES NO
11. Did she have urinary tract infections? YES NO
12. Did she have any pregnancy and delivery complications? YES NO
13. Was there maternal mortality? YES NO

For the Infant

1. Was it a low birth weight baby? YES NO
2. Was it a small for gestational age birth? YES NO
3. What was their Apgar score?
4. Are there any neonatal conditions? YES NO
5. If yes above, which conditions?
6. Was there neonatal mortality? YES NO

Appendix 5: Key Informant Interview Guide

1. Sex
2. Title
3. Years in service
4. Years working in Maternity

5. What would you say is the average age of mothers delivering in this maternity ward?
6. What are the pregnancy and child birth complications, if any, most faced by adolescents 19 years and under delivering here in the maternity ward?
7. What are the complications, if any, faced by infants born to mothers 19 years and under here in the maternity ward?

Appendix 6: Letter of Ethical Clearance

AFRICA UNIVERSITY
(A United Methodist-Related Institution)
INVESTING IN AFRICA'S FUTURE

AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE (AUREC)

P.O. Box 1320, Mutare, Zimbabwe, Old Hyanga Road, Old Mutare Tel (+263-20) 60075/60026/61611 Fax (+263-20) 61785 website: www.africau.edu

Ref: AU1219/19

31 January, 2020

Patience Gapara
C/O CHANS
Africa University
Box 1320
Mutare

RE: TEENAGE PREGNANCIES AND HEALTH OUTCOMES AT MUTOKO DISTRICT HOSPITAL

Thank you for the above titled proposal that you submitted to the Africa University Research Ethics Committee for review. Please be advised that AUREC has reviewed and approved your application to conduct the above research.

AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE (AUREC)
31 JAN 2020
APPROVED

The approval is based on the following.

a) Research proposal
b) Questionnaires
c) Informed consent form

- **APPROVAL NUMBER** AUREC1219/19

This number should be used on all correspondences, consent forms, and appropriate documents.

- **AUREC MEETING DATE** NA
- **APPROVAL DATE** January 31, 2020
- **EXPIRATION DATE** January 31, 2021
- **TYPE OF MEETING** Expedited

After the expiration date this research may only continue upon renewal. For purposes of renewal, a progress report on a standard AUREC form should be submitted a month before expiration date.

- **SERIOUS ADVERSE EVENTS** All serious problems having to do with subject safety must be reported to AUREC within 3 working days on standard AUREC form.
- **MODIFICATIONS** Prior AUREC approval is required before implementing any changes in the proposal (including changes in the consent documents)
- **TERMINATION OF STUDY** Upon termination of the study a report has to be submitted to AUREC.

Yours Faithfully

MARY CHINZOU – A/AUREC ADMINISTRATOR
FOR CHAIRPERSON, AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE

Appendix 7: Plagiarism Report

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Document Information

Analyzed document	GAPARA DISSERTATION REPORT (1).docx (D71693992)
Submitted	5/18/2020 10:20:00 AM
Submitted by	Dr Eltony Mugomeri
Submitter email	mugomerie@africau.edu
Similarity	7%
Analysis address	mugomerie.africa@analysis.urkund.com