

**SCHOOL OF PUBLIC HEALTH  
COLLEGE OF HEALTH SCIENCE  
UNIVERSITY OF GHANA**



**PREGNANCY OUTCOMES, A COMPARATIVE STUDY BETWEEN  
ADOLESCENTS AND VICENARIANS IN AKATSI DISTRICT HOSPITAL**

**BY  
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MASTER OF PUBLIC HEALTH DEGREE.**

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## DECLARATION

I, Michael Deladem Kwashie declare that this dissertation is my original work except for duly referenced ones and that no part of it has been presented for another degree in this university or elsewhere.

.....  
Michael Deladem Kwashie

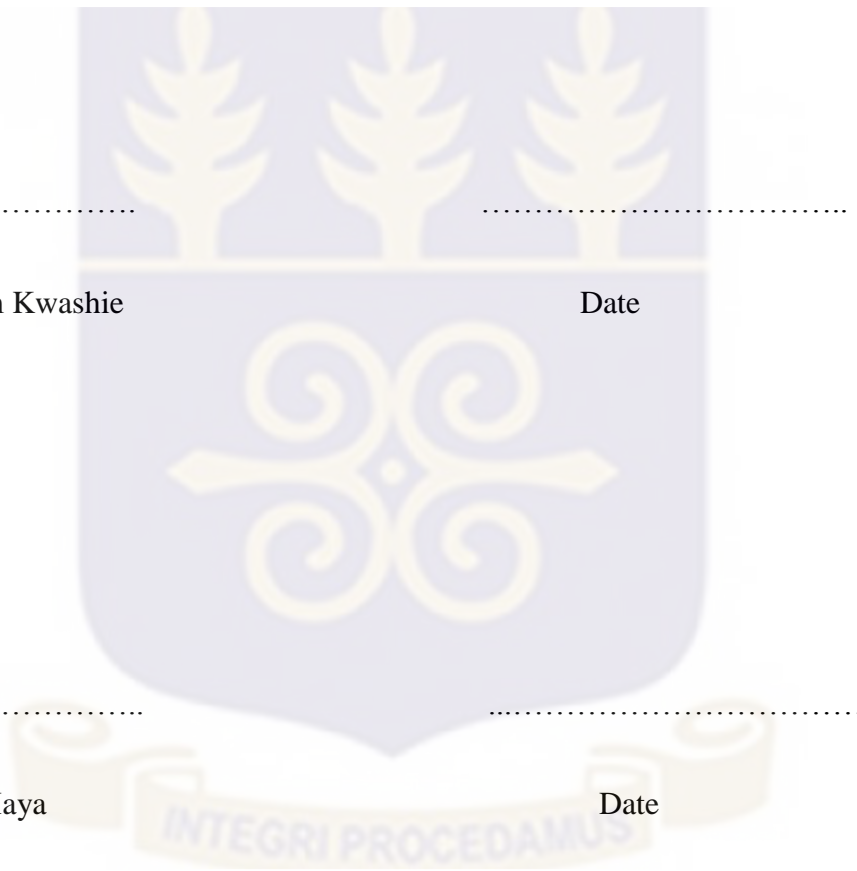
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Date



## **DEDICATION**

This work is dedicated to Priscy, Othniel and Joel.



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My first gratitude goes to the Almighty God for His continual blessings and favour upon my life.

My Lord I am forever grateful to you for this opportunity and the strength to complete this work.

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## ABSTRACT

### Background

Adolescent pregnancy is a burning global issue and a public health concern. It is defined as pregnancy in a girl aged 10 to 19 years. These pregnancies tend to have adverse health, economic, social and psychological effects on the adolescents. This study was done to compare obstetric and perinatal outcomes between adolescents and vicenarians and the factors associated with these outcomes at the Akatsi District Hospital.

### Method

A retrospective chart review of case records of 245 adolescents and 245 vicenarians who delivered in Akatsi District Hospital from January 2015 to December 2016 was performed. A structured data abstraction form was used to gather information on socio-demographic characteristics, obstetric and perinatal outcomes. The obstetric outcomes compared in this study were preeclampsia/eclampsia, episiotomy and perineal tear while the perinatal outcomes compared were preterm delivery, low birth weight delivery and birth asphyxia. Data was analyzed using Stata version 14.1. Categorical data was characterized by frequencies and proportion while continuous data was characterized by means (SD). Bivariate analysis of categorical variables was done with Pearson  $\chi^2$  test of independence. Multivariable analysis of factors affecting adverse pregnancy outcomes was done using multiple logistic regression analysis at a confidence interval of 95%.  $P \leq 0.05$  was deemed statistically significant.

## Results

The mean age of the adolescents was 17.45 (SD =1.26) with an age range of 13-19 years whilst that of the vicenarians was 23.64 (SD=2.85) with an age range of 20-29 years. The unadjusted analysis demonstrated an association between age and perinatal and obstetric outcomes. Compared to adolescents, vicenarians were found to have a 55% less likelihood of having episiotomy performed (uOR=0.45; 95% CI 0.31-0.64). The association between age and episiotomy remained significant after adjusting for some confounders in the model (aOR=0.35; 95% CI 0.21-0.60). With regards to mode of delivery, vicenarians were found to have a 92% more likelihood of having caesarean sections performed compared to adolescents (uOR=1.92; 95% CI 1.22-3.03) although not significant after controlling for confounders.

Vicenarians had significantly lower unadjusted odds of preterm delivery (uOR=0.16; 95% CI 0.11-0.22), low birth weight (uOR=0.24; 95% CI 0.18-0.33) and birth asphyxia (uOR=0.08; 95% CI 0.05-0.13) but these became non-significant after controlling for confounders.

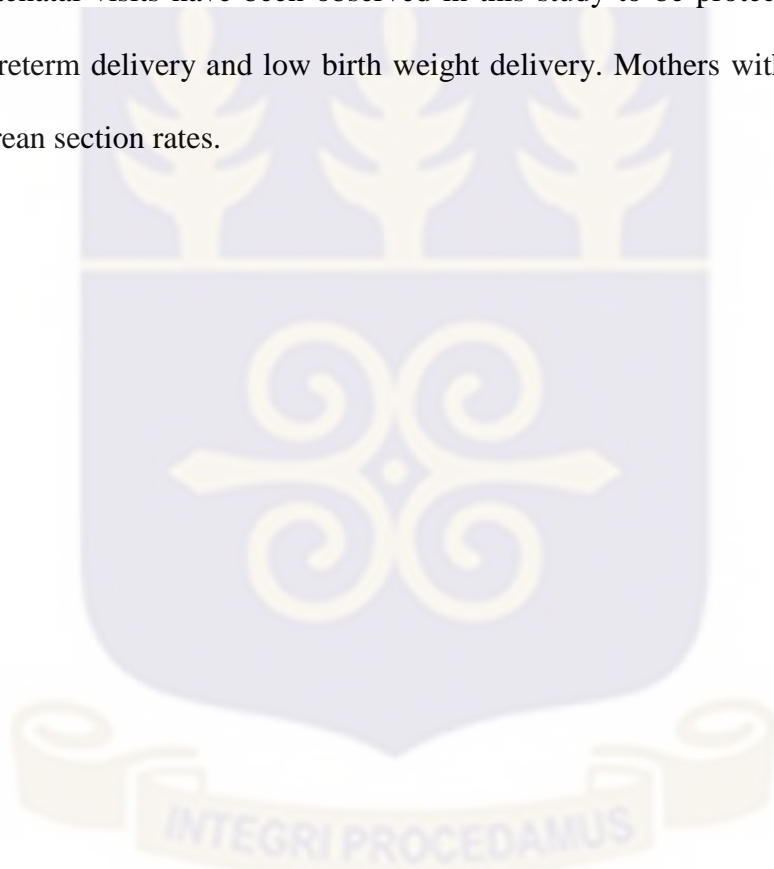
Mothers who had four or more antenatal visits had significantly lower odds of preterm delivery (aOR=0.29 95% CI (0.17-0.51) and birth asphyxia (aOR=0.46 95% CI; (0.20-0.99) and significantly higher caesarean section delivery rate (aOR 2.47; 95% CI (1.15-5.32). Mothers with tertiary education were found have significantly higher rate of caesarean deliveries (aOR=9.72 95% CI 1.06-88.71).

## **Conclusion**

The adolescents in this study tend to have more successful spontaneous vaginal deliveries and had significantly higher rates of episiotomy.

Adolescents in this study had higher likelihood of having preterm delivery, low birth weight delivery and birth asphyxia.

Four or more antenatal visits have been observed in this study to be protective factors against birth asphyxia, preterm delivery and low birth weight delivery. Mothers with tertiary education had higher caesarean section rates.



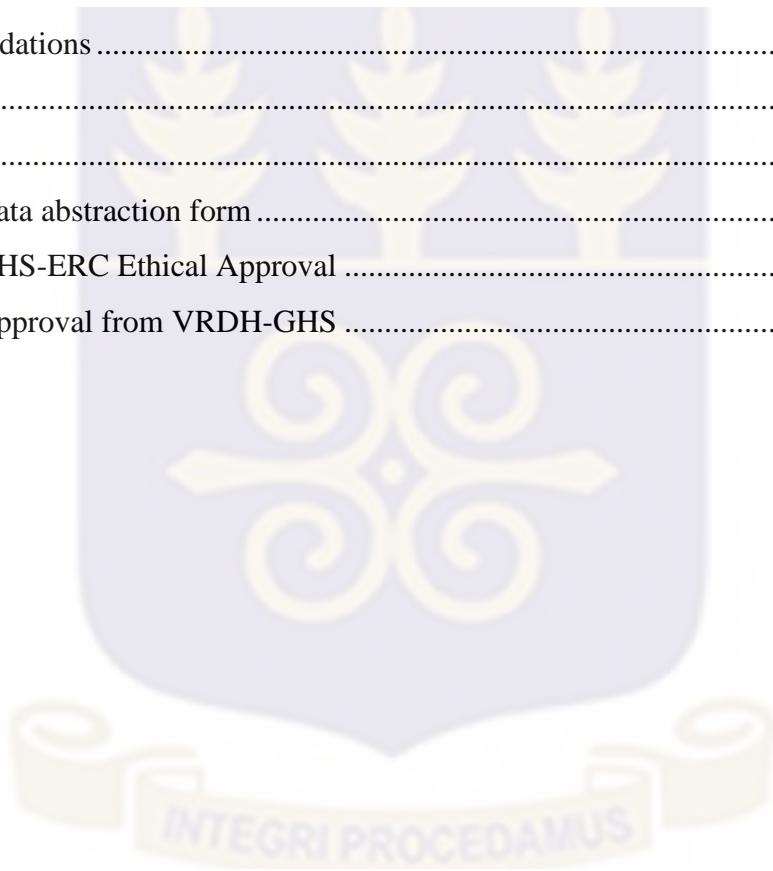
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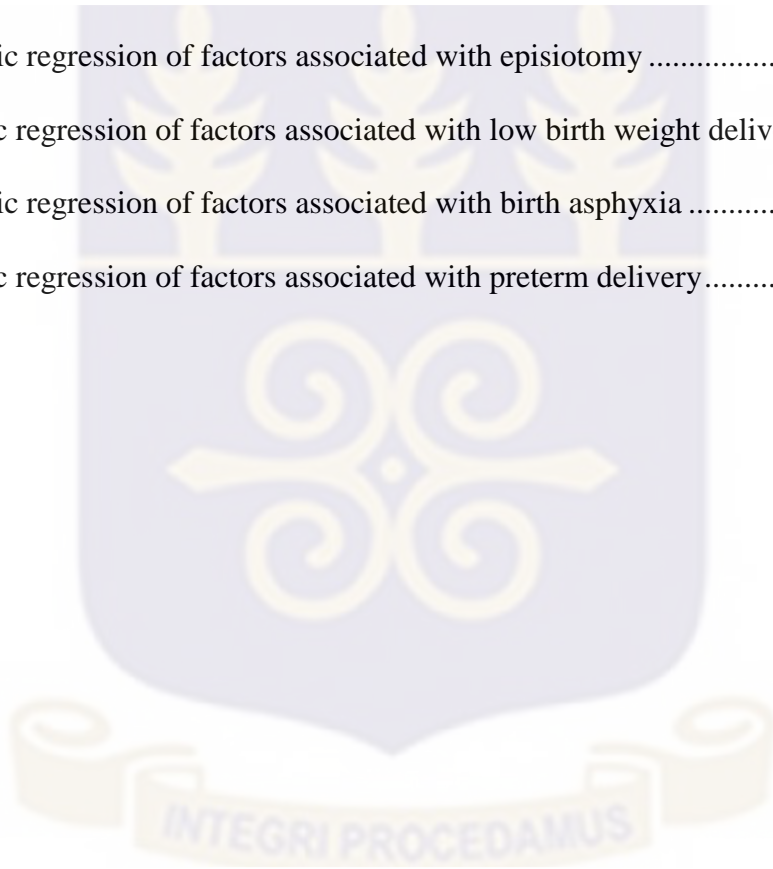
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## LIST OF ABBREVIATIONS

ANC	Antenatal Clinic
aOR	Adjusted Odds Ratio
APGAR	Appearance Pulse Grimace Activity Respiration
CI	Confidence Interval
CS	Caesarean section
DHIMS	District Health Information Management System
ERC	Ethical Review Committee
GDHS	Ghana Demographic and Health Survey
GHS	Ghana Health Service
IUSSP	International Union for the Scientific Study of Population
LMP	Last Menstrual Period
LBW	Low Birth Weight
OR	Odds Ratio
PPH	Postpartum hemorrhage
PTD	Pre-term Delivery
SSA	sub-Saharan Africa
SVD	Spontaneous vaginal delivery

uOR Unadjusted Odds Ratio

VRHD Volta Regional Health Directorate

WHO World Health Organization



## CHAPTER ONE

### 1.0 INTRODUCTION

#### 1.1 Background

Adolescent pregnancy is an age old problem globally. It is defined as pregnancy in a girl between the ages of 10 and 19 years of age (World Health Organization, 1986). The rates of adolescent pregnancy range from as high as 299 per 1000 girls in some developing countries to as low as 1 per 1000 girls in some developed countries, with the highest rates in sub-Saharan Africa (WHO, 2016). The high rate of adolescent pregnancy in sub-Saharan African countries are attributable to early age of marriage, cultural permissiveness, low socioeconomic status of parents, inadequate knowledge on sexual education, peer pressure, poor formal education, and no or ineffective use of contraceptives (Dutta, Indranil, Joshi, 2013; Ezegwui, Ikeako, & Ogbuefi, 2012).

Adolescence is a critical stage in the life of every individual. It is a stage where they undergo simultaneous but asynchronous development in various systems. These include physical, cognitive and psychological as well as social developments (Rosen, 2004). Pregnancy during this stage tends to have several undesirable consequences on the adolescent mothers, their families and the society at large. These effects cut across health, social, and economic sectors (WHO, 2011). Adolescent pregnancy remains a major contributor to maternal and child mortality and to the cycle of ill-health and poverty (WHO, 2016).

Health wise, adolescent pregnancy is being discouraged because it has been shown to have several obstetric and perinatal complications. The obstetric complications include postpartum

hemorrhage, anaemia, operative vaginal delivery, caesarean section, pregnancy induced hypertension, cephalo-pelvic disproportion and puerperal sepsis (Onoh et al, 2014). These complications can lead to maternal mortality, with rates higher in adolescents than adults (WHO, 2016). Complications from pregnancy and child birth are the second commonest cause of death in adolescents whose age range is between 15-19 years (WHO, 2016).

The perinatal complications include preterm labor, low birth weight, very low birth weight and birth asphyxia (Dutta et al, 2013). Others are congenital deformities, fetal death and small for gestational age (Liran, Vardi, Sergienko, & Sheiner, 2013). Babies born to adolescent mothers are more vulnerable than those born to vicenarians (women aged between 20 and 29). Babies delivered by adolescents face a 50% higher risk of being still births or dying a few a weeks after birth as compared to those born to vicenarians. The younger the mother, the greater the risk to the baby (WHO, 2016). These complications mostly arise because of poverty, lack of skilled health personnel and ignorance (Onoh et al., 2014). Other reasons adduced for these complications are biological immaturity and poor social, economic and behavioral factors such as smoking, alcohol/substance abuse, malnutrition, and inadequate prenatal care (Demirci et al, 2016).

Adolescent pregnancy also has socioeconomic consequences on the adolescent, her family and the society at large. Adolescents who get pregnant are more likely to drop out of school, to become unemployed and become a burden on the family and the society. They end up with inadequate employability skills reducing the overall quality of human resource in a nation and thus reducing productivity of the nation (WHO, 2016). Adolescent pregnancy is associated with a lot of stigma for both the individual and the family. These adolescents are often ostracized from associating with their peers and sometimes banished by parents ( Leerlooijer et al, 2013).

## 1.2 Problem statement

Adolescent pregnancy is a global issue. It is estimated that 16 million girls aged between 15 and 19 years deliver each year constituting 11% of all births worldwide with ninety five percent of these births occurring in low and middle income countries. Additionally one million girls aged below 15 years give birth each year. The average rate of adolescent birth in low income countries is five times that of high income countries (WHO, 2016).

Adolescent mothers are more likely to suffer adverse pregnancy outcomes and are also more constrained to pursue higher education than women who delay their child bearing ( Egbe et al, 2015). Morbidity for both mother and child from adolescent deliveries is estimated to be 23% of overall maternal and child morbidity (WHO, 2016). In sub-Saharan Africa, pregnancy-related causes have been reported as the leading cause of death in adolescent girls (Demirci et al., 2016).

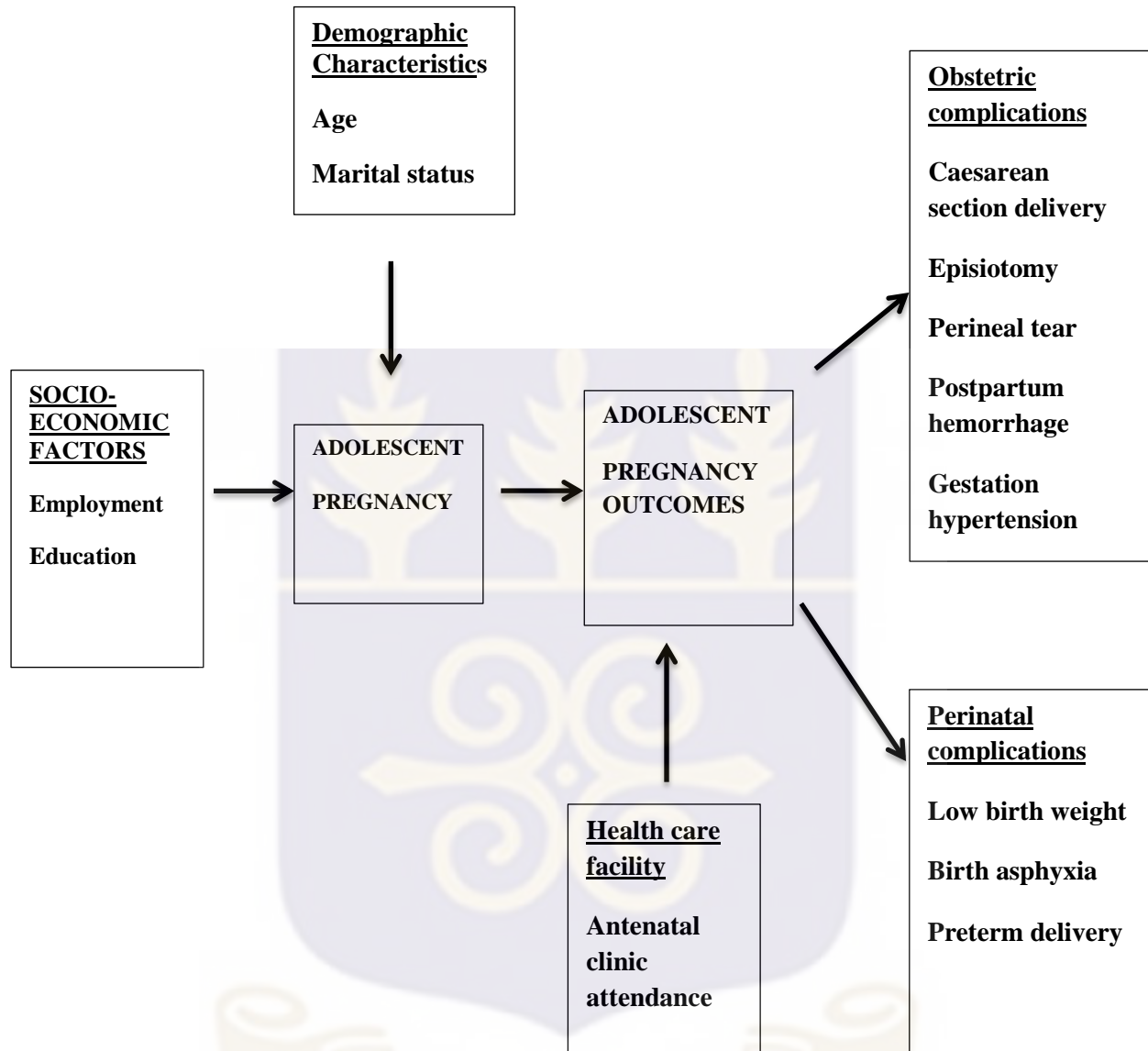
Maternal mortality is high globally even though strides have been made to reduce it. About 830 women die from pregnancy and childbirth related complications everyday (WHO, 2016). In Latin America, the risk of maternal mortality is four times higher in adolescents younger than 16 years than women in their twenties (WHO, 2016). In Africa, the maternal mortality ratio of adolescents 16-19 years is 570/100,000 live births which is higher than the ratio for young adults which is 510/100,000 live births (Nove, Matthews, Neal, & Camacho, 2014). It has been found that about 65% of women with obstetric fistulas developed it as adolescents with its attendant physical problems such as urinary incontinence, foul smelling vaginal discharge, and social stigmatization (WHO, 2014).

In Ghana 14% of adolescents aged 15-19 years are either pregnant or have had a child with regional variations. The Volta Region where the study site is located has the highest incidence of

22.1% followed closely by the central region with 21.3% (GDHS, 2014). Adolescent pregnancy rate in Akatsi South District is 14.7% which is higher than the national average of 11.9% (DHIMS/GHS, 2017) where the study was carried out.



### 1.3 Conceptual framework



**Figure 1.1: Conceptual framework adolescent pregnancy outcomes.**

Conceptual framework was adopted from a paper presented at the 27<sup>th</sup> IUSSP International population conference from 26<sup>th</sup> to 31<sup>st</sup> August 2013, by Shraboni Patra and Rakesh Kumah Singh titled Levels, Trends, Determinants and Consequences of Adolescent Pregnancy in India.

### **1.3.1 Conceptual framework narrative**

Socio-economic, demographic characteristics and healthcare related factors are known to impact on adolescent pregnancy.

The age at pregnancy has been found to be a significant factor in the occurrence of pregnancy related complications. These complications have a U-shaped distribution with regards to age. Adolescents tend to have higher incidence of pregnancy complications because of gynaecological immaturity. Complications tend to arise because of small uterine volume, short cervix syndrome and subclinical infections in the adolescents.

The influence of education on maternal health outcomes cannot be over emphasized. It has been observed in some countries that the provision of free education without discrimination up to the tertiary level has had a tremendous impact on maternal obstetric and perinatal outcomes. High maternal education increases the woman's access to, and understanding of information relating to health. In Sri Lanka for instance, the provision of free education contributed greatly to delaying the age at marriage, thereby reducing teenage pregnancies. Education has had similar impacts in Iran and Bangladesh. Iran had improvements in obstetric and perinatal outcomes and a concomitant reduction of maternal mortality ratio of about 72%.

Marital status has been found in some studies to have positive impact on the outcome of pregnancies. Rates of preterm delivery, small for gestational age and babies with low birth weight have been found to be significantly lower in married as compared to unmarried mothers. However, some studies found no difference in pregnancy outcomes between married and unmarried mothers. Marital status thus has a varied effect on pregnancy outcomes.

Maternal employment status has been reported to have missed effects on pregnancy outcomes. The pregnancy outcomes tend to depend on the maternal employment tasks. House wives were observed to have increased incidence of low birth weight deliveries among other complications whilst frequency of caesarean sections and low birth weight babies were observed more frequently in employed mothers.

Antenatal care for pregnant women is important to the health of pregnant women and the foetus in-utero in order to reduce morbidity and mortality associated with pregnancy, delivery and the postnatal period. It is recommended that pregnant women receive at least four essential evidenced based antenatal contacts during pregnancy in order to ensure optimal obstetric and perinatal outcomes. Antenatal care facilitates reduction in pregnancy related complications through thorough evaluation (history taking, physical examination and basic investigations), interventions (prevention/prophylaxis and treatment) and promotion (health education/counseling and health service dissemination). Absence or inadequate antenatal clinic attendance increases the chances of adverse pregnancy outcomes occurring in pregnant women.

Adolescent pregnancy could lead to maternal complications such as postpartum hemorrhage, pre-eclampsia and perineal tears and episiotomy. Fetal complications include birth asphyxia, preterm and low birth weight deliveries.

#### **1.4 Justification**

Adolescent pregnancy is a burning global problem and an essential risk to public health especially in sub-Saharan Africa (Liran et al., 2013). It is an issue facing countries all over the globe with negative social and economic consequences on the young women as well as on national development goals. These adverse pregnancy outcomes are higher in the extremes of age (Verma, Qureshi, Singh, Singh, & Sankhwar, 2016).

There is limited information regarding studies done in Ghana and specifically the Akatsi South District that looks at the outcomes of adolescent pregnancy as compared to adults. This study therefore seeks to provide evidence on outcomes of adolescent pregnancy with regards to obstetric and perinatal outcomes, and to assess the factors that are associated with these delivery outcomes. The study will provide firsthand information about the socio-demographic factors that tend to be associated with adverse pregnancy outcomes. Findings from this study will also serve as a source of information on adolescent pregnancy outcomes. It will also show the areas of obstetric care in adolescents and vicenarians that need urgent attention in the Akatsi District Hospital and inform training needs of the staffs. This could help in the formulation of policies regarding adolescent reproductive health services at the District level. Finally, the results of this study can be applied in other places that have similar sociodemographic characteristics as Akatsi South District.

## **1.5 Objectives**

### **1.5.1 General Objective**

To compare the obstetric and perinatal outcomes of adolescent and vicenarian pregnancies and the factors associated with these outcomes in the Akatsi District Hospital

### **1.5.2 Specific Objectives**

To compare adverse obstetric outcomes of adolescent and vicenarian pregnancies

To compare adverse perinatal outcomes of adolescent and vicenarian pregnancies

To determine the factors associated with the adverse pregnancy outcomes

## 1.6 Research Questions

Is there a difference between adolescents and vicenarians in terms of adverse obstetric outcomes of pregnancy?

Is there a difference between adolescents and vicenarians in terms of adverse perinatal outcomes of pregnancy?

What are the factors associated with adverse pregnancy outcomes?



## CHAPTER TWO

### LITERATURE REVIEW

#### 2.0 Introduction

There are several adverse obstetric and perinatal outcomes of pregnancy. This study however seeks to assess three each of obstetric and perinatal outcomes and the factors associated with pregnancy outcomes. This chapter therefore seeks to review the literature pertaining to these outcomes.

#### 2.1 Obstetric complications of pregnancy

The obstetric outcomes under consideration in this study include postpartum hemorrhage, pre-eclampsia/eclampsia and perineal tears and episiotomy.

##### 2.1.1 Post-partum hemorrhage (PPH)

Post-partum hemorrhage refers to the loss of 500mls of blood after vaginal delivery or 1000mls of blood after a caesarean section (WHO 2014). It is called primary postpartum hemorrhage if this blood loss occurs within 24hours of delivery and secondary postpartum hemorrhage if it occurs after 24hours of delivery. It is a major cause of morbidity and mortality worldwide accounting for 25% of maternal deaths globally with most of these deaths occurring in low and middle income countries (Woiski et al., 2015).

### **2.1.1.1 Causes of Postpartum hemorrhage**

There are a number of factors that cause postpartum hemorrhage. These factors can be grouped into four broad categories namely uterine atony, placental problems, genital tract trauma and systemic medical disorders (Abdul-Kadir et al, 2014).

Uterine atony is the commonest cause of PPH accounting for about 80% of all cases of PPH (Abdul-Kadir et al, 2014). Uterine atony basically means the failure of the uterus to contract after delivery of the baby. Factors that predispose pregnant women to uterine atony are prolonged labor, multiple gestation, grand multiparity, polyhydramnios and fetal macrosomia (Abdul-Kadir et al., 2014).

Placental problems include abnormal placentation and retained placenta while genital tract trauma entails cervical, vaginal and perineal tears (Abdul-Kadir et al., 2014). Systemic medical conditions like coagulopathies such as von-Willibrands disease (Abdul-Kadir et al., 2014) obesity and hypertensive disorders have also been implicated in the causation of PPH (Gollop et al., 2014; Suzuki, Hiraizumi, & Miyake, 2012). Other factors that have been stated as risks factors of post-partum hemorrhage are general anaesthesia and predelivery hemoglobin level of 9.9g/dl or less (Butwick et al., 2017). In a case control study done to identify risk factors for post-partum hemorrhage, it was found that a previous history of post-partum hemorrhage is one of the strongest risk factors for PPH (Nyflot et al., 2017). Other risk factors identified include severe pre-eclampsia or HELLP (hemolysis, elevated liver enzyme and low platelet) syndrome, assisted reproductive technologies and uterine fibromas (Nyflot et al., 2017).

### **2.1.1.2 Maternal age and PPH**

The effect of maternal age on the development of postpartum hemorrhage has been found in different studies to be conflicting with higher incidence of postpartum hemorrhage being seen in vicenarians than adolescents in most studies. Some studies however found no significant difference between the two groups.

In a study conducted in New York by Bommarito et al., (2015) to determine the effect of maternal age on the risk of labour and delivery complications, the occurrence of postpartum hemorrhage was found to be significantly higher in adolescents than in women aged 20-24years with women between 25-29 years serving as the reference. However, in another study conducted in a hospital in Nepal by Yadav et al., (2008) to determine the adverse reproductive outcomes associated with adolescent pregnancy, it was observed that there was no significant difference in the occurrence of postpartum hemorrhage between the adolescents and vicenarians. A similar non-significant finding was made in a study conducted in the year 2010 in Kano, North-Western Nigeria to determine the obstetric outcome of teenage pregnancy. In this study, 2.6% of adolescents as compared to 2.4% of vicenarians had postpartum hemorrhage (Omole-Ohonsi & Attah, 2010). These non-significant findings were further corroborated in a study done in a tertiary hospital in Turkey by Demirci et al., 2016 to determine the effect of young maternal age on perinatal and obstetric outcome. It was found that the occurrence of postpartum hemorrhage was similar in both adolescents and vicenarians.

Advanced maternal age has been observed in some studies to be a risk factor for postpartum hemorrhage. A study conducted in Abakaliki, Nigeria in 2014 found that vicenarians had a higher incidence of postpartum hemorrhage as compared to adolescents. They found that 16% of vicenarians as against 6% of adolescents had postpartum hemorrhage. This difference was

statistically significant (Onoh et al., 2014). Terence, Sahota, Cheng, Law, & Leung, (2014) also found in their study conducted in Hong Kong, China to determine the relationship between maternal age and the incidence of postpartum hemorrhage that advanced maternal age was a significant risk factor for postpartum hemorrhage.

### **2.1.1.3 Antenatal clinic attendance and PPH**

Antenatal clinic attendance has been shown to influence infant and maternal outcomes. The WHO recommends eight antenatal visits for uncomplicated pregnancies but increased if there are risk factors that could predispose the gravid woman to complications (WHO, 2016). It was observed in a study conducted by Worku, Yalew, & Afework, (2014) in Dabat District, Northwest Ethiopia, that four or more visits at the antenatal clinic is associated with reduced occurrence of postpartum hemorrhage by 25% (OR 0.75; 95% CI 0.25-2.75). For those who attended less than four times, they had a reduction of 9% (OR 0.91; CI 0.43-1.69). Another research done in Maiduguri, Nigeria in 2013 to study how birth interval and antenatal care contribute to the occurrence of postpartum hemorrhage found that 16% of those who had adequate antenatal care had postpartum hemorrhage as against 22% of those who had inadequate antenatal care albeit not statistically significant (Uthman, Garba, Danazumi, Mandara, & Sylvester, 2013).

### **2.1.2 Pre-eclampsia**

Pre-eclampsia is defined as systolic blood pressure  $\geq 140$ mmHg and diastolic  $\geq 90$ mmHg in a pregnant woman who was previously normotensive before the twentieth week of gestation and a proteinuria of  $\geq 0.3$ gram in a 24hour urine sample (Roccella, 2000).

The incidence rate of pre-eclampsia ranges from 2-5% in the developed countries to 4-18% in developing countries and accounts for 10-25% of maternal deaths (WHO, 2016).

#### **2.1.2.1 Risk factors for Pre-eclampsia**

There are conditions and health risks that predispose gravid women to pre-eclampsia/eclampsia. Some of these include nulliparity, multiple pregnancy, family history of pre-eclampsia, preexisting hypertension, chronic kidney disease, antiphospholipid syndrome, diabetes mellitus, maternal age > 40, previous history of pre-eclampsia, artificial insemination and maternal obesity (English, Kenny, & McCarthy, 2015).

#### **2.1.2.2 Maternal age and pre-eclampsia**

Several studies have sought to establish a relationship between maternal age and preeclampsia. There is conflicting evidence as to the relationship between maternal age and pre-eclampsia. Young maternal age has been documented as a risk factor for pre-eclampsia. In a study conducted in Beer-Sheva, Israel by Erez et al.(2006) titled Pre-eclampsia in twin gestations: Association with IVF treatments, parity and maternal age, it was found, though not statistically significant, that women younger than 20 years had higher incidence of severe pre-eclampsia than women between 20 to 34years. Moderate pre-eclampsia was also found to be higher in adolescents than adults in the same study. The incidence of pre-eclampsia was found to be significantly higher in adolescents than vicenarians in another study in New York that sought to determine the relationship between maternal age and delivery complications (Bommarito et al., 2015).

In other studies however, the converse is true as young maternal age was found to have lower incidence of pre-eclampsia. In a study conducted to determine the effect of young maternal age

on obstetric and perinatal outcomes in Turkey, incidence of pre-eclampsia in adolescents was found to be significantly lower as compared to adults (Demirci et al., 2016). Similar findings were made in other studies conducted in Nigeria by Loto et al., (2004) and Akadiri, Bakare, & Ko, (2015) where adolescents had lower incidence of pre-eclampsia as compared to vicenarians albeit not statistically significant.

Some other studies did not find any relationship between maternal age and pre-eclampsia. A study by Taebi, Sadat, Saberi, & Kalahroudi, (2015) conducted in Iran found no significant relationship between pre-eclampsia and maternal age. In another study conducted in South West Cameroon, there was no significant association between maternal age and pre-eclampsia as similar percentages of adolescents and vicenarians had pre-eclampsia (Egbe et al., 2015).

### **2.1.2.3 Antenatal clinic attendance and Pre-eclampsia**

The frequency of antenatal care has been found to be a good means of early detection of pre-eclampsia and has a significant impact on maternal and fetal outcomes in those who develop pre-eclampsia. There is a 12-fold risk of a poor maternal outcome and 53-fold risk of a poor fetal outcome and significantly higher risk of neonatal mortality in women who had inadequate antenatal visits in comparison to women who had adequate antenatal care (Mohamed, Martínez-Maestre, & Torrejón-Cardoso, 2016). The incidence of pre-eclampsia was found to be slightly higher in those who did not book for antenatal clinic as against those who book for antenatal clinic even though not significant. Eclampsia was however found to be significantly higher in those who did not book for antenatal clinic as against those who booked for antenatal clinic (Loto et al., 2004).

### **2.1.3 Perineal tears**

Perineal tear refers to the rending of tissues between the vulva and the anus caused by overstretching of the vagina during child birth. Risk factors of perineal tear include midline episiotomy, primary vaginal delivery, use of pudendal block, forceps delivery and birth weight greater than 4kg (Riskin-Mashiah, O'Brian, & Wilkins, 2002)

#### **2.1.3.1 Degrees of perineal tear**

Perineal tear has been graded into four degrees namely first, second, third and fourth degrees. First degree perineal tear involves only perineal skin laceration. Second degree tear involves the skin and the perineal muscle. Third degree perineal tear involves the disruption of the anal sphincter and may involve either or both internal and external anal sphincters (Eskandar & Shet, 2009). Fourth degree perineal tear involves disruption of the anal sphincter and a breach of the rectal mucosa (Eskandar & Shet, 2009).

#### **2.1.3.2 Maternal age and perineal tear**

The effect of maternal age on perineal tear occurrence is inconclusive as different studies had conflicting findings.

In a 2010 study to evaluate the risk factors of perineal tear in Tel Aviv University, Israel, young maternal age was a significant predictor for the development of perineal tears (Groutz et al., 2011). However, another study conducted in 2015 in the Hull and East Yorkshire NHS Trust, a University teaching hospital in the United Kingdom to assess the impact of maternal age on delivery outcome in women that spontaneously labour at term, found that increasing maternal age was rather a significant risk factor for perineal tear development during labour (Omih & Lindow, 2015).

#### **2.1.4 Episiotomy**

Episiotomy refers to the use of perineal incision to enlarge the vaginal orifice during the second stage of labour (Kalis, Laine, De Leeuw, Ismail, & Tincello, 2012). The ideal outcome of vaginal delivery is an intact perineum but this is sometimes not achieved and episiotomy is performed to expedite delivery and reduce soft tissue dystocia (Robinson, 2015). There are different types of episiotomy namely median, midline, mediolateral, J-shaped, radical lateral, anterior episiotomy and Schuchardt incision (Kalis et al., 2012). Episiotomies have been noted to increase the risk of severe perianeal tear, need for suturing and sexual impairment (Wu et al., 2013)

##### **2.1.4.1 Risk factors for episiotomy**

Risk factors for episiotomy in a study by Wu et al.,( 2013) include race, maternal exhaustion, fetal distress and experience of the midwife conducting the delivery. Other risk factors identified include primiparity, fetal macrosomia, short perineum and use of epidural anaesthesia (Wu et al, 2013).

##### **2.1.4.2 Maternal age and episiotomy**

The practice of performing episiotomy has been found to be affected by maternal age. Demirci et al., (2016) found in their study done in Turkey to determine the effect of young maternal age on perinatal and obstetric outcomes that, adolescent pregnancy was found to be associated with a significantly higher rate of episiotomy as compared to vicenarians. They observed that 91% of adolescents as against 80% of vicenarians had episiotomy performed. Another study to determine the outcome of adolescent pregnancies in Enugu, Nigeria found that adolescents had significantly higher rates of episiotomy as compared to vicenarians. While about 70% of adolescents had episiotomy performed, only about 30% of the vicenarians had episiotomy performed (Ezegwui et al., 2012).

## **2.2 Perinatal Complications of Pregnancy**

### **2.2.1 Low birth weight**

Low birth weight contributes to 60-80% of infant deaths and has a global prevalence of 15.5% amounting to 20million newborns each year. Ninety seven percent of these low birth weight deliveries occur in developing countries (WHO, 2014).

A neonate is said to be a low birth weight neonate when its birth weight is less than 2.5kg. Several of the deaths arising from low birth weight infants can be prevented by providing adequate warmth, good feeding practices, hygienic cord and skin care and prompt and proper management of complications like respiratory distress syndrome (WHO, 2014).

#### **2.2.1.1 Maternal age and low birth weight**

Studies have documented the association between young maternal age and low birth weight. Young maternal age was found in a study conducted in Nigeria by Ezegwui et al., (2012) that 23% of adolescents had low birth weight babies as against 10% of vicenarians. A prospective case control study conducted in India revealed that young maternal age has significant effect on low birth weight delivery. They found that 29.2% of adolescents as cases had low birth weight deliveries as compared to control group of adults who had 16.6% of low birth weight deliveries with a p-value of 0.019 (Dutta, et al, 2013).

In a retrospective cohort study titled Obstetric outcome of teenage pregnancies from 2002 to 2008: The Sheffield experience, it was found that adolescent pregnancy was positively associated with low birth weight delivery. In this study it was found that 10.5% of adolescents as compared to 8.5% of adults had low birth weight deliveries with a relative risk of 1.23 at 95%CI(1.06-1.42) and p-value of 0.005 (Jivraj, Nazzal, Davies, & Selby, 2010). Another

retrospective case control study carried out in Kano, North-Western Nigeria, found that 13% of adolescents as against 7% of the adults had low birth weight deliveries. This finding was statistically significant (Omole-Ohonsi & Attah, 2010).

### **2.2.1.2 Antenatal attendance and low birth weight**

Antenatal care is known to affect pregnancy outcomes. In a study done in Finland by Raatikainen, Heiskanen, & Heinonen, (2007), poor antenatal clinic attendance has adverse influence on pregnancy outcomes. It was found in the study that after logistic regression analysis controlling for confounding factors, low birth weight infants were significantly higher in under and non –attenders of antenatal clinic with Odds ratio at 95% CI of 9.18(6.65-12.68) and 5.46(3.9-7.65) respectively. In a study conducted 2012 in Kumasi, Ghana to assess the determinants of access to antenatal care and birth outcomes, it was found that infrequent use of antenatal care was associated with adverse pregnancy outcomes such as low birth weight (N. Ntui Asundep et al., 2013).

### **2.2.2 Preterm delivery**

Preterm delivery is one of the most serious public health problems globally and a major contributor to neonatal mortality (Guimarães, Araujo, Pires, Nardoza, & Moron, 2013). Preterm deliveries are those babies delivered before 37 completed weeks of gestation. About 15 million babies are born preterm every year and about 1 million die as a result of complications of prematurity (WHO, 2016).

There are various severities of prematurity. This include extremely preterm (less than 28 weeks), very preterm (28-32 weeks) and moderately preterm (32 to <37 weeks) (WHO, 2016).

Prematurity is the leading cause of deaths in under-fives globally. Most of the children who survive also do so with sequelae such as learning disabilities, visual and hearing problems (WHO, 2016).

### **2.2.2.1 Causes of preterm delivery**

The causes of preterm delivery are varied. Some of them are discussed below.

### **2.2.2.2 Short cervix syndrome**

A factor that has been identified as a common final pathway for most preterm deliveries is the so called short cervix syndrome. A statistically significant inverse relationship was found between the length of cervix on trans-vaginal ultrasound measurement and the risk of preterm delivery (Guimarães et al., 2013).

Other factors found that were significant risk factors for preterm delivery were previous preterm delivery and Streptococcus B infection (Schwab et al., 2016).

### **2.2.2.3 Maternal age and preterm delivery**

Adolescent pregnancy is a major risk factor in the delivery of preterm babies. In a study conducted in Enugu, Nigeria by Ezegwui et al., (2012) 25.7% of adolescent deliveries were premature as against 11.4% in women older than 19years. This difference was statistically significant with a p value of 0.001. In another study in south Western Nigeria, adolescent deliveries were associated with 32.7% of preterm deliveries while adults' deliveries were associated with 20.1%. This was statistically significant with a p value of 0.01. It was also found in another study that the odds of having a preterm delivery for women aged 11-14years, 15-19years and 20-24years with 25-29years as reference were determined to be as 1.57 at 99% CI (1.18-2.10), 1.19 at 99% CI (1.14-1.25) and 1.06 at 99%CI (1.03-1.10) respectively (Bommarito

et al., 2015). Contrary to the above studies however, Jivraj, Nazzal, Davies, & Selby,(2010) found that there was no statistical difference in the preterm delivery rate of adolescents as compared to adults.

#### **2.2.2.4 Antenatal clinic attendance and preterm delivery**

Poor antenatal care during pregnancy is known to impact negatively on pregnancy outcomes. Asunde et al., (2014) found in Kumasi, Ghana that the odds of having adverse outcomes was 2 times more in mothers who attended antenatal clinic less than four (aOR=2.27 95% CI; 1.30-3.94). In a study conducted in Malawi in the year 2004 to assess the risk factors and mechanisms of preterm delivery, it was found that infrequent antenatal clinic attendance was associated with increased preterm delivery rate (Abrams et al., 2004). Similar findings were made in a study conducted 2013 in Brussels, Belgium to determine the relationship between antenatal care and preterm birth. It was found that significantly 18% of those who had inadequate antenatal care had preterm deliveries as against 5% of those who had adequate antenatal care (Beeckman, Louckx, Downe, & Putman, 2013).

#### **2.2.3 Birth asphyxia**

Birth asphyxia basically refers to an insult to the organs of a newborn due to the failure to initiate and sustain breathing at birth. There is poor oxygen delivery, poor tissue perfusion, tissue hypoxia and accumulation of carbon dioxide resulting in a series of biochemical changes and eventual brain damage (Lincetto, 2007). Severe cases of birth asphyxia culminate in multiple organ damage and resultant neonatal mortality in some cases (Aslam, Saleem, Afzal, Iqbal, Saleem, Shaikh & Shahid, 2014). According to the WHO, 23% of neonatal deaths are as a result of birth asphyxia (Lincetto, 2007). Globally between four and nine million neonates suffer from

birth asphyxia each year with an estimated 1.2 million deaths and about the same number of infants who develop severe consequences, such as epilepsy, cerebral palsy, and developmental delay (Pitsawong & Panichkul, 2012).

Asphyxia is a condition that occurs when there is an impairment of blood-gas exchange, resulting in hypoxemia (lack of oxygen) and hypercapnia (accumulation of carbon dioxide). The combination of the decrease in oxygen supply (hypoxia) and blood supply (ischemia) results in a cascade of biochemical changes inside the body, whose events lead to neuronal cell death and brain damage. Continuous asphyxia will also lead to multiple organ systems dysfunction. Birth asphyxia is a serious clinical problem worldwide and contributes greatly to neonatal mortality and morbidity (Pitsawong & Panichkul, 2012).

Birth asphyxia has several risk factors such as caesarean delivery, prolonged second stage, prolonged rupture of membranes, meconium staining of liquor, multiple births, maternal antenatal anaemia and maternal febrile illness (Kiyani, Khushdil, & Ehsan, 2014). Other risk factors include antepartum hospitalization, antepartum hemorrhage, mal-presentation, low birth weight babies, severe pre-eclampsia and eclampsia (Kaye, 2003). These risk factors can be categorized into antepartum, intrapartum and fetal risk factors. Antepartum risk factors include gestational diabetes, pre-eclampsia, intake of adrenergic drugs, intake of diuretics, primiparous women and women with a previous history of birth asphyxia. The intrapartum risk factors include breech presentation, emergency caesarean section, cord prolapse, prolonged labour and spontaneous premature rupture of membrane. Fetal risk factors include prematurity, fetal distress, oligohydramnios and negative amniotic fluid surfactant test (Aslam et al., 2014a).

### **2.2.3.1 Maternal age and birth asphyxia**

Adolescents have been observed in most studies reviewed in this study to have a higher likelihood of delivering asphyxiated babies as compared to the vicenarians. A 2011 study conducted in Enugu, Nigeria found that the percentage of adolescents who had babies with APGAR score less than seven at one minute was 35.1% whilst that of the control group of adults was 19.1% with a p-value of 0.005 (Ezegwui et al., 2012). It was found in another study in Turkey that adolescent mothers were significantly at risk of having asphyxiated babies as compared to adults. Adolescents contributed 8% of asphyxiated babies as against 4% for the adults with a p value of 0.04 (Demirci et al., 2016). In this study, they found that about 84% of asphyxiated babies were delivered by vicenarians as compared to 14% by adolescents with the remaining 2% delivered by those above 30 years. However, in another study conducted in Pakistan by Aslam et al., (2014), it was found that significantly the vicenarian group was at a higher risk of delivering of asphyxiated neonates. A similar non-significant finding was made in a study done in Southwest Nigeria by Akadiri et al., (2015), where the effect of maternal age on birth asphyxia was found not to be significant. The percentage of adolescents whose babies had APGAR score less than seven at one minute was 33% whilst that for the adults was 34%.

### **2.2.3.2 Antenatal clinic attendance and birth asphyxia**

Poor antenatal attendance has been shown to be a major contributor to poor pregnancy outcomes and birth asphyxia is no exception. In a descriptive prospective study that was conducted in Isra University Hospital, Pakistan by Majeed, Memon, Majeed, Shaikh, & Rajar, (2007) 64% of 125 newborns who had birth asphyxia had mothers who poorly attended antenatal clinic.

In a retrospective case control study to determine the risk factors of birth asphyxia, it was found that the risk of birth asphyxia increased significantly in un-booked mothers as compared to booked mothers (Aslam et al., 2014).



## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.1 Study Design**

This was a retrospective chart review that analyzed and compared data of adolescent and vicenarian women who delivered their first babies in the Akatsi District Hospital from 1<sup>st</sup> January 2015 to 31<sup>st</sup> December 2016. Pregnancy outcomes of adolescent girls (aged between 10 and 19 years inclusive) were compared with pregnancy outcomes in vicenarians (women aged between 20 and 29 years inclusive) who delivered in the same hospital during the same period. Data was obtained from the admission and discharges book, delivery register, theatre register, ANC register, patient folders and the health information unit. The data collection was done over a period of 3 weeks.

#### **3.2 Study Site**

The study was conducted in the District Hospital of the Akatsi South District which is located in the southern part of the Volta Region of Ghana.

##### **3.2.1 Boundaries of Akatsi South District**

The district covers a land area of 536sq kilometers and is bounded by Keta Municipal to the South, Ketu North to the East, South Tongu to the West and to the North by Akatsi North (GDHS, 2014).

### 3.2.2 Map of Akatsi South District

Map of Akatsi South District

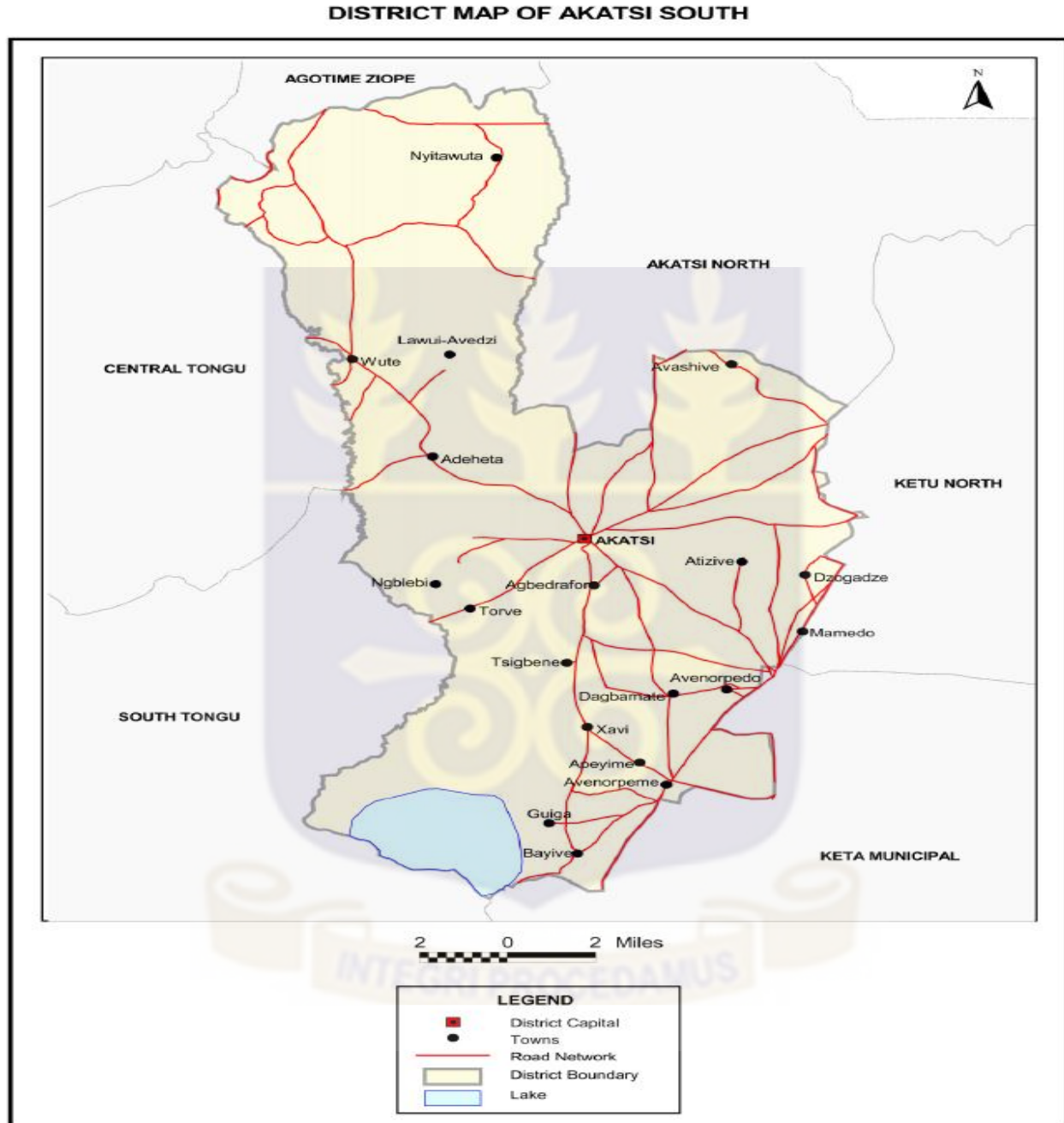


Figure 3.1: Map of Akatsi South District

Source: Ghana Statistical Service

### **3.2.3 Ethnicity**

Majority of the people in the district are Ewe with few immigrants from different ethnic groups such as the Akans, Ga's and the Hausa. The Ewe population is further divided into the Anlo people and the Avenor people.

### **3.2.4 Occupation of Akatsi Inhabitants**

The main occupations of the people are farming and petty trading. The main farm produce includes cassava, maize, groundnut, beans, sugar cane and black berries. However, there are various institutions like hospitals, schools, banks, the Ghana police service, Ghana revenue authority and the district assembly that employ various categories of workers.

### **3.2.5 Traditions and Festivals**

The people of Akatsi are part of the Anlo people and so celebrate the Hogbetsotso festival. This festival is celebrated annually to commemorate their migration from Notsie to their present location. The main dance of the people is the Agbadza dance.

The main food of the people of Akatsi is Akple with okro soup but with the advent of globalization, almost any food could be found in Akatsi.

### **3.2.6 Demographic characteristics of Akatsi**

It has a population of 98,684 representing 4.6% of the total population of the Volta Region (Ghana Statistical Service, 2014). The population is youthful with 36.7% being less than 15 years. The District has a high teenage pregnancy rate of 17.2% (DHIMS/GHS/2016).

### **3.2.7 Health Facilities in the District**

The District has one District Hospital which serves as the main referral facility in the district, four health centres, twenty nine CHPS compounds and four private facilities.

### **3.2.8 Profile of Akatsi District Hospital**

The Akatsi District Hospital was established as a Health Centre in 1994 and upgraded into a District Hospital in 2006. It is currently a 70 bed hospital. The services provided include general OPD, antenatal clinic, postnatal clinic, obstetric and gynecological services, general surgical services, pediatrics services and internal medicine services. Other services include laboratory services, diagnostic Imaging services, eye clinic, ART clinic, tuberculosis clinic and in-patient services.

### **3.2.9 Management Structure of Akatsi District Hospital**

The hospital is managed by a core management team led by the Medical Superintendent.

The Medical Superintendent coordinates all the medical and administrative issues of the hospital and reports directly to the Volta Regional Director of Health services. He is supported by a Nurse Manager who has direct oversight of nursing practice in the hospital. The head of administration and head of finance support the medical superintendent and offer advice on the day to day management of the hospital. The pharmacist, who is also a member of the core management team advises the management on the day to day running of pharmacy in the hospital.

The management team is supported by various cadres of staff. The hospital is manned by 6 medical officers, 39 general nurses, 21 midwives, 39 enrolled nurses, 2 physician assistant (Medical) and 2 physician assistant (Anesthesia). Other cadre of staff includes 2 biomedical scientists, 4 laboratory assistants, 2 laboratory technicians, a pharmacist, a pharmacy technician, a dispensary assistant and 5 medicine counter assistants. These clinical staffs are supported by

administrative and support staffs such as hospital administrator, accountant, executive officer, procurement manager, a supply officer and others.

The District Hospital is the facility with the most deliveries in the district. The hospital recorded 1,210 deliveries with 247 caesarean sections, 9,115 antenatal attendants, 36,043 general OPD attendants and 2 maternal deaths translating into a maternal mortality ratio of 165/100000 live births in 2015. Out of the total deliveries, 180 of them were adolescents and 618 were vicenarians, and there were 43 preterm deliveries and 107 low birth weight deliveries (DHIMS/GHS/2015).

In 2016, total OPD attendance was 45,319, total deliveries were 1,148 with 222 caesarean sections and antenatal clinic attendants were 10,177. There were 177 adolescent deliveries as compared to 655 vicenarian deliveries. There was one maternal death translating into a maternal mortality ratio of 87/100000 live births. A total of 40 and 163 preterm and low birth weight babies were delivered respectively (DHIMS/GHS/2016).

In 2015, the hospital was manned by 4 medical officers with the support of two obstetricians. The number of medical officers however reduced to three in 2016. There are 21 midwives in all with two to five of them running a shift which covers both maternity unit and labour ward.

### **3.3 Study population**

The study used data of women aged between 10 and 29 years who delivered their first child at the Akatsi District Hospital from the 1<sup>st</sup> of January 2015 to the 31<sup>st</sup> of December 2016 inclusive and met the inclusion criteria.

### **3.3.1.1 Inclusion criteria**

Records of women aged 10 to 29 years who delivered their first babies from the 1<sup>st</sup> of January 2015 to 31<sup>st</sup> December 2016 inclusive were recruited into the study.

### **3.3.2 Exclusion criteria**

Women who had delivered two or more babies within the age range were excluded.

Women aged 10 to 29 years with chronic hypertension, diabetes mellitus, pelvic deformities, scoliosis, sickle cell disease were excluded from the study because they are prone to high risk pregnancies.

Women who delivered their first babies but were outside the age range were also excluded.

### **3.4 Study Variables of the study**

The study compared quantitative variables amongst the two groups of primiparous women. Data were specifically collected on demographic characteristics such as age, marital status, occupation, religion and educational status as recorded, their Antenatal clinic attendance, and their obstetric and perinatal outcomes. The obstetric outcomes included post-partum hemorrhage, hypertension in pregnancy/pre-eclampsia/eclampsia, episiotomy and perineal tears. The perinatal outcomes were preterm delivery, low birth weight delivery and birth asphyxia (APGAR <7 at 5minutes).

**Table 3.1: Study Variables of the Study**

<b>Independent variables</b>	<b>Definition</b>
Patient's age years	Age as recorded
Educational level	Level of highest education as recorded
Marital status	Marital status as recorded
Occupation	Occupation as recorded
Antenatal clinic attendance	Number of antenatal clinic visits as recorded
<b>Dependent variables</b>	
Post-partum Hemorrhage	Loss of 500mls of blood after vaginal delivery or 1000mls after a caesarean section
Perineal tears and episiotomy	Any tear in the perineum or episiotomy as recorded
Hypertension in pregnancy/Pre-eclampsia	Either the presence of systolic blood pressure $\geq 140\text{mmHg}$ OR diastolic blood pressure $\geq 90\text{mmHg}$ OR both after 20weeks gestation in an otherwise normotensive client with proteinuria greater $\geq 1+$
Eclampsia	Pre-eclampsia with generalized tonic clonic seizures
Preterm delivery	Delivery before 37 completed weeks gestation as estimated from LMP or ultrasound
Low birth weight	Birth weight less than 2.5kg
Birth asphyxia	APGAR score at 5minutes $<7$

### 3.5 Sample Size of the Study

There was no predetermined sample size. All primiparous adolescents who met the inclusion criteria were recruited into the study. For each adolescent who is selected, the next available

vicenarian who delivered was recruited. A total of 245 adolescent primigravidae were recruited into the study and hence 245 vicenarian primigravidae were recruited.

### **3.6 Sampling Method**

Data on all primiparous adolescent and vicenarians was obtained and arranged in order according to the date and time of delivery. Adolescents who met eligibility criteria were selected. The next eligible vicenarian who delivered after the selected adolescent was selected. This was done until all the eligible adolescents and hence vicenarians were selected. The data abstraction was done mainly in the maternity ward, theatre and health information unit over a period of three weeks. Data abstraction was done by 4 research assistants who were recruited and trained.

### **3.7 Data Collection Tool**

A structured data abstraction tool was used to collect the data for this study. The form was divided into three thematic areas namely demography, obstetric outcomes and perinatal outcomes. The demography section looked at the age, marital status, educational level, occupation, religion, booking status and the number of ANC visits. The obstetric outcomes section looked at the mode of delivery and the presence or absence of various complications such as perineal tear and episiotomy, pre-eclampsia, eclampsia, antepartum and post-partum hemorrhage. The perinatal outcome section focussed on birth weight, birth asphyxia, and preterm delivery.

### **3.8 Data Collection Method**

The Admission and Discharges register as well as the Delivery register were reviewed with the aid of a data abstraction tool that was designed for the abstraction of data.

The demographic characteristics such as age, marital status and educational status which are normally captured in the admission and discharge register were collected. The unique hospital registration numbers of the clients were used to identify the study subjects. Obstetric and perinatal outcomes which are also captured in the admission and discharge and the delivery register was also collected. Information on ANC attendance which is normally captured in the admission and discharge register and the ANC register was also gathered with the aid of the data abstraction tool. The data abstraction was done within a period of three weeks by four trained personnel. The folders of each 490 clients recruited into the study were retrieved in order to get information regarding Blood pressure measurements of clients, urine proteins, history of seizures and amounts of blood loss. The research assistants included two diploma midwives with two years working experience, one diploma general nurse with two years working experience and an HND statistician with four years working experience who also doubled as the field supervisor.

### **3.9 Data Processing and Analysis**

The data abstracted were cleaned to remove discrepancies. Data were entered into Microsoft Excel, double checked and imported in Stata 14.1 for analysis. Data were analyzed using descriptive statistics such as frequencies and means. Bivariate analysis of categorical variables was done with Pearson Chi-square test of independence. Welch t-test was used to analyze continuous variables. Multivariable analysis of factors affecting adverse pregnancy outcomes in adolescents was based on the multiple logistic regression analysis. A p-value of  $<0.05$  was said to be statistically significant throughout the study.

### **3.10 Quality Control of the Study**

Four research assistants were recruited and given training on the variables of interest of the study. The research assistants were not told the purpose of the study to prevent bias in the data

abstraction. A pilot data abstraction was done for 40 randomly selected case records within a period of five days in order to test the data abstraction tool and the competence of the data abstractors. All weaknesses identified were ironed out by the principal investigator. Coded data abstraction forms were checked on daily basis for consistency and completeness.

Daily meetings were held amongst the research assistants to discuss any issues or difficulties pertaining to the data collection and to ensure the completeness of the data. The principal investigator met the data collectors on alternate days or any time the need arose to discuss and resolve any issues pertaining to the data collection.

### **3.11 Ethical clearance**

Ethical clearance was obtained from the Ghana Health Service Ethical Review Committee of the Research and Development Division of the Ghana Health Services before the commencement of data collection.

Approval was obtained from the Volta Regional Director of Health Services and the Administrator and Management of the Akatsi District Hospital before data collection was commenced.

### **3.12 Data Storage and Usage**

Data abstraction forms were coded and kept under lock and key by the principal investigator. Data abstracted was entered into Microsoft Excel within 24 hours of abstraction and saved under a password only known to the principal investigator.

### **3.13 Potential risks/benefits**

There were no potential risks and direct benefits to the clients whose records were used in this study.

### **3.14 Privacy/Confidentiality**

Clients' information that was abstracted was kept strictly confidential and not divulged to third parties. Their names were not recorded.

### **3.15 Conflict of Interest**

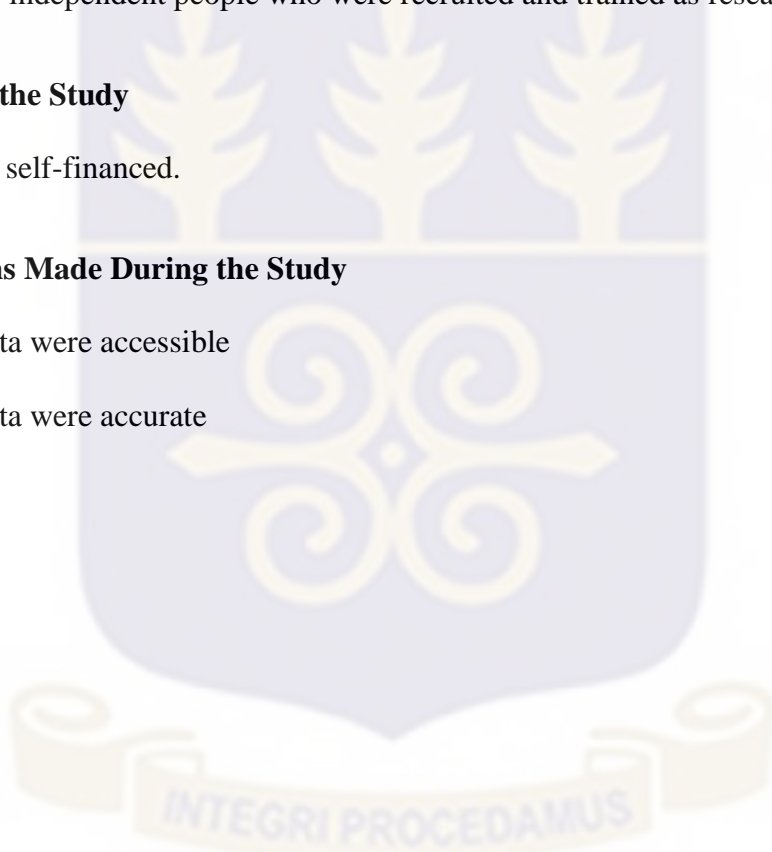
As an employee of the Ghana Health Service working in the Akatsi District Hospital, I have an interest in the study aside the academic and public health importance. Data abstraction was therefore done by independent people who were recruited and trained as research assistants.

### **3.16 Funding of the Study**

The research was self-financed.

### **3.17 Assumptions Made During the Study**

- a. Patient data were accessible
- b. Patient data were accurate



## CHAPTER FOUR

### RESULTS

#### 4.0 Introduction

This chapter presents the results obtained from the data analysis. The demographic information is first presented. The various results aimed at addressing the objectives of the study are subsequently presented.

#### 4.1 Demographic characteristics of first time mothers delivering at Akatsi District Hospital

In all, four hundred and ninety data case records were reviewed for the study. Half of the case records were for adolescents and the other half for vicenarians. The mean age of the adolescents was 17.45 (SD =1.26) with age range of 13-19years whilst that of the vicenarians was 23.64 (SD=2.85) with the age range of 20-29years. More than half (51%) of the mothers were married, most of them had education up to primary level (65%) and almost all (98.6%) were booked for antenatal clinic attendance. However only 78% had at least four antenatal visits. The details are in table 4.1



**Table 4.1: Demographic characteristics of first time mothers delivering at Akatsi District Hospital**

Demographic characteristics	Adolescents N=245 n (%)	Vicenarians N=245 n (%)	Total N=490 n (%)
<b>Marital status</b>			
Single	172 (70.2)	24 (9.8)	196(40)
Married	59 (24.1)	192 (78.4)	251(51.2)
Cohabiting	13 (5.3)	29 (11.8)	42(8.6)
Widow	1 (0.4)	0 (0.00)	1(0.2)
<b>Formal Education</b>			
No education	10 (4.1)	8 (3.3)	18(3.7)
Primary	199 (81.2)	122 (49.8)	321(65.5)
Secondary	36 (14.7)	83 (33.9)	119(24.3)
Tertiary	0 (0.00)	32 (13.1)	32(6.5)
<b>Occupation</b>			
Employed	43 (17.6)	181 (73.9)	224(45.7)
House wife	10 (4.1)	9 (3.7)	19(3.9)
Unemployed	192 (78.4)	55 (22.4)	247(50.4)
<b>Religion</b>			
Christian	235 (93.5)	234 (94.3)	469(95.7)
Muslim	7 (2.9)	7 (2.9)	14(2.9)
Traditionalist	3 (1.2)	4 (1.6)	7(1.4)
<b>ANC attendance</b>			
Booked	242 (98.8)	241 (98.4)	483(98.6)
Unbooked	3 (1.2)	4 (1.6)	7(1.4)
<b>ANC visits</b>			
0-3 visits	80 (32.7)	28 (11.4)	108(22)
≥4 visits	165 (67.3)	217 (88.6)	382(78)

Source: Field survey, 2017

#### **4.2 Bivariate analysis of obstetric outcomes among adolescents and vicenarians**

This section analyzed the obstetric outcomes between the adolescents and vicenarians mainly using Pearson's  $\chi^2$ . The obstetric outcomes analyzed were episiotomy, perineal tears, hypertensive states in pregnancy (pre-eclampsia and eclampsia), and modes of delivery. From the bivariate analysis, caesarean section delivery and episiotomy were the only obstetric outcomes that were associated with age group ( $p < 0.05$ ). The overall prevalence of caesarean deliveries was 19.8% (95% CI; 16.5-23.6%). Vicenarians who delivered by CS was about twice the number of adolescents who had CS delivery (28.9% vs 14.7%,  $p = 0.05$ ).

Overall, episiotomy was prevalent at 44.1% (95% CI: 39.7%-48.5%) among the mothers. For adolescent mothers, prevalence of episiotomy was 53.9% (95% CI; 47.6-60%) whilst the vicenarians had a prevalence of 34.3% (95% CI; 28.6-40.5%). This difference was statistically significant ( $p < 0.001$ ). The prevalence of hypertension in pregnancy was 4.9% (95% CI; 3.8-7.2%), eclampsia was prevalent at 1.2% (95% CI; 0.5-2.7%). There was not significant statistical association between eclampsia, hypertension in pregnancy, perineal tear and age group. Details of the bivariate analysis can be found in table 4.2.

**Table 4.2: Bivariate analysis of obstetric outcomes between adolescents and vicenarians**

Obstetric outcomes	Age			$\chi^2$	p-value
	Adolescents N=245 n (%)	Vicenarians N=245 n(%)	Totals N=490 n(%)		
<b>Mode of delivery</b>				8.03	<b>0.005</b>
Yes	36 (14.7)	61 (28.9)	97(19.8)		
No	209(85.3)	184(75.1)	393(80.2)		
<b>Hypertension in Pregnancy</b>				2.80	0.094
Yes	16 (6.5)	8 (3.3)	24(4.9)		
No	229 (93.5)	237 (96.7)	466(95.1)		
<b>Eclampsia</b>				2.70	0.100
Yes	5 (2.0)	1 (0.4)	6(1.2)		
No	240 (98.0)	244(99.6)	484(98.8)		
<b>Episiotomy</b>				19.08	<b>&lt;0.001</b>
Yes	132 (53.9)	84 (34.3)	216(44.1)		
No	113 (46.1)	161 (65.7)	274(55.9)		
<b>Perineal tear</b>				1.20	0.273
Yes	13 (5.3)	19 (7.8)	32(6.5)		
No	232 (94.7)	226 (92.2)	458(93.5)		
<b>Median blood loss after SVD</b>	161.30mls (sd=45.27)	163.04mls (sd=42.96)	162.13mls (sd=44.14)	-0.38 §	0.702 ¥
<b>Median blood loss after CS</b>	414.24mls (sd=97.02)	434.82mls (sd=113.59)	427.19 (sd=107.64)	-0.91 §	0.368 ¥

p-values were based on Pearson Chi-square test for categorical variables, sd: standard deviation, mls: milliliters, ¥: p-values obtained from welch t-test, §: t- test statistic value from welch t-test

### 4.3 Bivariate analysis of perinatal outcomes between adolescents and vicenarians

This section analyzed the perinatal outcomes between the adolescents and vicenarians mainly using Pearson's  $\chi^2$  as the statistical tool. The perinatal outcomes analyzed include birth weight, preterm deliveries and birth asphyxia. Birth asphyxia, low birth weight and preterm delivery were the perinatal outcomes assessed. From the bivariate analysis, preterm delivery and low birth

weight were significantly associated with age. The prevalence of the perinatal outcomes is as follows: low birth weight - 26.3% (95% CI; 22.6-30.4%), birth asphyxia – 8.4% (95% CI; 6.2-11.2%) and preterm delivery -18.4% (95% CI; 15.2-22.1%). For low birth weight, adolescents had significantly 13.5% higher prevalence than the vicenarians (33.1% vs 19.6%, p=0.001).

Adolescents recorded a higher percentage of preterm deliveries compared to vicenarians (23.3% vs 13.5%, p=0.001). There was not sufficient statistical evidence of association between birth asphyxia and age. Details are found in table 4.3 below.

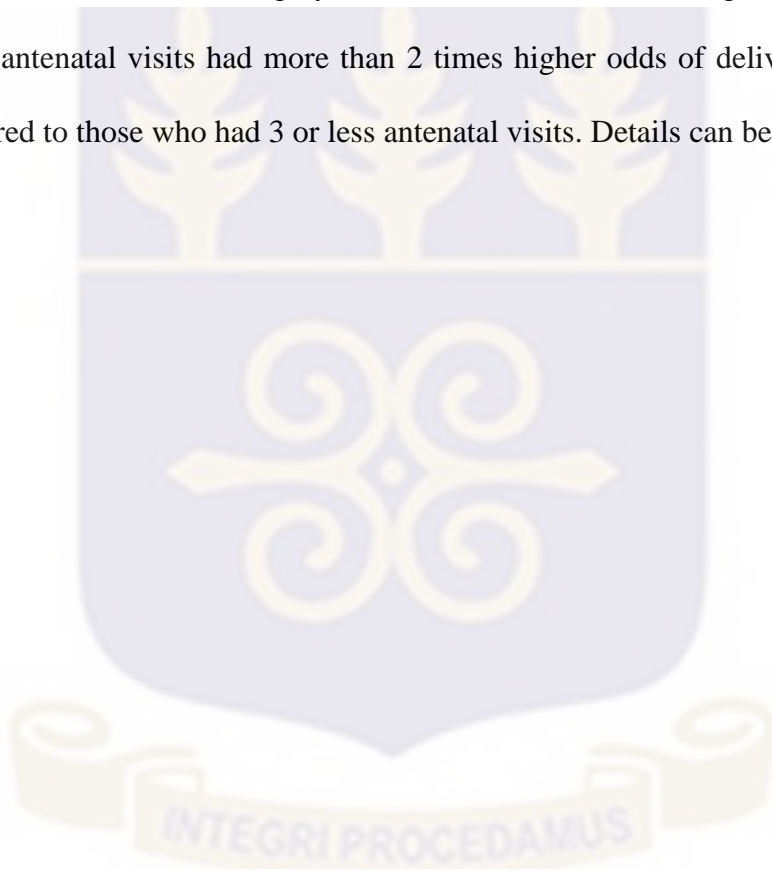
**Table 4.3: Bivariate analysis of perinatal outcomes between adolescents and vicenarians**

Perinatal outcomes	Age			$\chi^2$	p-value
	Adolescents	Vicenarians	Total		
	N=245 n (%)	N=245 n (%)	N=490 n (%)		
<b>Birth weight</b>				11.46	<b>0.001</b>
Low	81 (33.1)	48 (19.6)	129(26.3)		
Normal	164 (66.9)	197 (80.4)	361(73.7)		
<b>Birth asphyxia</b>				0.67	0.414
APGAR < 7	23 (9.4)	18 (3.67)	41(8.4)		
APGAR ≥ 7	222 (90.6)	227 (92.7)	449(91.6)		
<b>Gestation at delivery</b>				7.84	<b>0.005</b>
Preterm	57 (23.3)	33 (13.5)	90(18.4)		
Term	188 (76.7)	212 (86.6)	400(81.6)		

p-values were based on Pearson Chi-square test

#### **4.4 Multiple logistic regression of factors associated with mode of delivery (caesarean section)**

From the results, age was not significantly associated with caesarean section after controlling for confounders. Mothers with tertiary education significantly had more than 9 times higher odds of delivering by caesarean section as compared to those who had no education (aOR=9.72 95% CI; 1.06-88.71). Mothers with primary and secondary education compared to those with no education had higher odds of delivering by caesarean section albeit not significant. Mothers who had at least four antenatal visits had more than 2 times higher odds of delivering by caesarean section as compared to those who had 3 or less antenatal visits. Details can be seen in table 4.4.



**Table 4.4: Logistic regression of factors associated with mode of delivery(CS)**

<b>Factors</b>	<b>uOR</b>	<b>(95% CI)</b>	<b>aOR</b>	<b>(95% CI)</b>
<b>Age</b>				
Adolescents	Ref			Ref
Vicenarians	<b>1.92</b>	<b>(1.22-3.03)*</b>	1.51	(0.42-1.29)
<b>Education level</b>				
No education	Ref			Ref
Primary education	3.44	(0.48-26.39)	3.19	(0.33-22.2)
secondary education	4.99	(0.63-39.22)	2.28	(0.44-31.7)
Tertiary	<b>15</b>	<b>(1.78-126.59)</b>	<b>9.72</b>	<b>(1.06-88.71)</b>
<b>Marital status</b>				
Single	Ref			Ref
Married	1.26	(0.79-2.02)	0.53	(0.26-1.08)
Cohabiting	1.08	(0.46-2.54)	0.64	(0.24-1.71)
<b>Occupation</b>				
Employed	Ref			Ref
Housewife	0.36	(0.08-1.61)	0.49	(0.1-2.41)
Unemployed	<b>0.59</b>	<b>(0.38-0.94) *</b>	0.71	(0.38-1.32)
<b>Religion</b>				
Christian	Ref			Ref
Muslim	1.10	(0.3-4.0)	0.83	(0.13-5.14)
Traditionalist	0.67	(0.08-5.67)	1.48	(0.16-13.67)
<b>ANC visits</b>				
Less than 4	Ref			Ref
4 or more	<b>2.56</b>	<b>(1.3-5.0)*</b>	<b>2.47</b>	<b>(1.15-5.32) *</b>

ref: the reference category, uOR: unadjusted odds ratio from simple logistic regression, aOR: adjusted odds ratio from multiple logistic regression, \*p<0.05, \*\*p<0.01, \*\*\*p<0.001, CI: Confidence interval

#### **4.5: Multiple logistic regression of factors associated with episiotomy**

From the results, vicenarians were found to have significantly lower odds of having episiotomy performed as compared to the adolescents after controlling for confounders. They had 65% less the odds of episiotomy compared with the adolescents (aOR=.035 95% CI; 0.21-0.60). Mothers

who were married had significantly lower odds of having episiotomy performed albeit not significant after controlling for confounders. Number of antenatal clinic visits was also found to significantly reduce the odds of having episiotomy performed. However, after controlling for confounders it became statistically not significant. Details are displayed in table 4.5 below.

**Table 4.5: Logistic regression of factors associated with episiotomy**

Factors	uOR	(95% CI)	aOR	(95% CI)
<b>Age</b>				
Adolescents	ref			Ref
Viceniarians	<b>0.45</b>	<b>(0.31-0.64)***</b>	<b>0.35</b>	<b>(0.21-0.60)***</b>
<b>Education Level</b>				
No education	ref			Ref
Primary education	0.99	( 0.38 - 2.58 )	1.11	(0.87-2.69)
secondary education	1.11	( 0.41 - 3.01 )	1.55	(0.50-4.82)
Tertiary	0.57	( 0.17 - 1.87 )	1.15	(0.31-4.32)
<b>Marital Status</b>				
Single	ref			Ref
Married	<b>0.62</b>	<b>(0.48-0.80)*</b>	0.91	(0.52-1.57)
Cohabiting	1.00	(0.55-1.83)	1.31	(0.60-2.84)
<b>Occupation</b>				
Employed	ref			Ref
Housewife	0.73	(0.29-1.81)	0.84	(0.30-2.79)
Unemployed	0.87	(0.68-1.12)	0.67	(0.46-1.12)
<b>Religion</b>				
Christian	ref			Ref
Muslim	0.56	(0.19-1.66)	0.81	(0.23-2.83)
Traditionalist	2.5	(0.48-12.91)	3.66	(0.6-22.2)
<b>ANC visits</b>				
Less than 4	ref			Ref
4 or more	<b>0.71</b>	<b>(0.58-0.87)**</b>	0.78	(0.48-1.28)

ref: the reference category, uOR: unadjusted odds ratio from simple logistic regression, aOR: adjusted odds ratio from multiple logistic regression, \*p<0.05, \*\*p<0.01, \*\*\*p<0.001, CI: Confidence interval

#### 4.6 Multiple logistic regression of factors associated with low birth weight

From the results, vicenarians and those who had higher education had significantly lower odds of giving birth to low birth weight babies even though they were not significant after controlling for confounders ( $p>0.05$ ).

**Table 4.6: logistic regression of factors associated with low birth weight deliveries**

<b>Factors</b>	<b>uOR</b>	<b>(95% CI)</b>	<b>aOR</b>	<b>(95% CI)</b>
<b>Age</b>				
Adolescents	Ref			Ref
Vicenarians	<b>0.49</b>	<b>(0.32 - 0.75)**</b>	0.73	(0.41-1.31)
<b>Educational level</b>				
No education	Ref			Ref
Primary education	1.41	(0.45 - 4.38)	0.68	(0.37-1.26)
Secondary education	1.13	(0.34 - 3.70)	0.66	(0.31-1.39)
Tertiary	0.5	(0.11 - 2.30)	0.46	(0.13-1.6)
<b>Marital status</b>				
Single	Ref			Ref
Married	<b>0.47</b>	<b>(0.30 - 0.72)**</b>	0.81	(0.44-1.49)
Cohabiting	0.98	(0.49 - 2.00)	1.30	(0.58-2.94)
<b>Occupation</b>				
Employed	Ref			Ref
Housewife	0.75	(0.21 - 2.67)	0.80	(0.20-3.09)
Unemployed	<b>1.94</b>	<b>(1.27 - 2.96)**</b>	1.33	(0.76-2.32)
<b>Religion</b>				
Christian	Ref			Ref
Muslim	0.75	(0.21 - 2.73)	0.84	(0.22-3.25)
Traditionalist	0.46	(0.05 - 3.85)	0.40	(0.05-4.07)
<b>ANC visits</b>				
Less than 4	Ref			Ref
4 or more	0.49	(0.31 - 0.77)	0.66	(0.37-0.98)

ref: the reference category, uOR: unadjusted odds ratio from simple logistic regression, aOR: adjusted odds ratio from multiple logistic regression, \* $p<0.05$ , \*\* $p<0.01$ , \*\*\* $p<0.001$ , CI: Confidence interval

#### 4.7 Multiple logistic regression of factors associated with birth asphyxia

From the results in table 4.7, vicenarians were found to have significantly higher odds of having asphyxiated babies albeit not significant after controlling for confounders. Four or more antenatal clinic visits gave mothers significantly lower odds of giving birth to asphyxiated babies after controlling for confounders (aOR 0.46, 95% CI; 0.20-0.99).

**Table 4.7: Logistic regression of factors associated with birth asphyxia**

Factors	uOR	(95% CI)	aOR	(95% CI)
<b>Age</b>				
Adolescents	ref		ref	
Vicenarians	<b>0.08</b>	<b>(0.05-0.13)**</b>	0.63	(0.25-1.59)
<b>Education Level</b>				
No education	ref		ref	
Primary education	<b>0.09</b>	<b>(0.06-0.13)**</b>	0.62	(0.15-2.48)
secondary education	<b>0.11</b>	<b>(0.06-0.20)**</b>	0.90	(0.22-3.69)
Tertiary	<b>0.10</b>	<b>(0.03-0.34)**</b>		
<b>Marital Status</b>				
Single	ref		ref	
Married	<b>0.09</b>	<b>(0.06-0.14)**</b>	1.35	(0.51-3.61)
Cohabiting	<b>0.11</b>	<b>(0.04-0.3)**</b>	1.12	(0.3-4.15)
<b>Occupation</b>				
Employed	ref		ref	
Housewife	<b>0.12</b>	<b>(0.03-0.51)**</b>	1.22	(0.18-8.09)
Unemployed	<b>0.09</b>	<b>(0.06-0.15)**</b>	0.92	(0.4-2.08)
<b>Religion</b>				
Christian	ref		ref	
Muslim	<b>0.27</b>	<b>(0.08-0.98)*</b>	5.11	(1.10-23.8)
Traditionalist	0.17	(0.02-1.39)	1.76	(0.18-17.08)
<b>ANC visits</b>				
Less than 4	ref		ref	
4 or more	<b>0.08</b>	<b>(0.05-0.11)**</b>	<b>0.46</b>	<b>(0.20-0.99)*</b>

ref: the reference category, uOR: unadjusted odds ratio from simple logistic regression, aOR: adjusted odds ratio from multiple logistic regression, \*p<0.05, \*\*p<0.01, \*\*\*p<0.001, CI: Confidence interval

#### 4.8 Multiple logistic regression of factors associated with preterm delivery

From the results, four or more antenatal clinic visits gave mothers significantly lower odds of having preterm deliveries before and after controlling for confounders (aOR 0.29, 95% CI; 0.17-0.51). Vicenarians were seen to have lower odds of having preterm deliveries although not significant after controlling for confounders. Details of the logistic regression are shown in table 4.8

**Table 4.8: logistic regression of factors associated with preterm delivery**

Factors	uOR	(95% CI)	aOR	(95% CI)
<b>Age</b>				
Adolescents	Ref		Ref	
Vicenarians	<b>0.16</b>	<b>(0.11-0.22)**</b>	0.65	(0.34-1.24)
<b>Education level</b>				
No education	Ref		Ref	
Primary education	0.59	(0.20 - 1.71)	0.50	(0.26-0.96)
secondary education	0.69	(0.23 - 2.12)	0.79	(0.36-1.73)
Tertiary	0.08	(0.01 - 0.79)	0.14	(0.02-1.17)
<b>Marital status</b>				
Single	Ref		ref	
Married	0.65	(0.40 - 1.06)	1.3	(0.65-2.62)
Cohabiting	0.84	(0.36 - 1.94)	0.89	(0.33-2.38)
<b>Occupation</b>				
Employed	Ref		ref	
Housewife	0.66	(0.14 - 2.98)	0.59	(0.15-2.37)
Unemployed	1.56	(0.97 - 2.51)	1.04	(0.6-1.78)
<b>Religion</b>				
Christian	Ref		ref	
Muslim	0.76	(0.17 - 3.48)	0.87	(0.2-3.68)
Traditionalist	<b>6.11</b>	<b>(1.34 - 27.81)</b>	4.22	(0.81-22.02)
<b>ANC visits</b>				
Less than 4	Ref		ref	
4 or more	<b>0.26</b>	<b>(0.16 - 0.42)***</b>	<b>0.29</b>	<b>(0.17-0.51)**</b>

ref: the reference category, uOR: unadjusted odds ratio from simple logistic regression, aOR: adjusted odds ratio from multiple logistic regression, \*p<0.05, \*\*p<0.01, \*\*\*p<0.001, CI: Confidence interval

## CHAPTER FIVE

### DISCUSSION

#### 5.0 Introduction

This chapter discusses the findings of the study in the light of current literature. It discusses the socio-demographic characteristics, antenatal attendance and mode of delivery. It then focuses on the comparison of obstetric and perinatal outcomes. Finally, it discusses the factors that affect these outcomes of pregnancy.

This study found that vicenarians had significantly lower odds of having episiotomy performed after controlling for confounders. Adolescents were found to have higher odds of having vaginal deliveries. Preterm delivery, birth asphyxia and low birth weight deliveries were higher in adolescents. Higher education, at least four antenatal visits and being married have been found to be generally protective against episiotomy, low birth weight, preterm delivery.

#### 5.1 Sociodemographic characteristics

The sociodemographic characteristics in this study do not differ significantly from other studies. Generally as the study mothers progressed along the academic ladder, a higher percentage of vicenarians than adolescents were seen. This study found that 99% of the study participants had attended antenatal clinic at least once during the pregnancy which is higher than both the global average of 64% (WHO, 2017), and the national average of 97% (GDHS, 2014).

In Ghana, averagely 87% of pregnant women had four or more visits with the number ranging from 82% in rural areas to 93% in urban centres (GDHS, 2014). This study found that almost 78% of the study population had four or more antenatal visits which was lower than the national

average with adolescents contributing 34% and the vicenarians contributing 44%. These findings could be attributed to the fact that most of the adolescents are un-employed and therefore not empowered financially and also the stigma that comes with adolescent pregnancy.

## **5.2 Obstetric outcomes between adolescents and vicenarians**

This study found that the mode of delivery varied amongst the two groups significantly. The adolescents had more successful vaginal deliveries than the vicenarians. It was found that 85% of the adolescents had successful vaginal deliveries as compared to 75% of the vicenarians. After controlling for confounders however, there was no significant association between age and mode of delivery (aOR=1.51 95% CI: 0.42-1.29). Similar findings were made in Southwest Nigeria by Akadiri et al., (2015) in their study to determine the obstetric outcome of teenage pregnancy in a free antenatal setting. They found that 85% of adolescents had spontaneous vaginal delivery as against 70% of vicenarians.

Similar findings were made in other parts of the globe. In India for instance, a study done by Sagili, Karthiga, Mascarenhas, & Rani, (2012) to find out if adolescents were at higher risk of adverse pregnancy outcomes showed that 82% of the adolescents had successful spontaneous vaginal deliveries as compared to 62% of the vicenarians. This difference was significant statistically. Demirci et al., (2016), also found in their study done in Turkey that adolescents had significantly more successful vaginal deliveries than the vicenarians. They found that about 82% of adolescents as against 75% of vicenarians had vaginal deliveries with this difference being statistically significant.

These differences in vaginal delivery rates between adolescents and vicenarians were attributed to better uterine muscle function, greater elasticity of connective tissues and lower cervical

compliance. These differences in the mode of delivery could also be attributed to the fact that the adolescents had more low birth weight and preterm babies which were small and hence easy to deliver vaginally (Demirci et al., 2016).

This study found that a lower percentage of adolescents had caesarean section as against vicenarians. Caesarean delivery was 51% more likely in vicenarians than adolescents albeit not statistically significant. A study in Israel by Liran et al., (2013), found that averagely 8% of adolescents had caesarean section as compared to 11% of vicenarians which is lesser than the caesarean section rate in this study where about 15% of the adolescents and 30% of the vicenarians had caesarean sections. The findings in this study were in accordance with other studies done by Jivraj et al., (2010) where 15% of the adolescents as against 27% of the adults had caesarean sections.

However, in a study done in Nigeria by Loto et al., (2004), it was found that 23.% of adolescents had caesarean sections as against 17.1% of vicenarians albeit not significant. This finding is at variance with the findings of this study. Another study also had findings which were at variance with the findings of this study. Onoh et al., (2014) in Southeast Nigeria found that significantly 23% of adolescents had successful vaginal deliveries as against 15% of adults.

This study found that the incidence of hypertension in pregnancy is higher in the adolescent age group as compared to the vicenarians albeit not statistically significant. Seven percent of the adolescents had hypertension as against 4% of the vicenarians. This finding is in accord with studies done by Dutta et al, (2013) where they found that 18.5% of adolescents had hypertension in pregnancy as against 6.8% of the vicenarians. The incidence of hypertension is however lower in this study.

However, a study done to determine the effect of young maternal age on maternal and perinatal outcomes in Turkey by Demirci et al., (2016) had findings which were at variance to the findings of this study. It was found that the adults group had significantly higher cases of hypertension in pregnancy than the adolescents. 6.6% of the adolescents as compared to 8.7% of the adults had hypertension in pregnancy. A reason adduced for this difference is maternal obesity and rapid gestational weight gain. However adolescents tend to be malnourished and hence the lower risk of pre-eclampsia (Ganchimeg et al., 2014).

The incidence of eclampsia in this study was found to be higher in the adolescents (2%) than the vicenarians (0.4%) albeit not statistically significant. This finding was similar to a study done in Cameroon to determine the prevalence and outcome of teenage hospital births. It was found that 2% of adolescents had eclampsia as against 0.8% of the adult group although not statistically significant (Egbe et al., 2015). A multicountry survey done in 29 countries to investigate adverse pregnancy outcomes in adolescents found that 1% of had eclampsia as compared to 0.3% of vicenarians and this was statistically significant (Ganchimeg et al., 2014). This difference could be attributed to the fact that adolescents had lower ANC attendance and care, lacked prevention and treatment interventions for pre-eclampsia and infections.

Episiotomy is usually performed to facilitate delivery of the baby during the second stage of labour and to serve against the risk of perineal tears. This study found that being a vicenarian was protective of having episiotomy performed (aOR= 0.35 CI 95%, 0.21 - 0.60). These findings were in accordance with findings by Sagili et al., (2012) in India where 82.9% of adolescents as against 51.3% of the vicenarians had episiotomy performed with the difference being statistically significant. It was found in their study that risk of episiotomy was 5 times more in the adolescents than the vicenarians. The prevalence of episiotomy was however lower in this study

as compared to Sagili et al., (2012). Studies by Demirci et al., (2016) in Turkey also found rates higher than in this study. They found that 90% of the adolescents as against 80% of the vicenarians had episiotomy performed. Egbe et al., (2015) in Cameroon in their study had much lower episiotomy rates than was found in this study. They found that 3.4% of the adolescents received episiotomy as against 2% of the adults. The differences in episiotomy rates could be attributed to the professional judgment of the midwives, weight of the newborns and perceived immaturity of adolescents.

Perineal tear in this study is not significantly different in the two groups. Vicenarians were found to have higher odds of sustaining perineal tears following vaginal delivery as compared to adolescents albeit not significant. This finding is in accord with that by Sagili et al., (2012) where 4.7% of the adolescents as against 8.5% of the vicenarians had perineal tear. Demirci et al., (2016) also had a similar finding where 2.5% of adolescents as against 3.4% of vicenarians had perineal tear though this finding is not significant. A contrasting finding was made by Egbe et al., (2015) in their study to compare teenage hospital deliveries against vicenarian deliveries. They found that 18.9% of adolescents as against 12.8% of the vicenarians had perineal tear. This finding by Egbe et al., (2015) is higher than the perineal tear incidence in this study.

No cases of post-partum hemorrhage were recorded in this study. The mean blood loss of 150mls  $\pm$  56.75 after vaginal delivery for adolescents did not differ significantly from the mean blood loss of 151mls  $\pm$  59.58. The mean blood loss after caesarean section did not also differ significantly amongst the two groups. The mean blood loss was 406.64mls  $\pm$ 187.57 and 409.00mls  $\pm$  232.89 for adolescents and vicenarians respectively. The absence of cases of postpartum hemorrhage could be due to the visual estimation method used in assessing the blood volume. This method is known to be the least reliable method of blood loss estimation (Schorn,

2010). This could also be due to the fact that all the study subjects are primiparous and postpartum hemorrhage tends to occur less in this group. Another reason that could possibly explain this is good active management of the third stage of labour. Finally postpartum could have occurred if the hemodynamic stability of any of the study subjects was compromised though the blood loss was less than stated in this study but this study did not seek to evaluate the hemodynamic status of the study subjects. It only focused on the actual blood loss.

### **5.3 Perinatal outcomes between adolescents and vicenarians**

Low birth weight deliveries were found to be significantly higher in adolescents than the vicenarians in this study. Low birth weight deliveries were found to be 51% less likely in vicenarians as compared to adolescents in this study (aOR=0.49, 95% CI: 0.32-0.75). Most of the literature reviewed by this study agreed with this finding. Egbe et al., (2015) in Cameroon found that 10% of adolescents as against 4% of vicenarians had low birth weight babies with a p-value of 0.006. Ezegwui et al., (2012) in Nigeria also found that 23% of adolescents had low birth weight babies as against 11% of vicenarians. This difference was statistically significant.

Similar findings were made in other parts of the world. Liran et al., (2013) found in Israel that adolescents significantly had more low birth weight babies than the adults group. In their study, about 10% of the adolescents as against 4% of the vicenarians had low birth weight deliveries. Demirci et al., (2016) in Turkey also had higher rates of low birth weight deliveries in adolescents than vicenarians. They found that, averagely 25% of the adolescents had low birth weight babies compared to 18% of the vicenarians. Studies conducted by Sagili et al., (2012) in India and Dutta et al (2013) had significant findings which are consistent with this study. This finding could probably be attributed to the higher incidence of preterm deliveries in the adolescent group.

Preterm deliveries were found to be significantly higher in adolescents than the vicenarians in this study. It was found that preterm deliveries were 39% less likely in vicenarians as compared to adolescents although not significant (aOR 0.61 95% CI 0.31-1.2). Egbe et al., (2015) found that 14% of adolescents and 8% of the vicenarians had preterm deliveries with a p-value of 0.03. Liran et al., (2013) found in their study that averagely 13.5% of the adolescents as against 9.1% of the adults group had preterm deliveries. This was statistically significant. A study to determine the effect of young maternal age on obstetric and perinatal outcomes also had similar findings where the adolescents had significantly higher preterm deliveries than the vicenarians. About 30% of the adolescents as against 20% of the adult group had preterm deliveries (Demirci et al., 2016). This finding of higher preterm delivery in adolescents than vicenarians could be attributed to biologic immaturity, insufficient uterine volume, insufficient cervical blood supply, short cervix with increased susceptibility to subclinical infections and increased production of prostaglandins. All these factors tend to predispose women to preterm labour (T T Lao, Ho, & Kong, 2000).

The risk of delivering a baby with birth asphyxia was found to be higher in the adolescents as compared to the vicenarians in this study albeit not significant. Onoh et al., (2014) in Southeast Nigeria found that adolescents were significantly at a higher risk of having babies with birth asphyxia than adults. They found that 19% of adolescents and 7% of vicenarians had asphyxiated babies. Ezegwui et al., (2012) also had a similar finding. Twenty three percent of adolescents and 10% of vicenarians had asphyxiated babies with a p-value of 0.005. This finding is further corroborated by Demirci et al., (2016) and Liran et al., (2013).

#### **5.4 Factors affecting the pregnancy outcomes in both adolescents and vicenarians**

At least four antenatal clinic visits have been found in this study to be significantly protective against preterm delivery and birth asphyxia. Mothers who attended antenatal clinic at least four times had a 71% less likelihood of giving birth to preterm babies and 54% less likelihood of giving birth to asphyxiated. These findings did not differ significantly from what was found in other studies. Aslam et al., (2014) found in Pakistan that booking status was protective against birth asphyxia (aOR=0.20, 95% CI; 0.11-.057). Majeed et al., (2007) in Pakistan also found that 64% of babies who had birth asphyxia had mothers who attended antenatal clinic poorly.

The protective effect of at least four antenatal clinic visits was also seen in a study conducted in Kumasi, Ghana by Asundep et al., (2014). They found that mothers who attended at least four antenatal clinics had a 27% more likelihood of having better outcomes as compared to those who attended less than four antenatal clinics (aOR=2.27 95% CI; 1.30-3.94). In a study conducted in Malawi by Abrams et al., (2004) also found that infrequent antenatal clinic attendance was associated with increased preterm delivery rate as found in this study. Similar findings were made in Brussels, Belgium where 18% of those who had infrequent antenatal clinic attendance had preterm deliveries as against 5% of those who had adequate antenatal visits (Beeckman et al., 2013). These differences could be attributed to the fact that antenatal clinic offers education to mothers on pregnancy and its disorders, provision of prophylaxis for anaemia and malaria, and treatment of infections which could predispose to preterm delivery.

The odds of delivering by caesarean section were significantly more in those who attended antenatal clinic at least four times as compared to mothers who had less than four visits in this study (aOR=2.47 95% CI; 1.15-5.22). Similar higher rate of caesarean section in antenatal attendants was found in Nepal by Tuladhar & Dhakal,(2011). They found that there was 17.4%

increased rate in caesarean section in women who attended antenatal clinic adequately. This difference was attributed to the fact that almost all elective caesarean sections were planned for women who attended antenatal clinic visits.

Maternal education has been shown in various studies to have a positive impact on pregnancy outcomes. In this study, the odds of mothers with tertiary education were significantly higher than those with no education. This could probably be due to the fact that most of these women were the vicenarians who attended more antenatal clinic and had elective caesarean sections planned. Cesaroni, Forastiere, & Perucci, (2008) in Italy found the reverse. They found that those with primary education had the highest rate of caesarean section. In Norway, trend analysis of caesarean section and maternal education from 1967 to 2004 established that mothers with lower education had the highest caesarean section rate followed by those with medium education and then those with tertiary education (Tollånes, Thompson, Daltveit, & Irgens, 2007).

### **Strengths of the study**

This study has some strengths as well as some limitations. The strengths are as follows:

Multiple sources of data were used to complement one another in order to ensure the completeness of the data.

The research assistants employed had health background and adequate educational qualifications to be able to collect the data required.

All adolescent primiparous women case records were reviewed. No sampling of adolescents who met the eligibility was done.

### **Limitations of the study**

Multiple people entering data in various registers in the labour ward, antenatal clinic and health information unit may affect the quality of the data.

Use of existing data is also a limitation of the study



## CHAPTER SIX

### CONCLUSION AND RECOMMENDATION

#### 6.0 Introduction

This chapter looks at the conclusions that can be derived from the study. It further suggests recommendations for various stake holders to implement in order to improve pregnancy outcomes of adolescents and vicenarians.

#### 6.1 Conclusions

The main aim of this study was to compare the obstetric and perinatal outcomes of adolescents and vicenarians and to determine the factors that are associated with these outcomes.

The adolescents in this study had significantly higher rates of episiotomy.

Adolescents in this study had higher rates of preterm delivery, low birth weight delivery and birth asphyxia albeit not significant statistically.

Four or more antenatal visits has been observed in this study to be a significant protective factor against birth asphyxia and preterm delivery. Mothers who had tertiary maternal education were observed to have significantly higher rates of caesarean section delivery.

## 6.2 Recommendations

It is recommended that adolescents be encouraged to have four or more antenatal visits since its protective against adverse pregnancy outcomes. It is also recommended that the public health unit of the hospital intensifies education of the general public especially pregnant women on the importance of antenatal clinic attendance.

It is recommended that the hospital management investigate the cause of the high episiotomy rates in the hospital and find possible ways of reducing it.



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- WHO | Adolescent pregnancy. (2016). *WHO*.
- WHO | Care of the preterm and/or low-birth-weight newborn. (2014). *WHO*.
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## APPENDICES

### Appendix 1: Data abstraction form

#### DATA ABSTRACTION FORM

SERIAL NO: .....

Folder no:.....

Gestation .....

#### DEMOGRAPHY

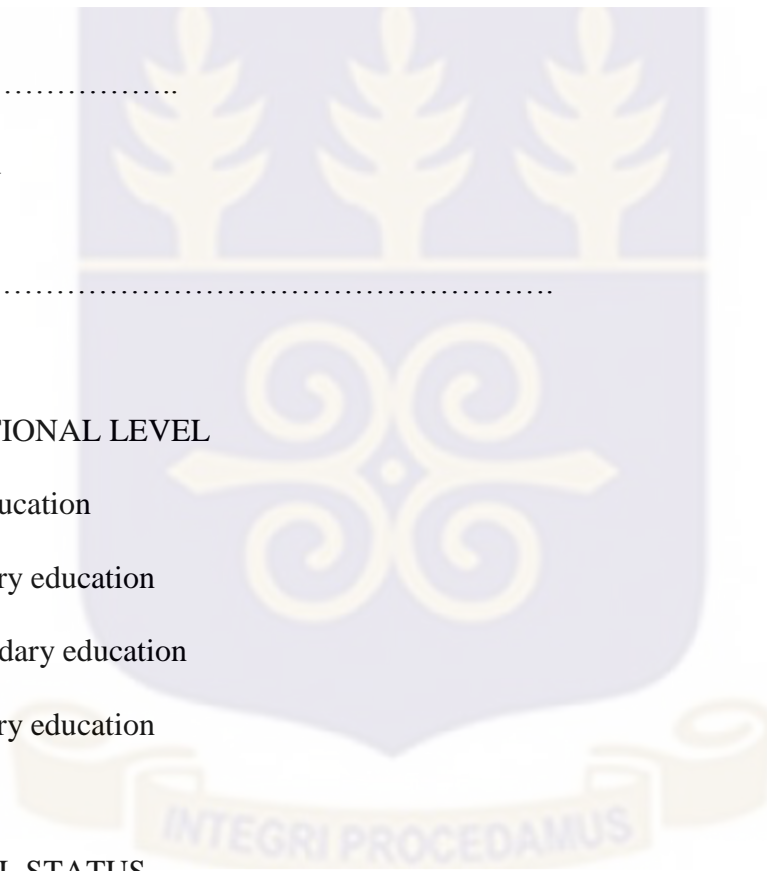
1. AGE.....

2. EDUCATIONAL LEVEL

- a. No education
- b. Primary education
- c. Secondary education
- d. Tertiary education

3. MARITAL STATUS

- a. Single
- b. Married
- c. Co-habiting
- d. Widow



4. OCCUPATION.....

5. ANTENATAL CLINIC ATTENDANCE

a. Booked

b. Not booked

6. If booked, number of ANC visits.....

OBSTETRIC OUTCOMES

1. Mode of delivery .....

2. If vaginal delivery, state blood loss .....

3. Episiotomy given

a. Yes

b. No

4. Perineal tear

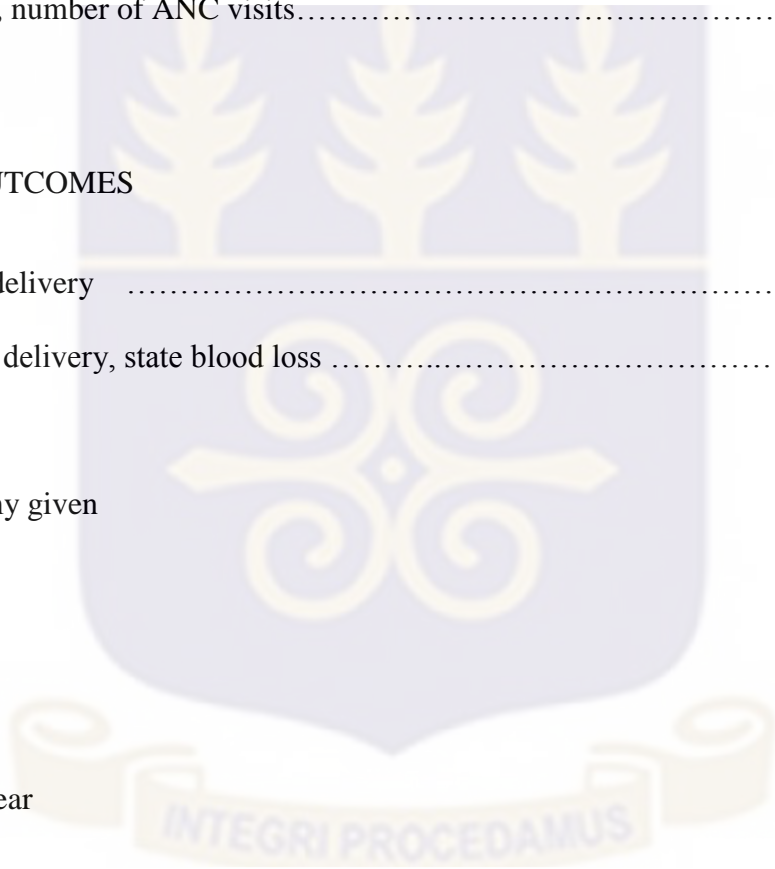
a. Yes

b. No

5. Caesarean section

a. Yes

b. No



If yes, indication for caesarean section .....

6. Blood loss after caesarean delivery .....

7. Admitting Blood Pressure .....

8. Highest blood pressure on admission.....

9. If  $\geq 140/90$ mmHg, urine protein .....

10. History of seizure

a. Yes

b. No

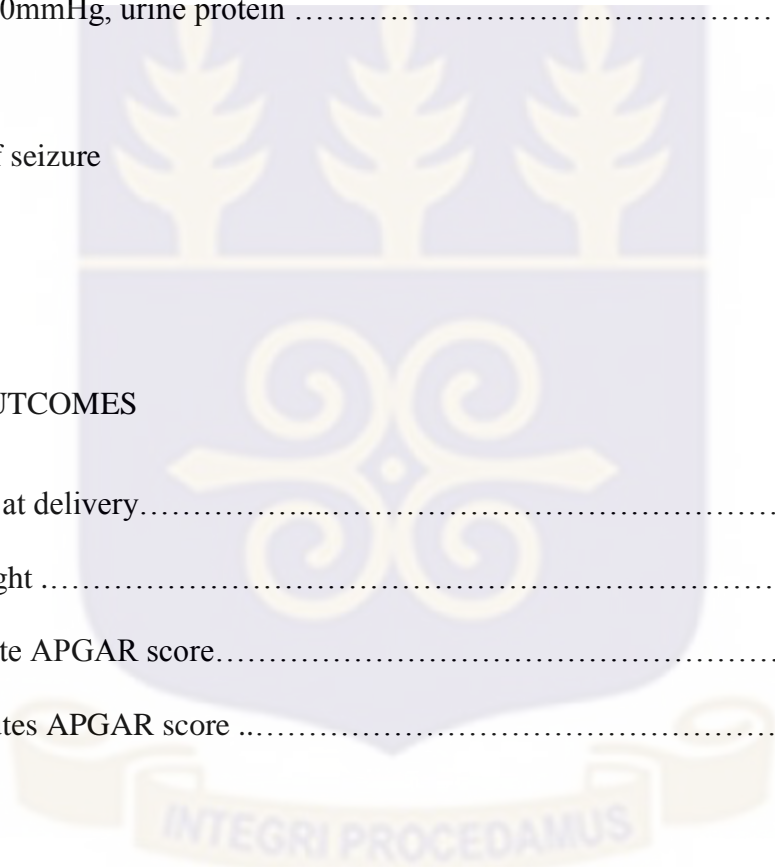
PERINATAL OUTCOMES

11. Gestation at delivery.....

12. Birth weight .....


13. One minute APGAR score.....

14. Five minutes APGAR score .....



**Appendix 2: GHS-ERC Ethical Approval**

**GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE**



Research & Development Division  
 Ghana Health Service  
 P. O. Box MB 190  
 Accra  
 Tel: +233-302-681109  
 Fax + 233-302-685424  
 Email: [ghserc@gmail.com](mailto:ghserc@gmail.com)

*In case of reply the number and date of this Letter should be quoted.*

My Ref: GHS/RDD/ERC/Admin/APP/17/428  
Your Ref. No.

Kwarshie Michael Deladem  
University of Ghana  
School of Public Health  
Legon, Accra

The Ghana Health Service Ethics Review Committee has reviewed and given approval for the implementation of your Study Protocol.

GHS-ERC Number	<b>GHS-ERC: 72/02/17</b>
Project Title	Pregnancy Outcomes, A Comparative Study between Adolescents and Vicenarians in Akatsi District Hospital
Approval Date	30 <sup>th</sup> March, 2017
Expiry Date	29 <sup>th</sup> March, 2018
GHS-ERC Decision	<b>Approved</b>

**This approval requires the following from the Principal Investigator**

- Submission of yearly progress report of the study to the Ethics Review Committee (ERC)
- Renewal of ethical approval if the study lasts for more than 12 months,
- Reporting of all serious adverse events related to this study to the ERC within three days verbally and seven days in writing.
- Submission of a final report **after completion** of the study
- Informing ERC if study cannot be implemented or is discontinued and reasons why
- Informing the ERC and your sponsor (where applicable) before any publication of the research findings.

Please note that any modification of the study without ERC approval of the amendment is invalid.

The ERC may observe or cause to be observed procedures and records of the study during and after implementation.

Kindly quote the protocol identification number in all future correspondence in relation to this approved protocol

SIGNED.....  
 DR. CYNTHIA BANNERMAN  
 (GHS-ERC CHAIRPERSON)

Cc: The Director, Research & Development Division, Ghana Health Service, Accra

**Appendix 3: Approval from VRDH-GHS**

