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**FACTORS OF RAPID REPEAT PREGNANCY AND ITS CONSEQUENCES
ON DEPRESSION AMONG ADOLESCENTS IN THE GREATER ACCRA
REGION, GHANA.**

BY

**SUSAN AMA AMUASI
(10197446)**

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DECLARATION

I hereby declare that except for other people's investigations which have been duly acknowledged and referenced, this work is the result of my own original research and work product, conducted under the supervision of my team of supervisors. It is hereby, further declared that this thesis either in part or whole, has not been presented or submitted elsewhere for another degree.

SUSAN AMA AMUASI

Date:

Signature:

(PhD Candidate)

6th May, 2019 


TEAM OF SUPERVISORS

Prof. Augustine Ankomah

Date:

Signature:

(Principal Supervisor)

3rd May, 2019 

Dr. Abubakar Manu

Date:

Signature:

(Co-supervisor)


6th May, 2019 

Dr. Ernest Tei Maya

Date:

Signature:

(Co-supervisor)

3rd May, 2019 

ABSTRACT

Rapid repeat pregnancy (RRP) is defined as pregnancy onset within 24 months of the previous pregnancy outcome. RRP has been identified to result from different situations and as such might create different risks to the individual. Several studies have shown an association between RRP and mental health issues such as anxiety, emotional stress, depression, aggression and poorer education attainment. There is a pint-size consensus as to which risk factors are the very key predictors of RRP and whether the outcome (RRP) may lead to depression. This study seeks to identify the main risk factors that could lead to RRP and its consequences on depression among adolescents.

METHODS: A mixed method approach (quantitative and qualitative) was used for this study which was conducted in 12 public health facilities in the Greater Accra Region. An unmatched case-control study design was used for the study. The cases were adolescent girls aged between 15 and 19 years who have had more than one pregnancy within two years. Controls were adolescent girls aged between 15 and 19 years who have had one pregnancy which either ended an abortion or delivery with more than twenty-four months spacing. The sample size for the quantitative method was $n= 417$ with 209 controls and 208 cases. Both the qualitative and quantitative components were hospital-based. Six FGDs were conducted among the control group in six of the selected hospitals and involved a total of forty-six adolescents. Eleven In-depth Interviews (IDI) were also held with every eligible adolescent who had experienced RRP (case) in six of the twelve health facilities selected for the research. STATA 15 MP (StataCorp, College Station, TX, USA) was used to analyze the quantitative aspect of the work. Univariate, bivariate and multivariate logistic regression analyses were conducted with p-value of <0.05 considered as significant. Composite score analysis was used in estimating the level of depression among the participants using Beck's Depression Inventory scale. The qualitative data were audio

recorded, translated into English and transcribed verbatim. Thematic content analysis was adopted for the analysis. Data triangulation was done to support the quantitative data using the qualitative data.

RESULTS: There were two outcome variables in the study. The first one was the risk factors for RRP and the second was the effect of RRP on depression.

Risk factors for RRP: The median ages at menarche between cases and controls were 12 and 13 years respectively and it was observed that most of the girls who experienced menarche at age 12 years and below were involved in early sexual activity (age at first sexual intercourse) than those who did not. It was also revealed in the study that the number of times a pregnant adolescent visits the hospital for ANC had some form of influence on the risk of RRP. The peers of the adolescents were the main source of information on issues of sex among the cases as compared with the control group. Transactional sex was more common among the cases than the controls. In a univariate analysis variables that showed significance as risk factors for RRP were planning of last pregnancy, history of miscarriage, married or living with partner, parental care, and at least 4 ANC visits. All these variables were significantly associated with odds of RRP. There was an evidence that the odds of RRP for the adolescents who have ever had a miscarriage was about eight times more than that among those who have never had a miscarriage (aOR=7.92; 95%CL: 3.18-19.71; $p<0.0001$).

Effect of RRP on depression: The risk of being depressed among cases were 19% higher than the control group (crude RR=1.19; 95%CI=0.99 to 1.43; $p=0.070$). After adjusting for the confounding variables, this increased significantly to 36% higher risk of being depressed (adjusted RR=1.36; 95%CI=1.11 to 1.67; $p=0.003$) suggesting an evidence of association between RRP and depression.

CONCLUSION: This research has identified the main risk factors of RRP to be, age at menarche, marital status, parental care and support, number of times of ANC visits, sex education and transactional sex. Again the study has investigated the extent to which having subsequent birth in less than 24 months (Rapid Repeat Pregnancy) could adversely affect psychological state of an adolescent mother. The results from this study could provide an insight into designing targeted interventions by policy makers and other stakeholders.

Key words: Rapid Repeat Pregnancy, depression, unmatched case-control, mixed method, Antenatal visits transactional sex, menarche, cases, controls.

DEDICATION

THIS RESEARCH WORK IS DEDICATED TO: My husband EBE for his unwavering support, encouragement and understanding AND to our dear KWAME & EWURABA.

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LIST OF ABBREVIATIONS/ACRONYMS

AIDS	Acquired Immuno-Deficiency Syndrome
AMA	Accra Metropolitan Assembly
ANC	Ante Natal Care
AOR	Adjusted Odds Ratio
APA	American Psychiatric Association
BDI	Beck's Depression Inventory
CHPS	Community-based Health Planning and Services
CWC	Child Welfare Clinic
FGDs	Focused Group Discussions
GAR	Greater Accra Region
GDHS	Ghana Demographic and Health Survey
GHS	Ghana Health Service
GSS	Ghana Statistical Service
IDI	In-Depth Interview
HIV	Human Immuno-deficiency Virus
JHS	Junior High School
LEKMA	Ledzokuku Krowor Municipal Assembly
MICS	Multiple Cluster Indicator Survey
MOH	Ministry of Health
NGO	Non-Governmental Organization
OR	Odds Ratio
RRP	Rapid Repeat Pregnancy
STD	Sexually Transmitted Diseases
STI's	Sexually Transmitted Infections
SPSS	Statistical Package for Social Sciences
UN	United Nations
UNFPA	United Nation Population Fund
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organization

DEFINITION OF KEY TERMS

For the purposes of this research, the following definitions were used.

Adolescent sexuality: this is a stage of human development in which adolescents experience and explore sexual emotional state.

Age at first sexual intercourse: The age at which an adolescent girl first engaged in sexual intercourse with a partner (male).

Age at Menarche: The age at which an adolescent girl experiences menstrual period for the first time.

Age at conception: The age at which an adolescent gets pregnant.

Menarche: The beginning of the menstrual function; especially, the first menstrual period of a girl.

Knowledge: The information, understanding, and skills that you gain through education or experience (dictionary definition).

Sexuality: Sexuality is a central aspect of being human throughout life and encompasses sex, gender identities and roles, sexual orientation, sexual receptivity, pleasure, intimacy and reproduction (WHO definition).

Sexual Intercourse: It is a sexual contact between individuals involving penetration, especially the insertion of a man's erect penis into a woman's vagina, typically culminating in orgasm and the ejaculation of semen.

Rapid Repeat Pregnancy (RRP): Pregnancy onset within 24 months of the previous pregnancy outcome

CHAPTER ONE

INTRODUCTION

This chapter provides the background to the study, the problem statement, general and specific objectives of the study, questions that this research work seek to address, conceptual framework, the public health importance of this research work and a summary of a total organization of the entire thesis.

1.1 Background to the study

Adolescence is a term originated from the Latin word “adolescere” which means to grow or to develop (WHO, 2012). This time is taking as a period of transition from childhood to adulthood (Baldwin & Edelman, 2013). These individuals are not classified as children but they are not yet adults as well. This period is characterized by rapid physical growth and development as well as significant physical, emotional and psychological changes. According to the World Health Organization, adolescents constitute 1.2 billion people of the world’s population (WHO, 2012). Eighty five percent (85%) of adolescents live in developing countries. Globally, adolescents represent the largest age group in terms of numbers and are the future generation.

The challenges that confront adolescents are multi-dimensional in scope and require all-inclusive approaches to solve. Adolescents are pressurized by environmental factors such as peer pressure and media exposure. This may lead the adolescent to risk-taking behaviours such as sexual promiscuity (UNICEF, 2013). Most adolescents are not able to manage sexual feelings such as sexual urges and desirability, developing new forms of affections and intimacy, learning to control sexual desires and behaviours to avoid detrimental consequences (Hutchinson & Montgomery, 2007).

Adolescent health is the approach to preventing, identifying or treating young people's health conditions and well-being issues (WHO, 2018). The World Youth Report in 2013 reveals the main health challenges adolescents face. These challenges were noted to be sexual and reproductive health issues which include too early pregnancy (often a risk to the mother and her baby), health complications that are normally associated with pregnancy and child birth which include unsafe abortion and sexually transmitted infections including HIV/AIDS (UN, 2004). Unsafe traditional practices like female genital mutilation and sexual compulsion also known to be a challenge among adolescents. There are some other issues that may also pose health threats to these age groups. These include injuries from accidents, deliberate violence, mental health challenges, substance use and endemic diseases such as malaria, schistosomiasis, tuberculosis and undernutrition as well as over nutrition (WHO, 2012). They also have unique reproductive and sexual health needs. Adolescent sexual and reproductive health (ASRH) has been ignored generally notwithstanding the great risks that countries face for this abandonment.

There are several problems encountered by adolescents and young adults worldwide. These may include but not limited to early pregnancy and parenthood, problems with the accessibility of contraception and safe abortion, and high proportions of HIV and sexually transmitted infections (WHO, 2018). Sociocultural, political and economic factors sometimes restrict the dissemination of information and services to these age group. Healthcare workers mostly act as obstacles to care by failing to offer adolescents and young people with compassionate, nonjudgmental, youth-friendly services. Child birth amongst adolescent girls who are within the ages of 15 and 19 years' constitute about eleven percent of all births worldwide which is estimated at 16 million, and as many as 4 million girls obtain abortions, (WHO, 2012). According to WHO (2012), the overall

percentages of adolescent births worldwide range from almost 2% in China and 18% in Latin America and the Caribbean, sub-Saharan Africa however constitute more than 50%. Younger adolescent mothers are more probable to experience problems and die of causes that are pregnancy-related.

The new mothers also deal with challenges emanating from their adolescent development and their capacity to adjust to their new roles as parents (UNFPA, 2015). In Africa, problems of pregnancy and childbirth are the number one cause of RRP among adolescent girls aged 15–19 years (UNICEF, 2013). In low-income countries of the world, death rates among women between the ages of 15 and 19 years is mainly as a result of the complications from pregnancy and child birth (Gyesaw, & Ankomah, 2013). Though there is a drop in the overall birth rate in most developing world (WHO, 2012), rates of adolescent births still remain high, particularly in some countries of sub-Saharan Africa (WHO, 2012).

The Ghana Health and Demographic Survey (GDHS) 2014 indicates that nearly thirty-three percent of Ghanaians are between the ages of 10 and 24 (GSS, 2015). Majority of these young people are in danger or already struggling with the implications of an unexpected pregnancy or a sexually transmitted infection (STI), (UNICEF, 2013). Teenage pregnancy and child delivery are viewed as a major social and health concern in Ghana. It is more likely to occur in most of the societies in Ghana driven by poverty, as well as lack of education and employment opportunities. Giving birth at a tender age can have far reaching consequences and may lead to serious health problems for both the mother and child. An early start to motherhood can significantly decrease women's formal education and employment prospects and it is related with greater levels of fecundity.

Teenage pregnancy may be defined as pregnancy in a teenage girl, usually within the ages of 13-19 years, who have not reached the considered legitimate adulthood which differs throughout the world, (UNICEF, 2013). About 376,657 pregnancies occurred in Ghana were registered to young adolescent women aged between 10 and 24 years in 2013. This denotes 39 per cent of a total of 971,268 registered pregnancies nationwide. The proportions of teenage pregnancy in Ghana are high in terms of numbers, of all births registered in 2014, 30 per cent were by adolescents (GSS, 2015). Approximately, 14% of women between the ages of 15 and 19 had begun childbearing, either having had a live birth (11%) or having become pregnant with their first child (3%) (GSS, 2015). The growing numbers of expectant adolescents show the essence of meeting adolescent sexual reproductive health needs in Ghana.

The percentage of adolescent girls who have started childbirth ranges from eight per cent in the Greater Accra Region to 22 per cent in the Volta Region. For the past three years the Central Region has been constantly ranked as the region with the second utmost next to Brong Ahafo on prevalence rate of teenage pregnancy in Ghana (GSS, 2015). In Ghana, most of the adolescent girls are sexually active (though not always by choice) and, in some regions, most of them are even married (GSS, 2015; Khalil et al., 2010). It is not well known whether these adolescents are having repeat or first pregnancies. Engaging in sexual activities could place adolescents in danger of the several reproductive health complications which may lead them to being extremely stressed, depressed or too anxious (Khalil et al., 2010). These sexual activities can lead them to repeat pregnancies (Whitaker et al., 2014).

Rapid repeat pregnancy (RRP) among adolescents is defined as pregnancy onset within 24 months of the previous pregnancy outcome (Jacoby, Gorenflo, Black, Wunderlich, & Eyler, 1999). A study by Baldwin, and Edelman, (2013) indicated that repeat pregnancy within two years of an earlier delivery or abortion happens in about 35% of most pregnant female adolescents and further indicated that higher proportion of those pregnancies are categorized as unintentional and unwanted with about 50% resulting in deliveries and the rest ending up with abortions. This confirmed a previous study by Herrman, (2007) which showed that much of teen sexual activity is spur-of-the-moment and unplanned. Rapid repeat pregnancy has been identified to result from different situations and as such might create different risks to the individual. According to Zabin, Astone & Emerson (1993), several first and repeat teenage pregnancies are neither planned nor desired. Gemmill & Lindberg, (2013) also confirmed in their study that majority of RRP are unintended pregnancies.

RRP has constantly become the main focus of community and public health interventions, because of the worsening of the negative effects related with the recurring of adolescent pregnancy (Whitaker et al. 2014). The consequences of most unintended pregnancies can lead to an emotional, psychological and educational damage to adolescent girls, often with permanent implications for their life chances (Whitaker et al., 2014). Most young women and adolescents make up their minds not to get pregnant right after delivery, but many change their minds or become hesitant within months. This could be either intentional or unintentional. Studies by Baldwin, and Edelman, (2013) and Stevens-Simon, Parsons, and Montgomery, (1986b) showed how repeat pregnancy could occur together with some forms of challenges which include, low level of educational attainment and socio-economic difficulties.

Some identified risk factors which have been known to have a correlation with rapid repeat pregnancy based on statistical analysis and qualitative studies include younger age, low socioeconomic status, low education of teenage mothers' or heads of household, early marriage, intended or desired first pregnancy, and non-use of a family planning and contraceptive method (Bennett, Culhane, McCollum, & Elo, 2006; Rigsby, Macones, & Driscoll, 1998). Another study Crittenden, Boris, Rice, Taylor, and Olds, (2009) has examined factors such as mental health and social behavior of the adolescents and how their opinions are seen to be different from that of their parents'. Most adolescents' have different perceptions about engaging in sexual activities and protecting themselves from pregnancy and sexually transmitted infections (STIs). Successful development of interventions would depend on the detailed understanding of the mechanisms of RRP and the ability to quantify the effect of each of these interrelated factors on the high vulnerability of adolescents as a result of this problem. RRP among adolescent has been associated with depression (East, 2012). Repeat pregnancy is prevalent amongst adolescent mothers who experience symptoms of depression during the period of pregnancy and after delivery than the adolescents who do not (Barnet, Liu, & DeVoe, 2008).

Depression is a common mental disorder that presents with unhappy mood, loss of interest or pleasure, decreased energy, feelings of guilt or low self-worth, disturbed sleep or appetite, and poor concentration. Furthermore, depression normally occurs with signs and indications of anxiety (WHO, 2012). When an adolescent experiences depression during the gestation period, the condition could worsen if not addressed within one year postpartum (Khalil et al., 2010). According to Rahman et al., (2008), maternal depression is a range of conditions that could have negative effect on women during the period of

pregnancy through to about a year or more after delivery. It could have a significant negative impact on the growth and development of children born to these adolescents, with the effects of the depression bearing heavily on the child (Rahman, Patel, Maselko, & Kirkwood, 2008). Depressive symptoms in adolescent mothers have been linked with several undesirable consequences for the adolescent mother and her child.

According to Khalil et al. (2010), hardly do adolescents seek for psychiatric help. Most of them feel reluctant to make known their feelings and emotions to their parents and guardians. However; adolescents especially the females are seen to go through depressive symptoms more frequently than the general populace (Khalil et al., 2010). The extent of depression may influence the adolescent's confidence and decrease her self-efficacy for factors like contraceptive use and the ability to make decisions on sexual health issues (Marino, Sirey, Raue, & Alexopoulos, 2008).

According to Bandura, (1997), the belief in one's ability to succeed in a particular situation and circumstance or to accomplish a task effectively is referred to as **self-efficacy**. A person's sense of self-efficacy can play a major role in how he or she approaches and addresses goals, tasks, and challenges. Usually what an individual achieves or believes he or she can achieve using his or her skills under certain circumstances shows the persons level of self-efficacy (Bandura, 1997). Self-efficacy has been known to be a task-specific form of self-esteem (Lunenburg, 2011). Self-Efficacy Theory has a basic principle that states that, it is highly possible for individuals to involve themselves in actions for which they have high self-efficacy and disengage in the ones for which they do not (Kara, Van Der Bijl, Shortridge-Baggett, Astı, & Erguney, 2006).

People perform in ways that may influence their initial beliefs, thus self-efficacy functions as a self-fulfilling or esteem.

A lot of researchers have found out some associations between depression and low self-efficacy. The studies showed that depression may moderate the outcome of self-efficacy for making some necessary decisions in terms of health behaviors, particularly among adolescents (Barnet et al. 2008; Khalil et al. 2010; Lunenburg, 2011). Certain circumstantial factors in an adolescent's life can be influenced by self-efficacy and health behavior. As an example, an adolescent girl may choose to or not to use a contraceptive method based on her own self-efficacy for pregnancy prevention. Nevertheless, a factor such as depression may interfere and change her pregnancy prevention self-efficacy and successive health behavior (Lunenburg, 2011). What is not well-known is how and to what extent depression influences an adolescent's pregnancy self-efficacy. This study aims at determining the risk factors associated with rapid repeat pregnancy (RRP) and whether RRP is a main cause of depression among adolescents.

1.2 Statement of the problem

Globally, adolescent child births constitute 11% of all maternal deliveries and about 23% of the overall burden of disability and ill health are as results of pregnancy and childbirth (Holness, 2014). According to Gyesaw and Ankomah (2013) the percentage of teenage females who have experienced child births or are pregnant in Ghana is high. Their study discovered the practices of Ghanaian adolescents who are mothers, the period of pregnancy and childbirth. They also looked at how the adolescent mothers care for their children. In general their study showed that the adverse effects of RRP could not be

underestimated. As a qualitative study, these authors did not examine how multiple interrelated factors contribute to RRP.

It is likely that women who had several pregnancies during the period of adolescence may go through medical, emotional and social difficulties (Raneri & Wiemann, 2007). These may include, but are not limited to, preterm birth, pregnancy induced hypertension, low birth weight, increased perinatal mortality, congenital anomalies, cerebral palsy, infant death, maternal mortality, management of chronic medical conditions, anemia, increase risk of uterine rupture following caesarean section, and various forms of infection (Raneri & Wiemann, 2007). Repeat teen pregnancy and birth pose higher challenges as additional birth might further constrain the ability of adolescents to attain high social and economic status (Baldwin, & Edelman, 2013). Closely spaced births in general have health complications for the young ones. In the United States for instance, 17.0% of children who were second teen births were born preterm in 2005, compared with 12.6% for first births; 11% of second teen births were low birth weight, compared with 9% of first births (Conde-Agudelo, Belizán, & Lammers, 2005). Jacoby et al. (1999), showed that it is highly probable for children who are born to teenage mothers to attain lower formal education, increased rates of juvenile incarceration, give birth as teenagers, have high unemployment and increased health problems. All these are in relation to socio-economic consequences.

The effect of RRP is the likelihood of both the child and mother contracting HIV as indicated by Karim, Magnani, Morgan, and Bond, (2003) who showed how the development of the HIV/AIDS epidemic will be greatly influenced negatively by the current group of adolescents in Ghana and many other developing countries. Their

research also identified factors related with higher threats of sexually transmitted infection and pregnancy among Ghanaian youth who are not married.

According to the GDHS (2014), young women who give birth late, stand a higher advantage in life over young adolescent girls who give birth early. This is because young teenage girls experience adverse childbirth outcomes and are usually impeded in their access to pursue their educational development. (GSS, 2015). Despite these negative effects, some considerable number of Ghanaian adolescents still give birth within two years after their first pregnancy notwithstanding whether they were successful or not. Most studies done in Ghana to determine the effect of different forms of postpartum contraceptives on pregnancy have not necessarily looked at the root cause of repeat pregnancies and how interventions other than contraceptive use may be directed at the true cause(s) (Karim, Magnani, Morgan, & Bond, 2003; Gyesaw, & Ankomah, 2013; Asampong, Osafo, Bingenheimer, & Ahiadeke, 2013). Research works done in some other parts of the globe, aside Ghana, have identified some factors that may contribute to high RRP (Prata, Holston, Fraser, & Melkamu, 2013; Hindin, 2012; Bennett, Culhane, McCollum, & Elo, 2006). These results from the studies may differ from that of Ghana due to the variations in terms of differences in cultural/beliefs, ethnicity, and socio-demographic indicators. Also the risk factors identified by the various studies as the key driving forces behind RRP may not be entirely applicable to adolescents in Ghana who have had rapid repeat pregnancy. There is not enough body of evidence to explain RRP and its relative effect on adolescents, their families and the country as a whole. Not much research work has been done to show the practices of adolescent mothers' extensively with respect to their pregnancy and deliveries (Gyesaw, & Ankomah, 2013).

The risk factors that are the key significant predictors of RRP are still subject of much research (Boardman, Allsworth, Phipps, & Lapane, 2006). That notwithstanding, linkages between socio-demographic, behavioral factors, past life experiences, contraceptive and socioeconomic indices with RRP are not well understood, as interaction among these factors are mostly not included in research on RRP (Crittenden et al., 2009). The direction of causality for RRP and depression is not too clear as some studies considered depression as a risk factor while very few studies investigated depression as a consequence of RRP (Barnet et al., 2008). This study seeks to identify the main risk factors that may lead to RRP and its consequences on the level of depression the adolescents may experience during or after pregnancy.

1.3 General objective

The general objective of this study was to identify the risk factors for RRP and its effect on depression among adolescents in the Greater Accra Region.

1.3.1 Specific objectives

1. To synthesize available evidence on the relationship between RRP and depression among adolescents using systematic review approach.
2. To identify the risk factors for rapid repeat pregnancy among adolescents.
3. To estimate and compare the effect of RRP on depression between cases and control among adolescents.
4. To explore the key factors that could lead to RRP and how RRP can affect depression among adolescents.

1.4 Conceptual framework

This section discusses the possible risk factors of RRP and how it may lead to depression.

Figure 1.1 describes how socio-demographic factors may affect proximate factors and eventually lead to RRP which then may also contribute to depression among adolescent.

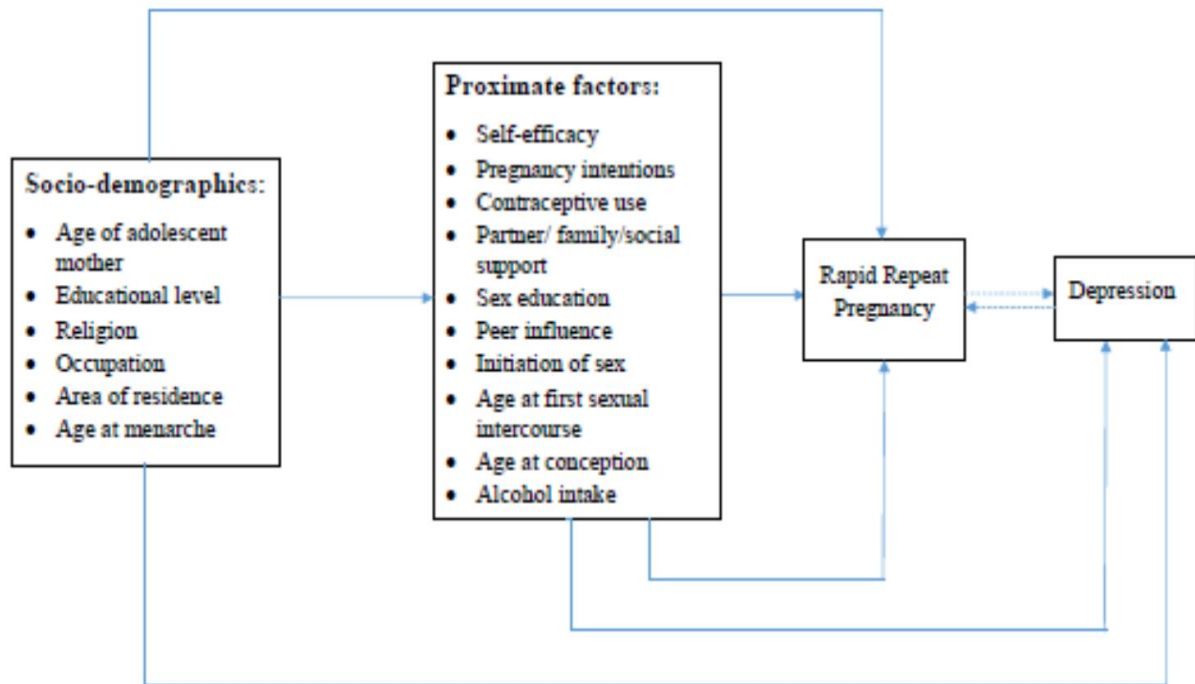


Figure 1. 1: Conceptual framework for risk factors for rapid repeat pregnancy and its effect on depression

Source: adapted from Risgby et al, 1998 & Maravilla et al., 2017

1.4.1 Description of framework components

There are a limited number of study on RRP and its effect on depression. Studying adolescents and their sexual health issues has its own complexities. In spite of all the complexities, this study uses the conceptual framework in figure 1.1 to conceptualize the possible risk factors of RRP and how it may lead to depression among adolescents.

The framework shown in Figure 1.1 involves four components (four blocks of variables), these are the basic factors which are mainly the socio-demographic, proximate factors

which are factors that may be intermediary cause, and the two outcome variables in this study which are RRP and depression. These blocks of variables looked at the effect and associations of individual factors. This framework demonstrates the relationship between the two outcome variables and the various independent variables. This will aid the researcher to ascertain the potential precursors and the main causes for a specific effect, problem or circumstance.

The occurrences of rapid repeat pregnancy among adolescents is believed to be affected by socio-demographic indices such as age, formal educational level, religion and parents' occupation; these characteristics may also reflect the individual's position in the society. Rigsby et al. (1998), identified socioeconomic status (SES) as a variable associated with both first and second pregnancies among teens, especially if the second pregnancy is rapid repeat. These indices are however assumed to affect an individual's life experiences. Knowledge and use of contraceptives are highly predictive variables that may contribute to RRP. According to Jacoby et.al. (1999), it will be less expected for adolescents to use contraceptives successfully in a relationship where her educational background is low and this may lead to RRP especially if she has a child.

It is widely believed that self-efficacy has an association with rapid repeat pregnancy among adolescents, but the mechanisms through which this causal effect acts are poorly understood. Among adolescents, level of education, age and occupation may affect the way they make decisions in relation to prevention of pregnancy (Baldwin, & Edelman, 2013). The use of contraceptives have some form of association with the sex education that the individual has. Research has shown that sex education for adolescents has positive effect on their use of contraceptives during sexual intercourse and this effect may or may

not lead to RRP (Muller & Lorrie, 2008). Intended or not intended of the occurrence of a pregnancy may mostly lead to lack or inconsistent use or incorrect use of contraceptive methods and this may be as a result of low levels of education (East, 2012; Tonlaar & Ayoola, 2014). Socio-demographics characteristics such as age, religion and educational attainments are mostly affected by ones self-efficacy to be able to make decisions and use contraceptives which may lead to the occurrence of repeat pregnancy.

Adolescents who have the impression that they do not get sufficient care could be more susceptible to go in for sexual intimacy, and or give birth to children who they think could fulfil their need for the sense of affection (Rigsby et al., 1998). The supports adolescents' receive have a lot of effect on them whether from the family or society. It is perceived that, the family and or social support received by the adolescent could determine whether she will get pregnant or not. As found in many studies, alcohol is related with an initial teen pregnancy and may have some influence on their sexuality (Quinlivan, Tan, Steele, & Black, 2004; Woodward, Fergusson, & Horwood, 2001; Gest, Mahoney, & Cairns, 1999; Carpenter, Clyman, Davidson, & Steiner, 2001; Herrenkohl, Herrenkohl, Egolf, & Russo, 1998). The likelihood of these teen girls having RRP is very high. Anecdotal evidence shows that there is a reverse causative relationship between RRP and Depression but there is no study to confirm the direction. From the framework the consequence of RRP could lead to depression.

1.5 Research questions

Given the research gap with respect to RRP, this study seeks to provide answers to the following questions:

- 1 . What underlying mechanism explains the relationship between RRP and depression?

2 . “What socio-behavioral and cultural factors influence pregnancy within 24 months of a teenager giving birth for the first time?

3 . What is the effect of RRP on depression?

1.5 Public health implications of the study

The study targets adolescents because they are very vulnerable, and as tomorrow’s adult population, their health and well-being are crucial matters. It is important to instill in the youth, the idea of responsible sexual behavior, and the small family size norm, pursuit of career and values of responsible adulthood (Quinlivan et al., 2004). As prospective leaders of the country it is essential to ensure that they are well informed, educated especially on sexual health issues and provided with improved health care facilities.

The 2014 GDHS reports on statistics regarding sexual health issues of adolescents aged between 15 and 19 years’ are as follows: sixty-nine percent female and 78% of male adolescents primarily abstained from sex and had never married. Age at first sex was 18.4years for girls and 20years for boys while sexual intercourse before age 15 among this age group recorded as 8.2% for girls, and 3.6% for boys. (GSS, 2015). By age 18years, 44% of girls and 26% of boys have had sex while condom use at first sexual intercourse amongst 15-19 year olds was 25.9% for females and 31.4% for males. The statistics show higher percentages among adolescent girls than boys in all the risk factors presented. From literature these factors among several factors may contribute to repeat pregnancy among adolescents. Further study needs to be done to find out the main risk factors that could lead to adolescent pregnancy and repeat pregnancies that occur without planning for it.

This study therefore will contribute in identifying the possible risk factors that could lead to adolescent repeat pregnancies and its consequences on depression. It is anticipated that this study will be informative to policy makers to direct intervention programs to address RRP among adolescent as a public health issue to build a solid future for the country.

1.6 Organization of the Thesis

Chapter One provides information on the possible risk factors that may lead to RRP, it further gives an introduction to RRP, depression and self-efficacy. The chapter further describes the magnitude of the research problem and provides the objectives of the study, conceptual framework and research questions. Chapter Two provides a literature review of the risk factors of RRP and a systematic review of studies on the effect of RRP and its consequences on depression among adolescents to provide an insight into predictors of RRP as well as its role on risk of depression.

Chapter Three gives a brief explanation and characteristics of the study area, target population, the methods used and the study design for the study. Chapter Four provides the analysis, results and their interpretations in line with the study objectives and the conceptual framework. Chapter Five discusses the study findings, summary of key findings, interpretation of results, strengths and limitations of study and other factors that are relevant to the study. Chapter Six gives a conclusion to the study based on the study findings, recommendations and implication for future research interventions.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This study has two outcome variables, Rapid Repeat Pregnancy (RRP) and Depression. The first section looks at the risk factors of RRP and the second section looks at the effect of RRP on Depression. A thorough literature review was done at the first section because, a current systematic review and meta-analysis has been conducted on the factors influencing repeat teenage pregnancy (Maravilla, Betts, Cruz, & Alati, 2017). A systematic review however was done at the second level to find out the effect of RRP on Depression

2.1 Literature review on the risk factors that may lead to RRP

2.1.1 An overview of adolescent pregnancy

Statistics from most developing countries indicate that annually, almost 16 million girls aged 15 to 19 years and 2.5 million girls under 16 years give birth (Merrick, Tenenbaum, & Omar, 2013). Adolescent pregnancies can happen in many regions of the world including in high, middle, and low income countries and are considered a global health challenge. Globally, adolescent pregnancies are more likely to occur in disregarded communities, commonly driven by poverty and lack of education and employment opportunities

Complications during pregnancy and childbirth are the number one cause of death for 15 to 19 year-old girls globally (WHO, 2012). In relation to health, adolescent pregnancy and child birth is a main contributor to maternal and neonatal morbidity and mortality.

Unintended pregnancies are mostly common among adolescents aged between 15 and 19 years (more than 90%) and half of all adults in their reproductive age. Unwanted pregnancies among adolescent girls account for more than fifty percent and end up in either spontaneous or induced abortion (Aziato et al. 2016), compared with 35% of adolescent pregnancies overall. Alternatively, few adolescent pregnancies have been recorded to be planned. This is because some married young women are encouraged to have children on their own. Unsafe abortions occur among adolescent girls aged between 15 and 19 years accounting for 3.9 million annually (Hindin, & Fatusi, 2009). It is reported that there are greater threats of systemic infections, puerperal endometritis and eclampsia among adolescent mothers than women between the ages of 20 and 24 years.

In Ghana, out of a population of about 25 million, adolescents represent about 22.4% (GSS, 2015). A study by Aziato et al., (2016) revealed that of all births that were registered in Ghana, 30% were by adolescents and about 14% of adolescent between ages 15 and 19 had begun childbearing. The increasing figures of teenage pregnancy in Ghana make adolescent reproductive health an issue that needs to be addressed. Teenage pregnancy occurs when girls aged between 15 to 19 years get pregnant. Most of these pregnancies are unwanted and effort to get rid of these pregnancies result in unsafe abortions and deaths.

According to a Ghana Statistical Service report, females engage in sexual activity far earlier than their male counterparts (GSS, 2015). Same report revealed that, Upper East region has the highest pregnancy rate of 15.4% whereas Greater Accra has the lowest of 6.2% prevalent rate. There is an increasing trend of teenage pregnancy in the Ashanti and Brong Ahafo Regions with no annual decreasing trend (GSS, 2015). The top districts with

the highest prevalence rate are the Accra metropolitan, the Kumasi metropolitan and the Techiman municipality which are all located in urban centres (GSS, 2015). In some cases, adolescent girls are being abused into having unwanted sex or coerced sex either with partners or non-partners which is most at times not protected and results in unwanted pregnancies. (WHO, 2012).

There are several other causes that may lead to early pregnancy among adolescents. An understanding of both individual and societal influences is important in effectively decreasing the high rates of teenage pregnancy in Ghana. There are several guidelines outlined by WHO to avoid teenage pregnancies and reduction of poor delivery results among adolescents (WHO, 2018). These guidelines were provided in order to protect and improve the health and general wellbeing of young girls. They are: Reducing marriages before the age of 18 years.

Creating understanding and support to reduce pregnancy before the age of 20 years.

Increasing the use of contraception by adolescents at risk of unintended pregnancy.

Reducing coerced sex among adolescents.

Reducing unsafe abortions among adolescents.

Increasing the use of skilled antenatal, childbirth and postnatal care among adolescents.

2.1.2 Rapid Repeat Pregnancy (RRP)

According to Abma, Dawson, Martinez, and Mosher (2004), unplanned pregnancies have been considered as a significant global health problem for adolescents and young adults.

A study by Baldwin, Maureen and Edelman, Alison (2013), reveals that immediately after a pregnancy, most young women try to avoid pregnancy again, but change their minds within months and as such end up with repeated pregnancies within a short period of time.

Rigsby et al. (1998) classify majority of rapid repeat pregnancy (RRP) as unintended with a majority ending either aborting or giving birth. RRP is related to increased maternal and neonatal morbidity and continues a cycle of depriving young women and their families from economic development (Edgardh, 2000). The same study revealed that, the proportions of adverse pregnancy events are reduced among young women than among adolescents however spacing births effectively remains important among these age groups.

RRP according to Nelson (1990) is prevalent among younger teenagers within the ages of 11-16 years, for which closed to 23–26% of them repeating pregnancy and giving birth to another child in less than two years after delivery of their first child while older adolescents within the ages of 17–19 years are also at greater threat for RRP with about 21% getting pregnant again within twenty-four months. A research done in the United States by Crittenden et al. (2009) revealed that 42% of adolescents reported to have experienced rapid repeat pregnancy in the year 2008. Vieira et al. (2016) in their study conducted in France found out that the adjusted risk ratio for RPP for adolescents who did not have adequate formal education was 2.1 (95%, CI 1.8 – 2.4) compared to young adults with adequate schooling and reported that there is a significant association between young maternal age and educational attainment.

RRP could lead to several factors among adolescents. Adolescents who become pregnant stand a higher chance of experiencing premature birth, low birth weight and neonatal and infant mortality compared to adult women with a repeated pregnancy further increasing the risk of preterm birth, lower birth weight and stillbirth (Speizer, Santelli, Afable-Munsuz, & Kendall, 2004). Adolescents' within the ages 10–19 years and young women within the ages of 19–24 years pregnancies are likely to be unplanned and unwanted.

Repeat pregnancy is higher among women who have given birth before. Statistics show that more than twenty-one percent of teenage mothers stand a higher chance of becoming mothers again within 12 months of delivery and more than thirty-five percent will become pregnant within two years of delivery (Abma et al., 2004; Ventura & Curtin, 1999; Stevens-Simon, Parsons, & Montgomery, 1986a).

Studies by Finer and Zolna (2011) and Finer and Henshaw (2006) have shown that almost fifty percent of all adolescent pregnancies in the United States are unplanned, 29% are not timed, hence occurring earlier than desired and 19% are unwanted with 43% of unintended pregnancies, ending in an induced abortion. Finer and Henshaw (2006) again suggest that unintended pregnancy rate among certain subpopulations including women who are young, less educated, of low income, cohabiting, serving in the military, or of racial and ethnic minority groups are not similar. Wildsmith, Guzzo, and Hayford (2010) have also found out that there is a higher prevalence of unintended births among non-Hispanic black and Hispanic women than non-Hispanic white women. Another study found out that non-Hispanic black and Hispanic women also have double the proportion of unplanned pregnancies than any other racial or ethnic group (Finer & Henshaw, 2006). A number of factors have been identified to contribute to Rapid Repeat Pregnancy. These include the Socioeconomic Status; Family Structure and Stability; Marriage and Social Support (Rigsby et al. 1998). Maternal complications such as post-partum haemorrhage (PPH), preeclampsia and eclampsia, cerebrovascular accidents (CVA), loss of uterine fertility due to unsafe abortions, systemic infections, poverty and reproductive system weakness as a result of rapid repeated deliveries reduce the state of health of the mothers. On the side of the new-born, early maternal delivery put babies at the risk of conditions such as birth

asphyxia due to placental insufficiency, jaundice, low birth weight, preterm delivery and early neonatal deaths (Ganchimeg et al. 2014).

2.1.3 Knowledge and use of contraceptives.

Contraceptive knowledge and its use are said to be major determinants in the management of population and development of a country especially among adolescents since they are the future of every nation. The use of contraceptives has been found to reduce RRP (Coard, Nitz, & Felice, 2000). The main cause of repeat unintended pregnancy is as a result of not using contraceptive methods effectively and the lack of family planning (DeFranco, Stamilio, Boslaugh, Gross, & Muglia, 2007). A study by Finer and Henshaw (2006) indicates that about a little over half of the population of women with unintended pregnancies are not engaged in the use of contraceptive around the time of conception. Studies have also revealed that RRP in adolescents have associations with contraceptive failure (Stevens-Simon, Kelly, & Kulick, 2001; Raneri & Wiemann, 2007; Coard et al., 2000).

A study by Tocce, Sheeder, Python, and Teal (2012) identifies postpartum adolescents who obtained a contraceptive method especially implant right after birth were less expected to get pregnant within one year than those who do not receive an implant. The same study indicated that, within a year, 86.3% of those who used implant after delivery, still continued this method, Heikinheimo, Gissler, and Suhonen (2008) also opine that long-acting reversible contraceptives (LARCs) reduce repeat abortion in adolescents with adolescents younger than twenty years having an increased risk of repeat abortion, compared with women greater than age 25. A study by Damle, Gohari, McEvoy, Desale, and Gomez-Lobo (2015) has also found out that adolescent mothers who start a LARC

method within two months of giving birth are less likely to have a repeat pregnancy within two years than those who choose other methods or no method.

Prata et al. (2013) also identifies young mothers who begin the use of LARC such as contraceptive implants and intrauterine devices (IUDs) are to be less susceptible to repeat pregnancy than other women who are put on shorter-acting methods and those who do not use any contraceptive method postpartum, Kelly, Sheeder, and Stevens-Simon (2005) found out from their study that the early resumption of intercourse as well as non-use of a LARC method cause pregnancy and can lead to preterm delivery. Teenage pregnancy continues to persist because, though most teenage girls do not want to become pregnant, they have sex without any form of protection (Kelly et al. 2005).

Postpartum or post abortion initiation of LARC have been found to reduce rates of rapid repeat teenage pregnancy and abortion within two years of giving birth (Kelly et al. 2005). Researches have shown that, young teenage girls starting a LARC method hold an advantage over their counterparts who have chosen a non-LARC method. There is up to a 35- fold reduction in risk of experiencing a rapid repeat pregnancy (within two years) (Baldwin & Edelman, 2013; Langston, Joslin-Roher, & Westhoff, 2014).

LARC methods are recognized among adolescents and acceptance is high when these methods are given to adolescents and young women in the postpartum period with continuation rates of LARC methods being greater than with user-dependent methods such as oral contraceptive pills and injections, but IUDs and implants have not been directly compared when initiated in the immediate postpartum period (Klerman, 2004). The uses of IUDs and implants are increased when they are used at the same time and day as

induced abortions for comprehensive contraceptive use compared with visiting a facility or going in for other services. This decreases repeat pregnancies within a year or more as well as repeat abortions (Langston Joslin-Roherb & Westhoff, 2014). Younger women are more vulnerable to unintended pregnancy compared to older women of reproductive age but typically favour methods with high failure rates including oral contraceptives (9% failure rate associated with typical use) and condoms (18% failure rate).

Low contraceptive use among adolescents may lead heavily to Unplanned and unwanted pregnancies and eventually RRP (Baldwin & Edelman, 2013). There are several barriers to accessing contraceptives which includes restrictions regarding the selling of contraceptives based on age and marital status, the unwillingness to acknowledge adolescent sexual health needs, health worker bias in terms of health care delivery and adolescents own inability to access contraceptives due to financial challenges (Darroch, Woog, Bankole, & Ashford, 2016). In addition, though adolescent girls are able to seek assistance on contraceptive methods, the stigma surrounding non marital sexual activity and the use of contraceptive, lack of knowledge on correct use and the fear of negative effects of contraceptives prevent them from utilising the services. Lack of the knowledge on contraceptive use and proper self-control puts adolescents at the risk of unwanted parenthood and forced marriages which most at times result in complications such as unsafe abortions and death (Darroch, Woog, Bankole, & Ashford, 2016).

Socially, they are faced with the problems of parental neglect and denial by partners and the challenges of hard labour in order to fend for themselves and for the new born (Langston, Joslin-Roher & Westhoff, 2014). Most adolescents' dropout of school which

results in high levels of illiteracy and poverty. The health needs of adolescents are being overlooked which results in their high unmet needs for support.

2.1.3.1 Knowledge and use of contraceptives among adolescents in Ghana

According to the GDHS, the main goal of contraceptives are to aid married couples and persons of reproductive age to obtain their reproductive goals and improve their general reproductive health (GSS, 2015). Contraceptive use especially the modern methods are widely known by adolescents in Ghana than the traditional method (GSS, 2015). Among currently married adolescents aged between 15 to 19 years, 96% have heard of any modern contraceptive method same percentage of sexually active unmarried adolescents have heard of any method (GSS, 2015).

In Ghana contraceptive use is low among young people. This could probably be because they are in the infantile stages of raising a family, than oldest women age 45-49 of reproductive age. Thirty-one percent of sexually active adolescents in Ghana use any modern contraceptive method 16.7% married adolescents also use. The most widely used modern methods include injectables, and a few preferred their partners to use male condoms (GSS, 2015).

2.1.3.1 Myth and misconceptions about contraceptive use

Myth is defined by the Cambridge English dictionary as a well-known story which was made up in the past to explain natural events or to justify beliefs or social customs. A belief or explanation is described as a myth, when many people believe it but it is actually untrue. A misconception is however an interpretation or opinion which is not correct because it is premised on faulty reasoning or understanding (Dictionary, 2008). According

to Rashid (2006), young people and adolescents are characterised by high sexual behaviors with unpredictable, frequent and unplanned sexual activities. This usually exposes them to Sexually Transmitted Infection and unwanted pregnancy.

While they are sexually active, there is low level of knowledge of contraceptive among them especially young women and adolescent girls and how contraceptive is used. Promoting contraceptive use among this age group has the likelihood to decrease early maternal and child morbidity and mortality, high risk pregnancy, and abortion (Rashid, 2006). Several studies have found out that most young women had myths and misconceptions regarding the use of the modern methods of contraceptives (Russo, Miller, & Gold, 2013; Adongo et al. 2014; Chipeta, Chimwaza, & Kalilani-Phiri, 2010).

2.1.4 Socioeconomic status

Young mothers (between 15 and 24 years) as compared to older mothers have been recorded not to have satisfactory results such as formal education, economics, family and personal achievements Bradley and Corwyn (2002), compared girls who had experience pregnancies and had one or more children from similar backgrounds. According to the study the teen mothers reported to have little or no formal education and gainful employment, (Bradley, Cupples, & Irvine, 2002). It is unlikely for adolescent mothers to complete high school and have formal tertiary education, (Nanchahal et al. 2005). Adolescents are noted to live in poverty. This is because they find it hard to gain employment, maintain the employment or have high earnings (Attico & Hartner, 1993) and (Hardy, et al. 1997). This is worrying as adolescent mothers stand a higher chance of having successive children, as well as high family size which eventually depletes resources that the family has (Maynard, 1995).

Some negative situations and conditions may also end up in teenage pregnancy or lead adolescents to get pregnant (Woodward, et al. 2001). These contextual features that could influence them to becoming pregnant include socioeconomic status (Nanchahal et al. 2005). For instance, a girl who comes from a deprived family or whose parents live in poverty is more likely to get pregnant than a girl from a relatively affluent (rich) home (Woodward, Horwood, & Fergusson, 2001). Socio-demographic factors such as family and personal factors can lead to teenage pregnancy chances. These include having a parent with little or no formal education, with future exposure being too low, and having less assurance in the possibility of graduating in a high school (Young, Turner, Denny, & Young, 2004). Again an adolescent's attitude and behavior such as not doing well in academic work, having bad conduct, taking high sexual risks, and behavioral challenges may contribute to a poor teenage parenting chances. There is a high possibility of educational interruption and dropping out of school among adolescent mothers (Nanchahal et al. 2005).

A major challenge is that, with teenage mothers' shortened education is sequence. Research is still inconclusive on whether girls who give birth in their teenage years have a higher chance of doing well academically, or they will drop out of school as a result of pregnancy or whether pregnancy itself leads to stopping school. In one study, approximately thirty percent of adolescent mothers were reported to have stopped schooling before they were seen to be pregnant (Maynard, 1995). Bonell et al. (2005) in their paper suggested that there is an association between high risk of pregnancy among adolescents with dislike for school after controlling for variables such as lack of expectation of education or training, expectation of parenting, sexual knowledge and confidence. Studies elsewhere especially from the United States, suggest that early onset

of sex among adolescents who stopped schooling was great. These adolescents were seen not to be using contraceptives during sexual intercourse which led to their pregnancy and childbirth (Mauldon & Luker, 1996). Teenagers who become mothers at that tender age perform poorly academically, miss a lot of school periods, and always face serious challenges coping with school work than their counterparts, eventually leading to academic detachment (Manlove, 1998).

Social health factors such as individual age and the environment in which people are born, develop, learn, work, play and interact also contribute to the person's sexual behavior (Bradley, & Corwyn, 2002). The quality of life results and threats are influenced by a large range of health determinants. Teenage pregnancy and teen behavior have been associated with some social factors like, high unemployment rate, low level of education, and low income (Bradley, & Corwyn, 2002). Some young mothers willingly leave school choosing child birth over education while a great number of them are forced out of school due to the shame or the need to work to cater for themselves and the new-born. All these sum up to the increasing numbers of lower educational levels and fewer skills for employment opportunities which leads to low income among young mothers.

Rigsby et al. (1998) identified socioeconomic status (SES) as a characteristic related to both first and second pregnancies among adolescents, especially if the second pregnancy is rapid repeat. According to Kalmuss and Namerow (1994) Caucasians with low earnings have greater rates of rapid second pregnancies than higher-income Caucasians. A study by Stevens-Simon et al. (2001) revealed that, there is a strong association between RRP among adolescents and poverty. Very young mothers living in poverty are at highest risk for consequences related to closely spaced pregnancies and compared with older mothers,

adolescent mothers are less likely to receive adequate prenatal care, with multiparous adolescents being at higher risk for micronutrient depletion both during and after pregnancy (Klerman, 2004 ; Stevens-Simon et al, 2001). Childbirth among adolescents is related to negative results among infants born to these adolescents. These adverse outcomes include low birth weight, premature birth and infant mortality. According to Moore (1995) living in a disadvantaged neighborhood has a positive association with teen pregnancies and births.

2.1.5 Religion and adolescent pregnancy

Teenage pregnancy and religion according to several studies have some form of link. Notwithstanding the fact that the doctrines of most religions encourage abstinence and rejecting premarital sex and extra marital sex among adolescents, the teenage pregnancy rate among individuals in highly religious affiliates remains high (Hardy, et al. 1997). Many studies suggest that, the prevalence of sexual activity among many religious teenagers is higher compared to their non-religious counterparts (Adamczyk & Felson, 2008). However, that may not be the case. It could simply be that religious teens are not using protection as much as non-religious teens that are having sex. Many religious groups frown on contraceptive usage especially among young unmarried teenagers. Other studies have also suggested that greater religiosity is associated with either higher abstinence or lower adolescent pregnancy and birth rate. Hardy and Raffaelli (2003) analyzed data from the National Longitudinal Survey of Youth and reported that the higher time one religiosity predicted a lower likelihood of first sexual intercourse between time one and time two Dudley, Rostosky, Korfhage, and Zimmerman (2004) found that adolescent religiosity expected later coital introduction.

Some studies have attempted to link RRP to religious beliefs (Trussell & Menken, 1978). These studies found out that rapid repeat pregnancy was seen to be high among Catholics than Protestants. This is possible because the Catholic Church prohibits the use of contraceptive methods among their members. This was factual regardless of the legitimacy status of the births Mott (1986), reported in a multivariate analysis model that adherence to fundamental Protestantism was a factor which led to the decrease in repeat pregnancy. However, Dudley et al. (2004) did not identify any association between the religion to which an individual belongs to and their recidivism. Compliance to basic protestantism may offer some sort of guidance by encouraging adolescents to abstain from sex. Nonetheless, the significance of religion to a person is difficult to assess objectively, and general inferences cannot be obtained since the number of studies was not adequate. According to Adamczyk & Felson (2008), to be able to prevent adolescents' pregnancy it is important for the adolescents and their parents to be realistic about the possibility of the fact that teens have high libido and it is easy for teens to have sex. Being able to engage in safe sex is a very important means of avoiding the adolescent girls especially from continuing to get pregnant and repeat the pregnancy. According to Hardy and Raffaelli (2003), there are several resources at the disposal of adolescents to use, to learn and to engage in safe sex with contraception though they will not be happy with the consequences from their religious background. Consistent contraceptive use or abstaining from sexual intercourse can help in the reduction of pregnancies among teenagers.

2.1.6 Family structure and stability

A lot of family factors may affect adolescent pregnancy risk. The influences could range from some potentially important characteristics such as early age of menarche, hormonal levels, and genetics to the contextual and structural features of families like parent's

educational background and their marital status. Practices like parental support and the control they have on their adolescents could also determine adolescent risk of sexual behavior (Cavanagh, Crissey & Raley 2008). It is essential for parents to involve themselves in teenage pregnancy prevention and avoiding other adolescent risk behaviours. There are several schools of thought about the extent to which parents and guardians get involved in adolescent sexual decision making (Cavanagh et al. 2008).

There is evidence that the involvement of parents in adolescent upbringing is an essential and reliable component of preventing teenage pregnancy. The use of healthy family-based interventions is the most effective way of preventing teenage pregnancy. These recommendations have been made by a lot of stakeholders in the subject area. Mothers who were married and gave birth at the age of adolescence had their children also giving birth around the same age. These mothers are about 42 percent less probable to engage in sexual activities compared with their counterpart adolescents whose parents co-habited during the period of adolescent birth. They were also 26 percent less probable to get themselves involved in sexual activities when they were compared to other counterparts whose mothers were not staying together with their partners during the period that the adolescents were born (Cavanagh, 2008).

Another study by Manlove, Ryan and Franzetta (2007) revealed that the family structure may influence adolescents' sexual initiation. Staying with one's biological parents was seen as a major factor that prohibited adolescents from starting sexual activity early as compared to their peers from different family system. Adolescents from other family structures were between 40 percent and 198 percent more likely to transition into sexual activity than adolescents living with two biological parents. Adolescent girls who had

good parental care and lived with both parents were 46% less likely to have sexual relationship than the other family structures. Most aspects of family organization have been found to affect repeat teen pregnancy, including the number of people in the family, number of immediate family relations, and the level of formal education attained by parents. The research work done by Kalmuss and Namerow (1994) again identifies that having more than three siblings was linked with a marginal rise in the rate of repeat pregnancy.

2.1.7 The role of marriage

The key factors behind high maternal and child morbidity and mortality rates globally are early child marriage and teen pregnancies (Rigsby et al. 1998). Many research works suggest that engaging in premature sexual activity and early pregnancy result from child marriages. Significant evidence reveals that almost one in five women age 20 to 24 (19%) had a live birth by their 18th birthday. This shows that, the annual occurrences of births to adolescent girls less than 18 years is reported to be 7.3 million births. Out of this figure, the occurrences of births among adolescents aged 15 and below constitute 2 million (UNFPA, 2015). Approximately ninety-three percent of the 15 countries where the figure is over 30 percent, were recorded to be in Sub-Saharan Africa (and nine are in West and Central Africa) with Niger recording the highest global rate. Research works that were initially done on teenage pregnancy concentrated on marriage as a means to legalise birth. However, it is confirmed that, the adverse effects of teen pregnancy are not resolved by marrying early. Studies have shown a high level of divorce as a result of early marriages (Furstenberg Jr, Brooks-Gunn & Morgan, 1987).

The notion that marriage may be a risk factor for rapid repeat pregnancy has two likely conjectural bases (Furstenberg Jr et al. 1987). Firstly, adolescents who marry may be at the stage of forming their families, and, therefore, wish to have more children. On the other hand, adolescents who marry to legitimise birth may in fact not be interested in having a second pregnancy, but may have more frequent sexual intercourse because their sexual partners are available to them (Rigsby et al. 1998). A research done has found a positive correlation between marriage and rapid second pregnancy among adolescents (Stock, Bell, Boyer & Connell, 1997).

2.1.8 Sex education

It is a taboo to mention sex education in most part of the world especially in sub Saharan Africa. There is a general contention about the approach to adopt in explaining reproductive health issues and prevention of pregnancy in adolescence Shtarkshall, Santelli, and Hirsch (2007) identifies sex education as a most sensitive and divisive topic to be discussed in most homes around the world. Issues such as who is to carry out sex education; whether parents or teachers, parental control over what is to be included in the sex education, the core values to be inculcated into the education and what is to be considered appropriate adolescent sexual behavior hinders the promotion of sex education (Shtarkshall et al. 2007). It is generally agreed that formal education should include sex education. Asmal & James (2001) showed in a study that teachers play an influential role in the development of children's identity and sexuality.

Sex education is an important component in the development of the adolescent. It provides the adolescent with all the necessary information they need to know about their bodies, gender, reproductive health, puberty, knowledge on contraceptives which enhance their

usage and the consequences of coitus which include sexually transmitted infections and unwanted pregnancies. It also helps the adolescent to make informed decisions concerning the sexuality. A report by the American Psychiatry Association, APA (2006) indicated that sex education has greatly impacted the sexual behavior of adolescents as effective programmes has provided them with practical skills such as exercising self-control and increasing communication and negotiation skills.

A research done by Sharkshall et al. (2007) showed that about 84.2% of girls obtained their first knowledge about adolescent body changes and sex education from their mothers. Children who have poor parental control often go to their age mates for advices and the desire to fit in and not be left out by peers' leads them to engage in acts that result in teenage pregnancy. Another study by Muller & Lorrie (2008) stated that explaining reproductive health issues to adolescents always have beneficial impact on their acceptance and usage of contraceptives the very first time they engage in sexual activity. Notwithstanding all these benefits of sex education, most parents find it difficult to talk about sex with their adolescents. A number of times, the issues on sex education that are been discussed by parents are mandated to be "abstinence-only", excluding the teaching of contraceptive techniques and use (Muller & Lorrie, 2008).

Just as the parents, adolescents also find it uncomfortable and difficult to discuss matters concerning sex with their parents as indicated by Shtarkshall et al. (2007). The study further indicated that in homes where parents are able to discuss issues of sex with their adolescents, mostly the content is limited, infrequent and mostly between certain family members such as mother and daughter. This communication often times happen after the adolescent has already initiated sex. Odu & Ayodele (2007) also reported that most

adolescents feel embarrassed to discuss matters that concern contraceptive use though they can talk about sex.

Sex education is usually taught in middle schools or the junior high school level which becomes a disadvantage to most adolescent girls who due to reasons such as poor background and financial constraints are not able to get to that level (WHO, 2011). Shtarkshall et al. (2007) reported that most adolescents prefer school as their source of information on sex with the home being the last choice even though they would have preferred additional information from their parents.

Adolescents therefore tend to seek for information on reproductive health from peers and the media such as the internet, magazines and television. This leaves most of the adolescents believing what is reported in the media about sex resulting in unwanted pregnancies as reported by Strausburger et al. (2009). A study conducted in 2007, reported that lack of sex education which teaches the adolescent about safe sex can lead to adolescent pregnancy (Eisenberg, Bernat, Bearinger, & Resnick, 2008). A study by Adu-Gyamfi (2014) in the Upper Denkyira West district in Ghana also indicated that about 83% of the respondents agreed to the assertion that lack of sex education results in adolescent pregnancy.

2.1.9 Age at menarche and initiation of sex

Adolescents from decades ago were experiencing puberty around the ages of 16 and 19 years. Now this generation of adolescents are going through puberty at an earlier age and this exposes them to sexual activities early in life (Roque & Gubhaju, 2001). While most countries have increased the age at marriage to 18years, due to the lifestyle and nutritional

changes in this era, the age of attaining puberty has decreased drastically. Adolescents are physically developing faster than it used to be in decades ago (Alford, Cheetham, & Hauser, 2005). The huge lacuna between the period of puberty and the age of marriage has made the adolescents at risk of engaging themselves in sexual activities at relatively younger ages (Roque & Gubhaju, 2001). This could be associated with high risk behaviours, leading to health problems such as unintended pregnancies, sexually transmitted infections and their negative outcomes (Bearinger, Sieving, Ferguson, & Sharma, 2007).

Females who mature early physically have a tendency of getting pregnant at the early ages of life than those who do not (Deardorff, Gonzales, Christopher, Roosa & Millsap, 2005). This could be the early growth and development of the effect of sex hormones, the faction between rapid physical development, cognitive, psychosocial maturity and genetic influences (Golub et al. 2008). Deardoff et al. (2005) stated that the average age of a girl at menarche is decreasing worldwide; sexual maturity is reached by girls now at a significantly younger age than their grandmothers. She also reported a drop in age at menarche in several countries like in the United States, Canada and Britain the average age at menarche declined from 14 years in 1900 to 12.8 years.

A study conducted in America among Black and Hispanic adolescents showed that, American adolescents who get pregnant experience menarche at an earlier age compared to their other peers who do not get pregnant (Dunbar, Sheeder, Lezotte, Dabelea, & Stevens-Simon, 2008). The same study showed that the mean age at menarche among US girls in the 2000s was 12.34 years, with racial variations; 12.06 years among non-Hispanic black girls, 12.09 years in Mexican American girls and 12.52 years in non-Hispanic white

girls. Several published works on menarcheal age have been recorded in the Ghanaian literature. The first of such recorded study on menarcheal age of the Ghanaian female was reported by Adadevoh, Agble, Hobbs, and Elkins, (1989) with a mean age of 13.5. This was followed by other studies by Adanu et al. (2006) and Aryeetey, Ashinyo & Adjuik (2011). A study by Ameade and Garti (2016), showed that urban dwellers in Ghana experience early menarche as compared with adolescents who reside in the rural areas. Early age at menarche may be an important factor affecting the sexual and reproductive health of adolescent girls and young women in low- and middle-income countries (Ibitoye, Choi, Tai, Lee & Sommer, 2017).

2.1.10 Context of miscarriage and rapid repeat pregnancy

Miscarriage, which is also known as spontaneous abortion and pregnancy loss, is the natural death of an embryo or fetus before it is able to survive independently (Tang & Quenby, 2010). Some studies use the cutoff of 20 weeks of gestation, after which fetal death is known as a stillbirth (Radford & Hughes, 2015). Vaginal bleeding with or without pain is the commonest symptom of miscarriage (Oliver & Overton, 2014). About 80% of miscarriages occur in the first 12 weeks of pregnancy (the first trimester). Some environmental risk factors of miscarriage include stress, poor nutrition, poor parental support and sometimes exposure to tobacco smoking (Tang & Quenby, 2010). Teenagers are at higher risk of miscarriage and complications from pregnancy than the average adult woman (Pal, Gupta, & Randhawa, 1997).

Most of the adolescent girls do not get to know they are pregnant until much later in pregnancy. This is due to the fact that many of them might have irregular periods and menstrual cycles because they are so new to entering their fertile age as teens, that they do

not know when they can expect their next period. It is possible for teens to go several weeks without menstruating. This is because of their usual irregular menstrual cycle. Some also do not seek prenatal care in order to keep the pregnancy a secret (Radford & Hughes, 2015). Another study by Conde-Agudelo & Belizan (2005) shows a possibility that adolescents under 18 years of age who have never given birth stand a higher chance of experiencing miscarriage. The miscarriages that occurred were however seen not to be in their first trimesters, but rather second and third trimesters. This is because it was shown that pregnancies which were not earlier than about two months gestation were not considered. It is therefore important to address the health challenges in relation to adolescent mothers (maternal health) to prevent miscarriages in the early part of their pregnancies. Another study done elsewhere confirms that miscarriage is mostly the commonest type of loss in pregnancy (Wieringa-de Waard et al. 2003). Eating a balanced and nutritious diet, stopping smoking, taking in illicit drugs, and getting adequate pre-natal care are some risk factors involved in the threats of experiencing miscarriage. Therefore, adolescents who get pregnant can avoid engaging in these risk factors. (Oliver & Overton, 2014).

Adolescents' antenatal (ANC) visits during pregnancy

Antenatal care is defined as the routine care of pregnant women provided between conception and the onset of labour (Fife, 2010). Antenatal care generally is a way of providing care to avoid and manage the potential causes of maternal and newborn mortality and morbidity. The new WHO antenatal care model recommends that the first antenatal care visit, takes place within the first trimester which is gestational age less than 12 weeks (WHO, 2012). Eight ANC visits are recommended during the entire pregnancy

period (WHO, 2012). The WHO recommends all the eight ANC visits under the focused antenatal care initiative for all developing countries.

Initiating the timing of the first antenatal care visit is principal for making sure that optimal care and health results for women especially pregnant adolescent are addressed (Fosu-Brefo & Arthur, 2015). It is essential to seek ANC services from skilled providers at health facilities. This ensures and enriches maternofetal health. Timely, appropriate adequate ANC practices among pregnant adolescents in Kenya has increased the high contraceptive usage postpartum and decreased repeat pregnancy (Pell et al. 2013).

The importance of attending ANC include good nutrition and routine health assessments, ability to manage the possible threats that are associated with pregnancy, counselling and assistance for females of reproductive age and their households, adequate knowledge on the methods of contraceptive which will be useful postpartum and higher probability of child delivery among skilled birth attendants. This may help reduce maternal and infant morbidity and mortality (Pell et al. 2013). Another study shows a confirmation that the timing of initiation of the first antenatal care visit is paramount for ensuring optimal care and health outcomes for women and children (Fife, 2010).

In Ghana, the routine content of antenatal care services includes:

- a) Assessment of previous and current pregnancies routine measurement of weight;
- b) Height and blood pressure;
- c) Abdominal palpation;
- d) Nutritional advice;
- e) Examination for the presence or absence of oedema,

- f) Distribution of iron and folate supplements;
- g) Malaria prophylaxis;
- h) Blood testing for haemoglobin;
- i) Urine testing for protein;
- j) Birth preparedness and complication readiness education,
- k) Tetanus toxoid vaccination
- l) Introduction of contraceptives after delivery (WHO, 2015).

According to WHO (2015), antenatal care is the time for service providers to embolden the use of professional attendance at birth and healthy behaviours which include breastfeeding, early antenatal care, and planning for ideal spacing of pregnancy.

Adequate use of antenatal care (ANC) services by adolescents could lower pregnancy and childbirth complications, and increase the outcomes for mothers and babies (Atinga & Baku, 2013). Adolescents' non-utilisation of ANC services poses health threats to themselves and their babies and is linked with poor birth outcomes (Arthur, 2012). It is important to improve ANC attendance among pregnant adolescents to reduce the risk associated with developmental stage and prevent repeat pregnancy outcomes.

2.1.11 Transactional sex

Transactional sex is a non-commercial, non-material sexual relationships motivated by the implicit assumption that sex will be exchanged for material benefit or status (Leclerc-Madlala, 2003). This is normally a relationship between boyfriend and girlfriend or even married couples but with high age differences. Power is key, and when you exchange gifts for sex then the control can seem to lie with the one giving the money. UNAIDS (2004), reveals that almost half of all new cases of HIV infection worldwide happens among

young people between the ages of 15 and 24 years. According to that same report, over 6000 of these young people acquire the disease daily of which some also end up with teen pregnancy (UNAIDS 2004). Among the young people who are infected, about 75% are females (UNAIDS, 2004). Unintended pregnancies that usually lead to unsafe abortions are also a major reproductive health problem among young people in Sub-Saharan Africa (Henry & Fayorsey, 2002).

It is clear that that the sexual conducts of this population is of great public health concern which needs to be addressed. According to Jewkes et al. (2012), any sex that is motivated by economic exchange is a public health concern and this has been the main cause of the high prevalence of HIV epidemic in the Sub-Saharan African (Jewkes et al. 2012). In the mid-1990s transactional sex was regarded as an important determinant of HIV transmission, especially in sub-Saharan Africa (Stoebenau et al., 2011). Transactional sex relationships have been designed by a number of economic, social and political situations for some period of time that have become, more often than not, contradictions the literature as motivated by either for ‘survival’ or ‘consumption.’

Most conventionally, within the context of highly unequal gendered power and position, young women and women with low income become victims to this survival sex to enable them find their daily needs (Stoebenau et al., 2011). This type of sex according to Swidler & Watkins (2007) provides the modern equivalent to these more traditional practices, instead of marrying more than one wife to portray wealth in the ancient days, the modern man will rather engage in having two or more girlfriends so that he can support them and provide for them. These girl friends are most often adolescents.

In Malawi, men who are wealthy and have higher social class are encouraged to engage in multiple, transactional sex relationships to help the under deprived female citizens especially those in the rural areas of Malawi (Swidler & Watkins, 2007). In high income countries, there is very little or even not much stigma on transactional relationships or sexual accidents where sex is exchanged for material gifts and rewards. Dunkle et al. (2010) suggested that relationships and transactional sex are very common and reported by one in three unmarried US women. This social stigma surrounding disclosure of such relationships are much more pronounced than in Africa especially in the southern part of Africa. Recent research works done in the field of reproductive health are shifting to addressing Transactional sex issues due to the link to demographic and health results including exposure to teenage unplanned pregnancies.

2.1.12 Social and mass media

The world has become a global village due to the advent of technology. The need for information on issues around the world has been made easy and possible through the mass and the social media such as television, newspaper, magazines, video games, bill boards internet and radio (Carpenter et al., 2001). Although sexual content in the media can affect any group, adolescents may be highly at risk. According to Reamer & Siegel (2009), watching sexual contents on television predicts and makes adolescents start sex early.

The researchers established that adolescents who watch most sexual contents are twice at risk of initiating intercourse or advancing in non-coital activity. Adolescents learn how to attract sexual partners, how they will be able to date well and information about contraception and birth control mainly from television (Reamer & Siegel, 2009). Findings from the 2014 Ghana Multiple Indicator Cluster Survey (MICS), mass media is a

necessary requirement for having a meaningful standard of living (WBG, 2014). The mass media has become a tool for learning and behavioral change. Adolescents are not left out when it comes to accessing information through mass media. It has been reported that 9.5% of adolescent girls between 15 and 19 years in Ghana have access to mass media at least once a week and that of adolescent boys between 15 and 19 years is 12.5% (WBG, 2014). This means that, adolescents are privy to programs with adult or sexual theme and this may influence their sexual behavior which may lead to adolescent pregnancy.

The media has been shown to have a greater influence on adolescent early sexual behavior. The media most times depicts the thrilling aspect of sex which lures the adolescent into perceiving sex to be some form of fashion. Since most adolescents have the magazines and internet as their vital source of sex education, they therefore go into early sex not thinking about the consequences of it such as pregnancies that are unplanned and unwanted and sexually transmitted infections (Strasburger, Wilson, & Jordan, 2009). A study conducted in the United States of America, comparing the outcomes of exposure to the mass media in white and blacks showed that white adolescents' sexual activity were greatly influenced by sexual content in music, magazines and television which also prone them to involving themselves in early sexual activities. Black adolescents on the other hand were influenced by the perception of their parents expectations and sexual behavior of their peers rather than what they see and hear through the mass media (Brown et al., 2006).

Another study also reported that there is a link between listening to music with degrading sexual lyrics and early initiation of sexual intercourse in adolescent. This according to the study is because youth who listen to more degrading music with sexual context are more

likely to move from intercourse to advanced non-coital sexual activities (Martino et al., 2006). Watching sex on television has also been found to hasten or increase the likelihood for adolescents to initiate sexual activities which also result in adolescent pregnancy (Chandra-Mouli, Camacho, & Michaud, 2013). The outburst of technology has presented new means of accessing information on reproductive health for most adolescents. A study conducted in the United States of America indicated that about 73% of adolescents used at least one form of social networking site which in Facebook, WhatsApp, Myspace and Twitter.

Most of the college students reported the internet as their key source for information on sexual health. Although the adolescents according to study indicated that they would have preferred getting information or talking to health professionals in person, searching for information on reproductive health or sexual health on the internet is their only option in obtaining such information (Selkie, Benson, & Moreno, 2011).

2.1.13 Parental care and family support

According to Kumpfer and Alvarado, (2003) a well-developed youth is dependent on a strong family value system. For some time now researches have shown that parents play a protective role in the lives of adolescents (Shumow & Lomax, 2002). Developmentally, period of adolescence is a peer-oriented stage, yet their parents are much more influential on the lives of these adolescents than they consider. Most parents obtain advice and knowledge about parenting strategies from different sources when their children are young, it mostly begins with prenatal classes and it continues through early period of childhood education (Kumpfer & Alvarado, 2003). Supervision and monitoring, discussing family values and expectations and regular instilling of discipline are the main

parenting practices that contribute to healthy adolescent behavior (Mayseless & Scharf, 2009). A study by Kirby (2007) revealed that individual and family characteristics were associated with adolescent pregnancy.

At the family level, adolescents with good parental care and control, and living with both biological parents have less risk of teenage pregnancy (Kumpfer & Alvarado, 2003). Although health care, social service, and educational systems provide sex educational messages to parents of young children, similar chances are not as broadly available throughout the adolescence period (Simpson, 2001). Individuals or family relations may remain resilient through challenges if there are healthy levels of family solidity (Kirby, 2007). This usually promotes the psychological and emotional support among family members (Shumow & Lomax, 2002). Efficient raising of adolescents through a smooth transition period to adulthood may require less cohesiveness from family members and authorities to achieve such a goal (Mayseless & Scharf, 2009). The lack of information, supervision and support from parents to adolescents have its negative consequences mostly on the adolescents' sexual health and behavior (Shumow & Lomax, 2002).

2.1.14 Social support

The social support accessible to pregnant adolescents can also contribute to RRP. Adolescents are usually faced with the problems of social neglect and denial by partners and the challenges of hard labour in order to fend for themselves and for the new born (Martino et al., 2006). The amount of care received from the relatives and friends of adolescents is seen as unmet psychological needs when assessed (Klerman, 2004). Adolescents usually go in to seek for sexual intimacy or have children to engage themselves and also feel loved with their babies around because they feel they do not

receive adequate support from the people they expect that from (Rigsby et al., 1998). Hence the less the social support the higher the chance of RRP among adolescents (Rigsby et al. 1998).

According to Jacoby, et al., (1999), the use of contraceptives in some relationships may also affect the relationship and could represent a form of one party abusing the other. This is usually supported by isolation and interference with social support. The health needs of adolescents are being overlooked which results in their high number of unmet needs for support (Alford et al., 2005). Adolescent mothers have a greater need for emotional, psychological and social support as compared to women aged 20 to 24years (Hindin, M. J. & Fatusi, 2009).

2.1.15 Mental health and adolescent pregnancy

Socially, married women who get pregnant before the age 19 tend to suffer violence from their partners at home (UNFPA, 2015) and with the unmarried, they face the trauma of school dropout, parental neglect and denial by sexual partners. Research has shown the existence of the relationship between behavior and repeat pregnancy among adolescent (Miller-Johnson et al., 1999). Aggression is seen by Crittenden, Boris, Rice, Taylor & Olds (2009) as an influential marker for higher threats results from adolescents who have experienced RRP.

Jacoby et al. (1999) identifies emotional stress as contributing factor to disorganization in contraceptive behavior which may in turn result into RRP and causing a loss of self-esteem and violation of the internal locus of control. Jacoby et al., (1999) again explains the presence of sexual abuse in partnered relationships results in the absence of personal

control in the use of contraceptives. Adolescents who experience a repeat pregnancy have been found out to achieve poorer educational attainment and lower rates of employment than adolescents who do not (Joyce, Kaestner & Korenman, 2002).

Some studies agree that mental health, behavioural, and experiential factors such as anxiety, depression, aggression, childhood trauma, and physical and sexual childhood abuse are associated with an initial teen pregnancy (Quinlivan et al., 2004; Gest et al., 1999; Carpenter et al., 2001; Herrenkohl et al., 1998). Among African-Americans, girls who displayed stable patterns of aggressive behaviour from third to fifth grade have increased risk for pregnancy during adolescence, had more children, and were younger when they had them; with aggressive girls having twice as many children as nonaggressive girls (Gipson, Koenig, & Hindin, 2008). Crittenden et al. (2009) identifies that greater likelihood of aggression among women is significantly associated with having a rapid repeat pregnancy within 24 months and that age at menarche and self-reported aggression contributed independently to the prediction of a closely spaced second pregnancy. Studies by Jacoby et al. (1999) explains that the experience of interpersonal violence is associated with rapid repeat pregnancy among teenagers of the lower socio-economic class and thus strongly suggests a need for both extensive screening for partner and family violence among pregnant and postpartum adolescents, and follow-up safety planning support in combination with family planning interventions.

Kaufmann, Morris, and Spitz (1997), find children who are born by adolescent mothers having higher risk of abuse and neglect, and adult children of teen parents have lower educational achievement, lower earnings and higher rates of experiencing teen pregnancy. Prevalence of spousal/partner abuse in obstetrical and postpartum patients ranged between

20.4% to 26% and the prevalence of dating violence has also been reported at 24.6%, although a wider range of values of these estimates has been indicated in several reviews. Jacoby et al. (1999) again suggests that the etiologies of rapid repeat pregnancy among adolescents are likely multiple. Emotional stress may contribute to disorganization in contraceptive behavior, and loss of self-esteem and violation of the internal locus of control.

When sexual abuse is present in partnered (or other) relationships, personal control of contraceptive use is generally absent (Quinlivan et al., 2004). In some relationships, interference with contraceptive behavior may represent a form of domination and control, a part of the abuse constellation, usually accompanied by social isolation and interference with social support. For some young women (as with their older peers), miscarriage may be followed by the desire for a “replacement baby” (Jacoby et al. 1999). Some young women who are fleeing abusive boyfriends form new partnerships with men they do not know well, that is in order to obtain some male protection from their previous assailant (Small & Kerns, 1993). Similarly, the odds of becoming pregnant among adolescents with persisting patterns of depressive symptoms was increased 2 times in unadjusted estimates. However this association was no longer significant after controlling for low socioeconomic status, drug use, and antisocial behavior.

Antisocial behavior and drug use were rather found to be strong predictors of adolescent pregnancy (Nielsen et al., 2008). Again, first-time mothers with moderate to severe depression had a seven fold (OR=7.24, 95% CI 21.08- 24.04) increase in the odds of becoming pregnant again within 6 months of having a baby (Patchen & Lanzi, 2013). In another study among women (who expressed strong desire to avoid pregnancy) 18 to 20

years, stress and co-occurring stress and depressive symptoms were strong predictors of unintended pregnancy. Adjusted estimates showed that women who showed stress symptoms had an increased risk of unintended pregnancy by 1.6 times compared to women who were without stress symptoms. Also, women with both stress and depressive symptoms had a relative risk of unintended pregnancy of 2.1 compared to women without both symptoms. The associations were similar among women who were nulliparous and women who had had a prior pregnancy over the one year period of study (Hall, Kusunoki, Gatny & Barber, 2014)

A study conducted by Meltzer-brody et al. (2013) in Raleigh, North Carolina among adolescents aged 12 to 20 years found that prim parity and stress were positively correlated with post-partum depression ($r= 0.27$, $p=0.002$). Other positive correlates of post-partum depression included poor post-partum adjustment, poor social adjustment. How positive the adolescent viewed her pregnancy was also negatively associated with both antenatal depression ($r=-0.45$, $p<0.001$) and post-partum depression ($r=-0.27$, $p<0.001$) (Meltzer-Brody et al., 2013). Studies show that perinatal and post-partum psychological stress or poor mental health have negative impact on maternal and neonatal outcomes as well as childhood development.

Findings from a Swedish National Health survey which diagnosed depression among adolescents and followed them over a 15-year period indicated that women who were formerly depressed had higher rates of maternal disorders during pregnancy and complications related to delivery and the puerperal period. Furthermore, eating disorders and disruptive behavior disorders were observed among adolescents who were exposed to

maternal depression 3 months after birth in a longitudinal study (Pawlby, Hay, Sharp, Waters, & O'Keane, 2009).

Depression has been observed to be one of the factors that affect RRP. A study, conducted by Stevens-Simon et al. (1996) identified no variance when they used the scores from the Center for Epidemiological Studies-Depression Scale to assess adolescents who had a second pregnancy and those who did not. RRP among adolescents is seen as a global health concern. Determining its prevalence and identifying the risk factors associated with it may be essential as it helps direct intervention policy framework using scarce resources.

2.2 A systematic review of depression as a consequence of adolescent pregnancy

A systematic review is a type of literature review that uses systematic methods to gather secondary information, critically appraise research studies, and synthesize studies (Liberati et al., 2009). Systematic reviews formulate research questions that are broad or narrow in scope, and identify and synthesize studies that directly relate to the systematic review question (Bilotta, Milner & Boyd, 2014). They are designed to provide a complete, exhaustive summary of current evidence relevant to a research question (Liberati et al., 2009). This provides a thorough knowledge on the topic and enable the researcher to perform searches of all relevant databases on the selected topic. A literature review was done for the first section (Risk factors for RRP) because a current systematic review has been done on the topic by Maravilla et al, (2017).

This section sought to do a systematic review on the effect of rapid repeat pregnancy on depression among adolescents. There was no specific study found on the said topic. The researcher further explored on the effect of postpartum depression among adolescents.

Whether it is a first delivery or multiple. This review was done systematically to identify, synthesise and assess all available evidence, quantitative and or qualitative, in order to generate a robust, empirically derived answer to the said research topic.

2.2.1 Introduction to Systematic Review

Adolescence is one of the most rapid phases of human development which is characterized by significant biologic and psychosocial changes. Psychosocial maturity is normally preceded by biological maturity and often poses certain challenges such as identity crises, mood and emotional challenges. Physical changes are marked by growth spurt and development of secondary sexual characteristics (WHO, 2018). This period of development may also be characterized by sensation seeking and risk taking putting adolescents at an increased risk of accidental death and injury. Pregnancy in adolescence may be present with certain risks for both mother and child. These may be due to the fact that they are both physical and psychological immature (Siegel & Brandon, 2014)

About 21 million girls between the ages of 15 to 19 years become pregnant around the world yearly. In developing countries 2 million of girls under the age of 15 years also become pregnant (WHO, 2018).

Disadvantaged communities record higher rates of adolescent pregnancies even though the problem is a global one, probably because child marriages occur higher among such communities, in which case pregnancies may be planned or wanted, although majority of adolescent pregnancies are unintended or unwanted (WHO, 2018). This combined with social or religious norms may put them at risk of unsafe abortions. An estimated 3.9 million unsafe abortions are done among teenagers worldwide each year.

Rapid repeat pregnancy during adolescence has been defined as one occurring within 24 months of the previous birth. Predictors of repeat pregnancy within various populations of adolescent mothers have been identified as individual-level factors such as using drugs or alcohol, experiencing physical or sexual violence, having positive attitudes toward adolescent childbearing and wanting to have a baby (Raneri & Wiemann, 2007). Pregnancy comes with some emotional, psychological and social demands among women; in teenagers the demands are even higher. Failure to meet with these demands may result in adverse maternal or neonatal outcomes (WHO, 2018).

Though there are a lot of articles published on depression among adolescent after pregnancy [(Birkeland, Thompson, & Phares, 2005);(Clemmens, 2002); (Logsdon, Birkimer, Simpson, & Looney, 2005)] there is no published research work and systematic review done on the effect of rapid repeat pregnancy on depression. According to Rigsby et. al., (1998), the probability that an adolescent who has gotten first pregnancy before the age of 16 years will have repeat pregnancy before 18years is high. This section of the study seeks to synthesize available evidence on RRP and Depression using systematic review approach.

The relationship between pregnancy and mental health is discussed in subsequent paragraphs in this chapter. This association is not a straight forward one as will be shown. Pregnancy may be a risk factor for stress, depression among others and on another hand pregnancy may be a result of poor mental health. Some studies even show the long term effects of stress, anxiety and depression during pregnancy and postpartum among mothers on their offspring. A literature search was conducted to get information on these issues in PubMed and JSTOR. Phrases and words like ‘pregnant’, ‘depressive disorder’,

‘adolescents’ were entered and different variants of the words were also used. The search was restricted to articles published from the year 2008 to 2018. Critical appraisal of selected articles was conducted using a tool developed by Young & Solomon (2009) and is illustrated in Table 2.1 which shows a synthesis of findings from the selected articles (Young & Solomon, 2009).

2.2.2 Methods

2.2.2.1 Search strategy

The search was carried out in March 2018. The generic search terms used were “rapid repeat pregnancy,” “depression,” “adolescent pregnancy,” “mental health*,” “depressive symptoms”. The main databases searched were PubMed, MedLine, EBSCOhost, CINAHL, PsycINFO, POPLINE, Web of Science, Research for life WHO global health library, and google scholar. The search was not restricted to any country. While the aim was to capture studies that investigated the effect of rapid repeat pregnancy on depression, the search was purposefully kept as broad as possible to capture all studies that investigated the effect of adolescent pregnancy on depression or mental health status in any setting. In addition, relevant citations from retrieved studies were accessed. Search strings were constructed using the generic search terms and their combinations. Search strings were modified to suite the databases interface.

2.2.2.2 Screening and eligibility

The author screened the titles and abstracts of the identified records for duplicates and relevance. All study design types (e.g. cross-sectional, case-control, cohort, survey, surveillance) as well as qualitative studies were eligible for inclusion. Studies that have been done among adolescents less than 20 years with pregnancy, delivery or repeat

pregnancy, and its relationship to depression as a measure of mental health status were also eligible for inclusion. Studies that reported depression or depressive symptoms as an outcome of interest as well as pregnancy, delivery, or rapid repeat pregnancy as the primary exposure of interest were included. All other studies that investigated risk factors for depression or depressive symptoms or mental health status were also included. All studies that have been written in English language, published, and available to the researcher were retrieved and included.

Studies were excluded if depression or depressive symptoms or mental health status were investigated as the exposure of interest. Unpublished articles were excluded because they are not subject to peer review for scientific merit. Also studies that did not target adolescent girls aged less than 20 years were excluded. The study selection process was guided by the PRISMA guidelines (Moher, Liberati, Tetzlaff, & Altman, 2009).

2.2.3 Data extraction

The author and one research assistant extracted the data from the included studies using data extraction form. Any differences or disagreement was solved through consensus. The form was to ensure that the reviewers gather a set of consistent data from each study. Nevertheless, in case of divergent issues, other expert who was not involved in data extraction, judged for final decision. The form was piloted on two full-text articles to ensure that the reviewers understood and interpreted the data items in the same manner. The form included key data items including first author and year, number of participants (N), aim of the study, the study design and results. The study design included the type of study design, participants selection, the setting in which the study was carried out as well as how the outcome was measured. Where studies have examined more than one outcome

variables, only the outcome that is relevant to this review was selected and reported. Only the results that were relevant to depression as an outcome were extracted.

2.2.4 Quality and risk of bias assessment

The author and one research assistant assessed the quality and risk of bias of the selected articles and subsequently discussed and corrected any discrepancies. The quality assessment was not used to exclude articles in this review, rather it was used to assess and report quality of studies included in this review in order to guide interpretation of results and to explain any variance between studies. The quality assessment was guided by and adapted from the framework developed by Jackson & Waters (2005). The framework provided 10-item questions or criteria against which to assess the methodological quality of each study (Table 2.1) (Jackson & Waters, 2005).

Table 2. 1: Quality appraisal criteria

1	Question	Does the research have a clear question to answer?	E
2	Theoretical perspective	Has there been any influence on the design of the study, the methods and the findings of the research which is as the result of an unambiguous theoretical or ideological perspective of the author (or funder)?	D
3	Study design	Does the design of the study appropriately address the research question?	E
4	Context	Is the context or setting adequately described?	D
5	Sampling	(Qualitative) Has the sample been drawn from the right population? Is the sample adequate to explore the range of subjects and settings? (Quantitative) Is the sample size that was estimated adequate for the analysis used? Has it been drawn from a correct population?	E
6	Data collection	(Qualitative) Was the data available adequate to explore the range of subjects and settings, and does the population of interest feel comfortable discussing the issues at stake? (Quantitative) Was the sample size adequate for the analysis used and was the questions clear for responses?	E
7	Data analysis	Was the data analysis clearly described and rigorously done to provide strong assurance and confidence in the study results?	E
8	Reflexivity	Are the results from the data and has there been a consideration of any limitations from the methods which affected somehow the study findings?	D
9	Generalisability	Do any claims to generalisability follow logically, theoretically and statistically from the data?	D
10	Ethics	Does the study addresses adequately the ethical issues and provide strict confidentiality and anonymity?	D*

E = essential, D = desirable, * Ethics may be essential in other sensitive fields

The questions that are marked as “E” are regarded as essential because they have the ability to alter the study findings and therefore the internal validity of the study. It is important that these questions are addressed satisfactorily. The questions that are marked as “D” are regarded as desirable, which could help in the interpretation of results and also

explain the variance in the study results. It is important to recognize that some studies may be more sensitive than others, for example studies on children's experiences, such that addressing ethical issues about the study may be essential for the study to be judged as sound. However, for this review, this was not the case.

2.2.5 Data synthesis/analysis

A narrative or descriptive approach was used to synthesize the study findings, characteristics, and validity. To ensure that no subjectivity or further bias is introduced, the results were presented as closely as possible to those in the original paper. The methodological quality of the included studies were assessed by reviewing each paper against the established quality criteria. Each paper was scored using a scoring scheme.

2.2.6 Results

Search results: The search strategy identified 1,914 articles. After screening the title and abstract for duplicates and relevance, 190 articles remained out of which 157 were removed because they were not relevant to research topic leaving a total of 33 full-text articles for eligibility review (Figure 2.1). Twenty-two articles were excluded due to wrong population as well as depression being an exposure. The remaining 11 articles were included in the study for data extraction, quality assessment, and data synthesis.

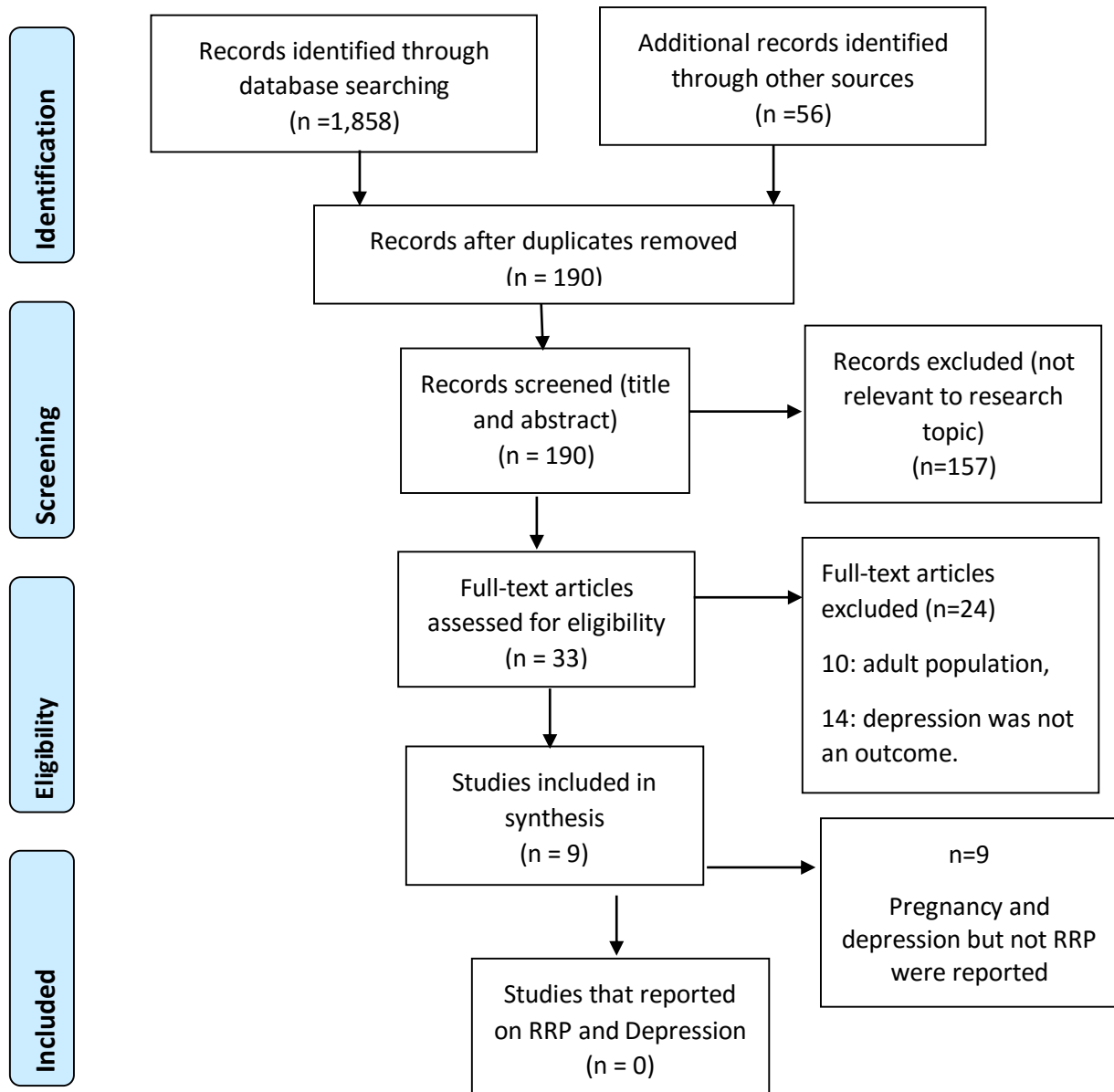


Figure 2.1: Flow diagram of article selection

2.2.7 Study characteristics

There was no study found on RRP and depression. Nine articles were considered for the systematic review because they all looked at postpartum and depression. Three out of the nine studies used the Center for Epidemiological Studies Depression Scale (CES-D) (Radloff, 1977). It is a 20-item measure that asks respondents to rate how often over the past week they experienced symptoms associated with depression, such as restless sleep, poor appetite, and feeling lonely. The rest of the articles reviewed used Mental Health

Inventory Sub-Scale, Brief Symptom Inventory Depression Scale, Edinburg Postnatal Depression scale, Kessler Psychological Distress and the Becks Depression Inventory Scale (BDI). All these depression scales are standardized scales used in the assessment of depression within the populace mostly among adolescents. All the nine articles reviewed reconnoitered on pregnancy and delivery induced depression. However none of them investigated on rapid repeat pregnancy on depression. This results showed evidence in gaps in the study topic. Based on this findings the third objective for the research work was generated.

Table 2. 2: Characteristics of included studies

Author, year	N	Aim of the study	Study design	Main results
(Anderson & Mccarley, 2013)	60	The aim was to compare PBT and Depression between two groups (pre-term vs term live birth).	A sub-study of a larger prospective cohort study (N=200) exploring PBT (psychological birth trauma) within 72 hours following birth, and at 3, 6, and 9 months postpartum. 30 adolescents aged 14-19 were identified as delivering live infants under 38 weeks gestation. Additional 30 adolescents of similar age, ethnic group, and marital status delivering between 38 to 42 weeks gestation were randomly selected as control using computer generated algorithm. The study was conducted in two postpartum units in a large hospital. Primary outcomes were PBT and depression. Depression was measured using Center for Epidemiological Studies- Depression Scale (CES-D).	Mean CES-D score among under 38 weeks gestation (preterm) was 15 (SD=7.39) compared to 12 (SD=6.93) among 38-42 weeks gestation (term) group. 36.8% (11/30) had moderate-to-severe depression (CES-D score 16+) among preterm compared to 20.3% (7/30) among term group ($F(1,47) = 2.37, p = .019$).
(Biello, Sipsma, & Kershaw, 2010)	1,426	The aim was to estimate the effect of teenage parenthood on mental health trajectories.	This was a nationally representative longitudinal survey of United States youth aged 16-19 as at year 2000. Participants were included for analysis if they were teenager in 2000, and were childless at the time of the interview. The final sample comprised of 178 teenage fathers matched to 330 nonparenting teenage males and 314 teenage mothers matched to 604 nonparenting teenage females for an overall sample of 492 teenage parents and 934 nonparenting teenagers. The primary outcome was mental health status, which was measured using mental health inventory sub-scale (MH1-5) of the Short Form 36 (SF-36). This instrument was designed to assess depression and anxiety. The exposure of interest was teenage parenthood defined as less than 20 years at the birth of the first child.	Mixed-effects model was used to estimate the effect of teenage parenthood on mental health score. The level 1 was measurement occasion nested within individual (level 2), which in turn nested within matched set (level 3). Adjusted mental health scores among teenage mothers was 9.511) in year 0 compared to 9.736 among nonparenting teenage females; at year 2 the score was 9.682 vs 10.052; at year 4 it was 9.838 vs 10.356; and at year 6 it was 9.978 vs 10.643.

Author, year	N	Aim of the study	Study design	Main results
East <i>et al.</i> , 2012	100	The aim was to examine whether adolescents' prenatal pregnancy intendedness was concurrently related to their psychological health.	This was a prospective longitudinal study, which enrolled one hundred unmarried, first-time-pregnant Mexican American adolescents aged 15 to 19 years. They were enrolled from high schools, Women, Infants and Children (WIC) program centers and community clinics in southern California. Participants were assessed at 3 time points (i.e. during 3rd trimester of pregnancy, and when their babies were 6 months and 1 year old). Depression was measured using five times from the Center for Epidemiological Studies- Depression Scale (CES-D). Pregnancy intendedness was measured using one item question: "How much did you intend for this pregnancy to happen?" (1 = Not intended at all , 2 = Not intended that much , 3 = Intended somewhat , 4 = Very much intended"	The mean depression score at prenatal, 6 month postpartum, and 1 year postpartum were 2.60 (SD=1.14), 2.32 (SD=1.05), and 2.59 (SD=1.17) respectively. Cross-lagged path analyses within a structural equation modeling framework was used to estimate the effect of pregnancy intendedness on depression. The results showed that higher pregnancy intendedness at 1 year was concurrently related to more frequent depression score symptoms (beta co-efficient=0.33; p<0.001)
(Gavin, Lindhorst, & Lohr, 2011)	240	The aim was to identify factors independently associated with elevated depressive symptom	This was a 17-year longitudinal cohort study, which enrolled 240 unmarried, pregnant adolescents aged 17 years and younger between June 1988 and January 1990. Initial interviews were conducted between June 1988 and January 1990. Interviews were conducted at 6-month intervals from 6–18 months postpartum and 3.5–6 years postpartum, and at 1-year intervals from 9.5–17.0 years postpartum. The primary outcome was clinically elevated depressive symptoms measured at each interview using the Brief Symptom Inventory depression subscale (BSI). A BSI score of 63 or higher were classified as clinically elevated depressive symptom.	Multiple logistic regression was used to estimate the associations between correlates and elevated depressive symptoms during five distinct developmental periods of the life course. In a multivariable logistic regression analysis, parity was independently associated with increased odds of elevated depressive symptoms at the third developmental period, mean maternal age=19.1-24years, (adjusted OR=1.98; 95%CI=1.19, 3.29).

Author, year	N	Aim of the study	Study design	Main results
(Koleva & Stuart, 2014)	509	The aim of the study was to examine potential risk factors for depressive symptoms in adolescent pregnancy.	A cross-sectional study conducted among adolescent women between 4 and 38 weeks gestation aged 18-20 years from a university hospital and mental health center in Eastern Iowa. The primary outcome was depressive symptoms measured using Beck Depression Inventory (BDI).	11.6 % of adolescents scored a BDI above 20 classified by the authors as clinical depression in adolescent pregnancy. Also, using the standard BDI cutoff scores for severity, 55.9 % of subjects scored in the mild depression range (BDI 10–14), 32.3 % were moderate (BDI 15–24), and 11.8 % severe (BDI>25). Using BDI score (continuous scale) as dependent variable, none of the factors including age, week of pregnancy, years of education, income, number of children, and number of previous pregnancies, full-term births, miscarriages, premature births, and stillbirths showed any significant correlation with total BDI scores.
(Iacobelli et al., 2014)	952	To evaluate utilization of health services among mother–infant pairs after adolescent pregnancy. Specific objective was to compare psychosocial outcome (e.g. major depressive disorders) between adolescent mothers (less than 18 years) and adult mothers (18-29 years).	This was a matched case–control study nested within a cohort of mother–infant pairs, data were compared between adolescent and adult mother–infant pairs who delivered at the tertiary care maternity department of Saint Pierre Reunion Island University Hospital in France between January 2004 and December 2006. Cases (476) were defined as mother-infant pairs with infant discharged alive and the mother was less than 18 years of age. The controls (476) were defined as mother-infant pairs with mother 18-29 years at delivery. The matching variables were delivery date and gestational age. The matching was done to reduce confounding regarding infant health outcomes. Mother-infant pairs were followed up until December 2011 to assess infant health outcome as well as mother’s health outcome and wellbeing. One of the mother’s health outcome assessed included use of public health services for psychosocial reason.	3.6% of adolescent mothers (cases) had major depressive disorders compared to 1.9% of adult mothers (control) (OR=1.9; 95%CI=0.8, 4.3); p=0.062).

Author, year	N	Aim of the study	Study design	Main results
(Meltzer-Brody et al., 2013)	212	The aim was to estimate the risk of postpartum depression (PPD) and also to identify risk factors of PPD in minority adolescents.	<p>This was a prospective cohort study among pregnant adolescents aged 12-20 years of age presenting for antenatal care in a clinic in Raleigh, NC, between July 2010 and August 2011. Postpartum depression was assessed during the routine 6 weeks postpartum visit to the clinic.</p> <p>The primary outcome was depression (PPD) measured using the 10-item Edinburgh Postnatal Depression Scale (EPDS). The authors defined PPD as a EPDS score of 11 or greater.</p>	10.3% of participants had PPD. In a multivariable analysis, the authors found that trauma history (adjusted OR (aOR)=3.76; 95% confidence interval=1.46, 9.66; p=0.006), how positive the pregnancy was viewed (aOR)=0.43; 95% confidence interval=0.27, 0.69; p<0.001), and social support (aOR)=0.55; 95% confidence interval=0.32, 0.93; p=0.03) were independently associated with PPD.
(Xavier, Brown, & Benoit, 2018)	3960 (teenage = 1330; adult= 2630)	The aim was to compare the risk of poor mental health outcomes including psychological distress between teenage and adult mothers.	<p>This was a secondary data abstracted from the 2012 Aboriginal Peoples Survey (APS). The APS is a national cross-sectional survey conducted every 5 years in Canada. Mothers were classified as teenage if they were 13 to 19 years at the time of first birth and adult otherwise.</p> <p>The psychological distress was measured using the 10-item Kessler Psychological Distress Scale (KPDS).</p>	9.7% of teenage mothers had psychological distress compared to 6.0% of adult mothers. In a multivariable logistic regression, there was no evidence that teenage pregnancy was associated with increased risk of psychological distress (adjusted OR =0.91, 95% CI= 0.48–1.74).

Author, year	N	Aim of the study	Study design	Main results
(Mollborn & Morningstar, 2009)	6,391	Experiencing adolescent child delivery and following psychological anguish was the aim of this research study.	<p>The study used a retrospective data from the National Longitudinal study of Adolescent Health (Add Health). The Add Health was a nationally representative survey of high school students, which started in mid 1990s (Bearman et al., 1997). This was a complex survey design with features of stratification, weighting, and clustering designed to be representative of high schools in the United States of America. Each selected student from each school completed in-home interview at wave one. This was followed up at one and six years as wave two and three respectively. The primary parent usually the mother also completed an interview. The response rate for the three waves ranged from 77% to 88%.</p> <p>The primary outcome was psychological distress measured using the Center for Epidemiologic Studies Depression Scale (CES-D; Rudolf 1977). The exposure of interest was teenage childbearing defined as having a child before her twentieth birthday.</p>	<p>The proportion of teenage mothers who were severely anxious and distressed were more than twice that among their peers who did not have a child ($p < 0.05$).</p> <p>In using the longitudinal structure of the survey to establish a causal relationship regarding whether teenage childbearing lead to psychological distress, the authors chose future adolescent mothers as the natural comparison group. Modelling distress on a continuous scale using linear regression, there was no evidence that teenage childbearing causes distress. In this analysis there were 239 teenage mothers and 558 future adolescent mothers. The authors defined future adolescent mothers as those who were not pregnant at wave two but became pregnant at wave three. The authors viewed this group as the natural comparison group to the teenage mothers at wave two.</p>

2.2.8 Quality assessment of included studies

Table 2.3 describes the overall quality assessment of the articles reviewed. In all instances the contexts of the nine studies were adequately described with very good theoretical perspective which were influenced by the research findings. The study design used for all the articles reviewed were very adequate to address the research objectives set. The studies drew their sample from the right population with the data analysis satisfactorily described and conducted to ensure confidence in the findings. All the articles considered the sensitive nature of the subject matter and the study population hence ethical issues were all considered. Three (Biello et al, 2010 ; Xavier et al., 2017; Mollborn & Morningstar, 2009) out of the nine studies used nationally representative samples using appropriate sampling design and therefore their findings can be considered as generalizable.

Table 2. 3: Quality of included studies. Key: Criteria not described [?]; Criteria not met [-]; Criteria partially met [+]; Criteria fully met [++].

Articles	1: Research Question	2: Theoretical perspective	3: Study design	4: Context	5: Sampling	6: Data collection	7: Data analysis	8: Reflexivity	9: Generalizability	10: Ethics
Anderson & McCarley, 2013	++	++	++	++	++	++	++	?	-	++
Biello <i>et al.</i> , 2010	++	++	++	++	++	++	++	?	++	++
East <i>et al.</i> , 2012	++	++	++	++	++	++	++	?	-	++
Gavin <i>et al.</i> , 2011	++	++	++	++	++	++	++	?	-	++
Koleva & Stuart, 2013	++	++	++	++	++	++	++	?	-	++
Iacobelli <i>et al.</i> , 2013	++	++	++	++	++	++	++	?	-	++
Meltzer-Brody <i>et al.</i> , 2013	++	++	++	++	++	++	++	?	-	++
Reid & Meadows-Oliver	++	++	++	++	++	++	++	?	-	++
Xavier <i>et al.</i> , 2017	++	++	++	++	++	?	++	?	++	++
Mollborn & Morningstar, 2009	++	++	++	++	++	++	++	?	++	++

2.2.9 The effect of adolescent pregnancy on mental health status

Some studies show that several factors come to play to influence mental health of women in both perinatal and post-partum periods. Gavin, Lindhorst, & Lohr (2012) reported on the increase in the odds (OR = 2 to 4) of higher symptoms of across five distinct developmental stages of the life cycle among women who were victims of intimate partner violence compared to those who were not. Smoking concurrently and receiving public assistance simultaneously were other reports that the study correlated.

Although pregnancy has been associated with depressive or stress symptoms many studies indicate that young mothers or adolescent mothers are at an increased risk of developing such symptoms. A review article conducted by (Hodgkinson, Beers, Southammakosane, & Lewin, 2013) reported an increased risk of depression among pregnant adolescents compared to non-pregnant adolescents and adults. Significant risk factors mentioned in the article include family history, childhood exposure to stressful life events such as sexual or physical abuse (Hodgkinson, Beers, Southammakosane, & Lewin, 2013). A case-control study using adolescent and adult mothers showed that there is significantly higher rates of needed psychosocial care for the adolescent mothers. They exhibited higher rates of suicidal ideation, psychiatric problems, road accidents and alcohol or drug intoxication (Iacobelli et al., 2014) Xavier, Brown, & Benoit (2017) on the other hand reported contrary findings among indigenous women in Canada.

There was stronger associations between teenage pregnancy and poor mental health before certain covariates were controlled and adjusted for (20.3 vs. 12.5%; uOR 1.77, 95% CI 1.24–2.53), but not after (aOR 1.00, 95% CI 0.64–1.56). In their study, they included women between the ages of 25 to 49 years and determined the number who had become

mothers as teenagers. Variables that showed significant associations were age (between 45-49 years), annual household income less than \$40,000, being separated/divorced/widowed, food security, poor or fair self-rated general health and learning disability. Among the teenagers themselves another study found that there are variances in the outcomes of parenting on mental health when stratified by sex. In their initial analysis Biello, Sipsma, & Kershaw (2010) found no association between teenage parenthood and mental health. However, when stratified by sex, they found that adolescent fathers improved their mental health faster than teenage boys who were not fathers. On the contrary adolescent mothers were experiencing slower improvement compared to non-adolescent mothers.

Whether or not a pregnancy is intended or wanted may also influence the mental health of the mother. Low prenatal intendedness has been found to be inversely associated with parental stress and harsh parenting at 6 months post-partum and were not significantly associated with prenatal depression or anxiety. This is not surprising because the same study found that adolescents' wantedness of the pregnancies or childbearing continued to decline throughout pregnancy and post-partum (East, et al, 2012). Parity was found to be associated with elevated depressive symptoms (aOR = 1.98, 95% CI 1.19-3.29) in the post-partum period (early childhood) (Gavin et al., 2012) whilst in another study among late teens, parity had no significant association with depression (Koleva & Stuart, 2014).

Giving birth before 38 weeks was positively associated with symptoms of depression and psychological birth trauma among adolescents (Anderson & McCarley, 2013). Age, gestational age, number of previous pregnancies, premature births, stillbirths and other sociodemographic variables had no significant relationships with scores of the Beck

Depression Inventory (BDI). The threshold score for diagnosing clinical depression among adolescents in this study was set at score of 20 (Koleva & Stuart, 2014). Nelson, Doty, McIntire, & Leveno (2016) on the contrary reported consecutive deliveries, stillbirths (uOR=6.9 95%CI 1.5-31.5; aOR= 8.5 95% CI 1.7-42.6) and neonatal malformations (uOR=3.4 95%CI 1.2-9.7; aOR 2.7 95% CI 0.92-7.9) to be significantly associated with risk of post-partum depression. Maternal age < 18 and > 35 years was reported to be associated significantly with increased risk of post-partum depression.

Just as mentioned, Mollborn & Morningstar (2018) reported higher levels of distress among teenagers who were mothers compared to those who were not. However, childbearing was not found to be the cause of distress among the young women. Instead, the distress levels among the teenage mothers were found to be high prior to pregnancy and persisted through pregnancy, postpartum and into adulthood. Interestingly, the likelihood of becoming pregnant among teenagers who had high stress levels was greatly increased among those who were poor while the association was spurious among teenagers who were not poor.

Perinatal stress has also been found to be associated with an increased risk of infectious and parasitic diseases, and mental and behavioral disorders among children up to 2.5 years. Other health outcomes include diseases of the skin, eye, respiratory and digestive systems (Tegethoff, Greene, Olsen, Schaffner, & Meinschmidt, 2011).

2.2.10 Conclusion

While depression was investigated as an outcome in the included studies none of them assessed the effect of rapid repeat pregnancy. Generally, the exposures investigated in the included studies were teenage or adolescent pregnancy. Majority of the included studies measured depression consistently using the Beck Depression Inventory. The methodological quality of the included studies were generally high. It is an important consideration to design future studies to investigate the extent to which having subsequent birth within 12 to 24 months (rapid repeat pregnancy) could adversely affect psychological state of an adolescent mother. The results from such studies could provide insight into designing targeted interventions.

2.3 Summary of Chapter Two

This chapter explored literature relating to factors that may lead to RRP and a systematic review of postpartum depression among adolescents. Most of the literature reviewed were conducted in the developed world, mainly in the US and a few from Southern Africa. Some knowledge gaps were detected. While some of the key issues studied produced consistent results, others were mixed. Most of the studies researched on the risk factors of RRP but did not relate RRP to depression. Again RRP on depression has not been explored on especially among adolescents. The systematic review revealed depression after delivery but not necessarily repeat pregnancy. This is because there was no available article of RRP on depression. Even though there has been some intervention studies which aimed at RRP, none has been conducted in Ghana. Therefore, this study seeks to identify the main risk factors of RRP and its effects on depression among adolescents in the Ghanaian context so as to fill the gaps and also contribute to knowledge.

CHAPTER THREE

METHODS

3.1 Introduction

This chapter presents the various methods and techniques used in the study. It discusses the study area, population, design, data and sources, as well as the sampling methods and size, data collection techniques, fieldwork, data processing, analysis and ethical issues.

In selecting the research methods that will best address the objectives of this study, thorough literature review was undertaken to back the choice of the methodology. The researcher combined the techniques, concepts and approaches of both qualitative and quantitative research methods into a single study known as mixed method to achieve the research objectives (Johnson & Onwuegbuzie, 2004). A mixed method research is an approach in conducting research that involves collecting, analyzing, and integrating (or mixing) quantitative and qualitative research (and data) in a single study, which is also known as triangulation (Creswell & Tashakkori, 2007). The use of both research paradigms – qualitative and quantitative methods provide a great advantage over the use of a single research method. This is because the use of both qualitative and quantitative methods provide a better meaning and appreciation of a particular research work (Bekhet & Zauszniewski, 2012).

The research work adopted the two research methods because, the use of the mixed methods strategies caters for the limitations in either one of the methods if it was used alone making way for better analysis and interpretation. A lot of information is obtained from the mixed method approach than could have been obtained from a single research

method used. Furthermore mixed methods approach helps combine inductive and deductive thinking and reasoning (Bekhet & Zauszniewski, 2012). This is because the use of mixed method research design helps the researcher to go for inductive and deductive reasoning technique in order to accurately answer the study research question that cannot be wholly addressed through qualitative or quantitative research alone.

3.1.1 Triangulation

This means using more than one methodological approaches to collect data on the same topic and combining at least two data analysis methods in a single study (Thurmond, 2001). This is a way of assuring the validity and credibility of research and counterpoise the deficiency of a single strategy. The main intent of using this method was to negate the deficiency of a single approach, prevent inconsistencies in data sets and also help the interpretation of the findings. Both the qualitative and the quantitative data were analyzed separately, but the findings or results from each method were triangulated in the write-up and the discussion section to attain the comprehensible conclusion which addressed the objectives.

Triangulation is useful for double-checking data validity and also provides confirmation and comprehensiveness when two or more different types of research data collection strategies are used. This method was used to upsurge the reliability and validity of both the qualitative and quantitative results[(Denzin, 2012); Yeasmin, 2012)].

3.2 Study area

This research was done in the Greater Accra Region (GAR). Information about the study area including geography, demography, health facilities and healthcare provision were

extracted from the 2014 Demographic and Health Survey (GSS et al., 2015) and the Greater Accra Regional Health Directorate's annual report for 2016 (GHS, 2016).

GAR is the smallest out of the ten (10) governmental regions of Ghana. It is situated along the Gulf of Guinea, in the South Eastern portion of the country. It occupies a total land area of 3,245 square kilometres or 1.4 per cent of the total land area of Ghana. Central, Volta and Eastern regions share borders to the West, East and North respectively with Greater Accra Region. GAR ranks as the region in Ghana with the second highest dense population behind the Ashanti Region, with a population of 4,010,054 in 2010, representing 16.3 per cent of Ghana's total population. It is also the most urbanized region in the country with 87.4% of its total population living in urban centers (Songsore, 2016).

GAR can boast of 16 metropolitan, municipal, districts and sub-districts. These are Accra Metropolitan Area (AMA), Ada West Municipal, Ada East Municipal, Dangme East Municipal, Shai Osudoku Municipal Assembly, Ga East Municipal Assembly, Ga West Municipal Assembly, Ga Central Municipal Assembly, Ga South Municipal Assembly, La Nkwantanag-Madina Municipal Assembly, Adenta Municipal Assembly, Ledzokuku Krowor Municipal Assembly, Tema Metropolitan, Ashaiman Municipal, Ningo-Prampram Municipal and Kpone Katamanso Municipal (MLGRD, 2017).

3.2.1. Healthcare services in various parts of the region.

The use of both the conventional and traditional health facilities are the commonest means of accessing healthcare as most households rely on them. The traditional health facilities include the herbal centres and herbal hospitals for primary health care needs. Most of the households greatly depend on the use of traditional health care system as the traditional

health care practitioners are easily accessible to the households within the same community and greatly dispersed. The orthodox health care system is usually farther away from the households and as such most people do not use their services (MLGRD, 2017). For example, the greatest distance a person travels from the household to a traditional health practitioner is below 5 kilometres. This contradicts the maximum distance from a household to an orthodox health system as this is between 25 kilometres for Tema to 49 for Dangme West. Statistics available indicate that the average population per doctor for the region is 2,968 while that for registered traditional healer is 1,207 (MLGRD, 2017).

3.2.2 Health facilities available in the region

There are several public and private health facilities within the region. The public ones include the regional hospital, several district hospitals, health centres, clinics and Community-based Health Planning Services (CHPS) zones. This section presents all the public hospitals within the Accra Metropolitan and Tema Metropolitan Assemblies, Ga East District, Ga West District, Dangme West District, and Dangme East District. Since this study is a facility based one, the researcher identified all the public health facilities in the region and how they have been dispersed within the region.

Accra Metropolis

AMA is the most heavily populated part of the region. It was separated into six sub-metros namely Ablekuma, Ashiedu-Keteke, Ayawaso, Kpeshie, Okaikoi, and Osu-Clotey till 2004. However, the number of sub-metros has been increased by legislative instrument to 13 by further sub-dividing the original six. According to the report, the health division still exists using the old system of six sub-metros.

Every single sub-metro among the six exists autonomously as a district. The reason for this is due to the increase in their population size and the system of health care currently being operated at the sub-metro organization. A government polyclinic serves each of the six sub-metros. In addition, there are several small government clinics and numerous private clinics and hospitals. Four major government hospitals are found in the Metropolis. These are La General Hospital, Princess Marie Louise (PML) Children's Hospital, Ridge Hospital and Achimota Hospital. There are many other hospitals which are directly not under the administration of the Ghana Health Service but has oversight responsibilities.

Tema Municipality

There is one government hospital in the Tema Municipality, a government polyclinic and 3 health centres. These public health facilities serve the several rural communities found within the Tema Municipality. These facilities including other private ones serve the neighbouring districts namely, Dangme West and Ga districts.

Ga West District

Rapid urbanization particularly in the Accra and Tema Metropolis has overshadowed the Ga West District which used to be predominantly rural. There is now quick development especially those communities closer to Accra and Tema. Its 2008 projected midyear population was 424,224. Within the Ga West District, there are 6 serviceable CHPS zones, 2 health centres and the Weija Clinic, without any government hospitals or polyclinics.

Ga East District

The Ga East has grown rapidly over the years. Its 2008 estimated midyear population was 258,478. There are also no government hospitals or polyclinics. There are several minor private clinics in the urbanized sections of the district.

Dangme West District

Rural communities make up a greater percent of the District making it predominantly rural and sharing several demographic characteristics with several other rural communities along the Coast of Ghana. The year 1988 saw the division of the Dangme District (which used to be one district) into both the East and the West. This took place because the government at that time decided to decentralize the administration of districts in the country. During that period, the Osudoku sub-district that was formerly part of the Yilo Krobo district of the Eastern region was further added to the Dangme West district and formed part of Greater Accra. According to the 2000 Housing and Population, Dangme West had a population of 96,809.

Poverty is known to be pervasive in the district and majority of the inhabitants are mainly subsistent farmers without the application of modern technology for farming and fishing. Fishing is the main occupation among the communities found closer to the sea. Osudoku, Prampram, Dodowa and Ningo are the four main divisional districts found in Dangme West district. There are 3 operational CHPS compounds, four health centres and one government hospital which serve the entire population in Dangme West.

Dangme East District

The Dangme East District is also a typical rural district just like the Dangme West. According to the 2010 Housing and Population Census, 93,112 people represented the entire population in the District. Majority of the population are subsistence farmers with high level of poverty. The main occupation apart from farming is fishing especially among communities along the Coast. The main government hospital found in the District begun operation in 2003 along with five health centres. Sege, Ada-Foah, Kasseh, and Pediatorokope are the four main administrative sub-districts found in the District.

3.2.3 Study locations

The study sites included ten public health facilities (mainly district hospitals) within the region (Figure 3.1). There are ten main health facilities (hospitals) within the GAR; nine of them were used for the study with three other polyclinics. Both cases and controls were recruited from these selected facilities. Princess Marie Louis (PML) hospital was substituted for Usher and Mamprobi Polyclinics because PML is a children's hospital. It serves mainly children under 12 years, maternity and gynecological services are not provided there. Ussher and Mamprobi Polyclinics serve as referral centers for PML. Lekma Polyclinic was also included because most of the family planning, contraceptives and child welfare clinic services offered in the LEKMA Municipality are usually done at the polyclinic.

Several health facilities were selected for the study. These comprised of:

1. Greater Accra Regional Hospital
2. Achimota Hospital
3. Ussher Polyclinic
4. Mamprobi Polyclinics
5. Ga South Hospital
6. Maamobi Government Hospital
7. Shai Osu Doku (Dodoowa) Hospital
8. Tema General Hospital
9. LEKMA Hospital and
10. LEKMA Polyclinic
11. La General Hospital
12. Amasaman Hospital

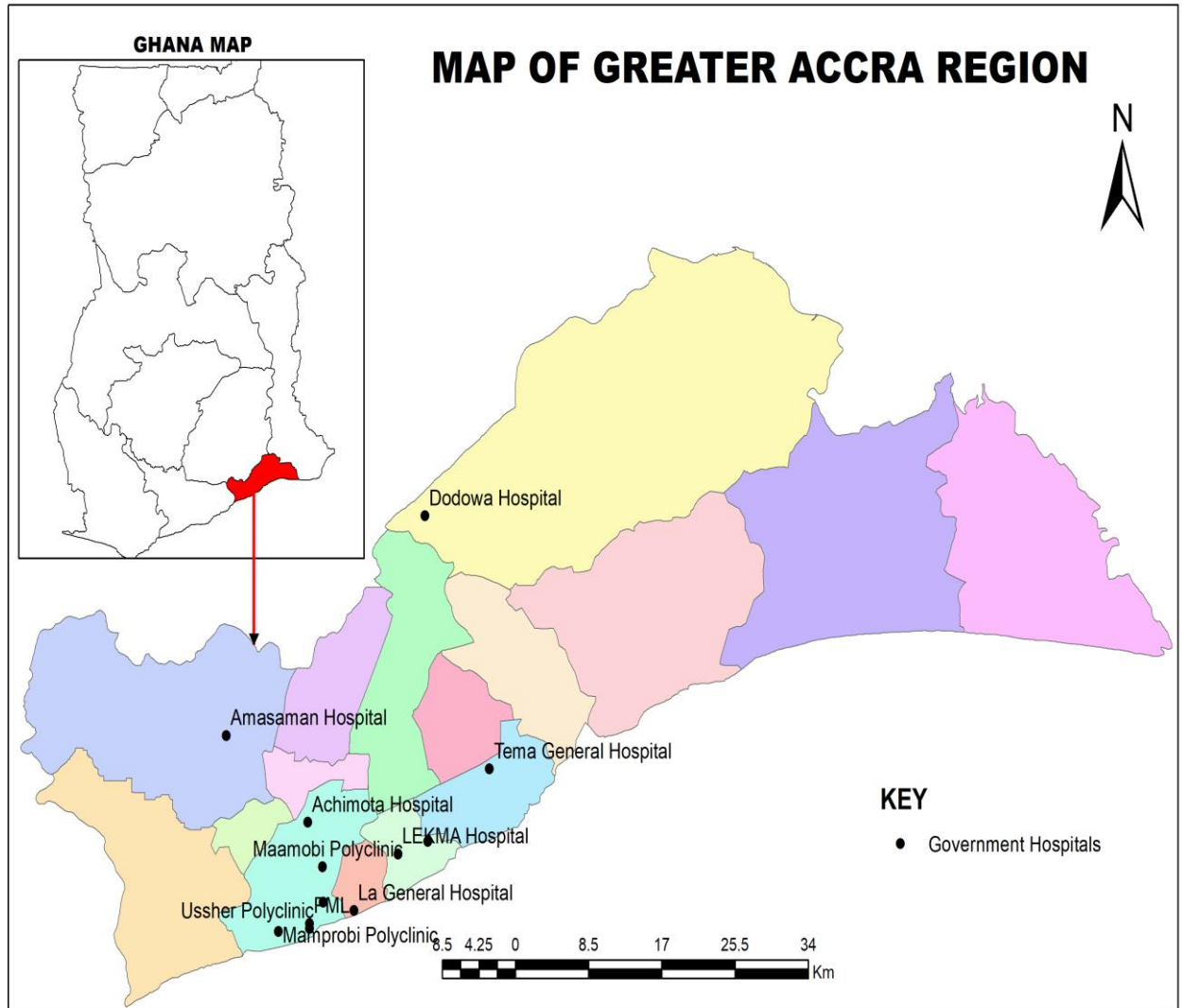


Figure 3.1: Map of the chosen health facilities Used for the research in the Greater Accra Region

Source: Field Survey and Survey department, 2018.

3.3 Study design

Study design according to Walsh & Wigen, (2003) consists of the strategies, approach, mode or conceptual structure used for the research. It can also be described as the foundation on which to build the research to arrive at very useful conclusions to meet the objectives set (Walsh & Wigen, 2003). Choosing a study design depends on the study objectives in order to be able to answer the research questions. This research was an

unmatched hospital-based case-control study design. The design helped to identify the main factors accounting for rapid repeat pregnancy (RRP) found using adolescents as the focus, with the help of a mixed method design in which quantitative data were collected concurrently with qualitative data.

A case-control is a type of research that compares two groups of individuals. These two groups are those individuals who have the disease or outcome of interest commonly referred to as the cases and a second group (called the controls) who have never had the disease or outcome of interest. In this study the outcome of interest is RRP. This method usually relies on recall because, it retrospectively tries to find out the exposure of both groups to a particular risk factor of interest (Rodrigues and Kirkwood, 1990). This helps to draw a conclusion on whether exposure to a particular risk factor leads to a desirable outcome (Chambers et al., 2006). The two groups must be from the same population and have been exposed to the possible risk factors of the condition so that the probability that one of those factors is the cause of the condition could be evaluated.

In situations where an outcome is extremely rare, the odds ratio from case control helps approximate the risk ratio associated with exposure and outcomes in a population. Some researchers including Rodrigues and Kirkwood, (1990), and Rothman, (2008) found out that the odds ratio estimates the incidence rate ratio even when outcomes are common if controls are sampled as each case is sampled. Pregnancy among teenagers is relatively high in the region, nevertheless, it is still very rare to identify a large number of adolescent girls who have had repeat pregnancy though there are some within the populace. A case control approach helps increase the sample size as well as generalization of the research findings (Rothman, 2008).

The cases for this study were adolescent girls between the ages of 15 and 19 years who had experienced more than one pregnancy within twenty-four months. Controls were adolescent girls between the ages of 15 and 19 years who had experienced one pregnancy which either ended in an abortion or delivery with more than twenty-four months spacing. In this design, adolescent girls who had the outcome of interest (cases) and those who did not have the outcome of interest (controls) were identified and assessed for eligibility to participate in the research. Data on main factors for each case together with the control participants were collected retrospectively (Chambers et al., 2006). The association between RRP and depression was further explored to examine the effect of RRP on depression as part of the quantitative component. Each case and control was asked to recall and score items that measure depression following their last pregnancy or abortion. The Beck's Depression Inventory scale was adopted for this study (Steer, Rissmiller, & Beck, 2000).

The qualitative component was designed to explore facilitating factors of RRP and how RRP impact depression among adolescents using In-Depth Interviews (IDIs) and Focus Group Discussions (FGDs). In this component, eleven (11) cases were selected for the IDIs and forty-six controls were carefully selected for the 6 FGDs. Opinions and experiences on facilitating factors were elicited from these selected participants using IDI and FGD guides. The same qualitative data collection methods were not used for both case and control groups because the cases did not feel comfortable sharing their experiences in the FGD section they felt free with one-on-one interviews hence the use of IDI. The control groups on the other hand fell at ease and relaxed discussing their experiences in a group.

3.4 Target population

The target population was teenage girls between the ages of 15 and 19 years who have or have not experienced rapid repeat pregnancy in Greater Accra Region. All the inclusion criteria stated below were satisfied before the adolescents were included in the study.

Inclusion criteria for cases

1. Adolescent girls who have gotten pregnant more than once within 24 months of previous pregnancy outcome.

Exclusion criteria for cases

1. Girls who have never been pregnant.
2. Girls below age 15 years and above 19 years.
3. Adolescents who refused to consent/ or were ill at the time of the study

Inclusion criteria for controls

1. Adolescent girls who have become pregnant once after 24 months

Exclusion criteria for controls

1. Girls below age 15 years and above 19 years.
2. Girls who have never been pregnant.
3. Adolescents who have had more than one pregnancy within 12 to 24 months.
4. Adolescents who refused to consent/ or were ill at the time of the study

3.5 Recruitment and selection process

Recruitment is the process of identifying prospective participants and having a dialogue with them prior to the initiation of the consent form (Ahmad & Schroeder, 2002). Selection may be defined as the process by which a researcher chooses from among the population, those people who would best meet the requirement and the inclusion criteria of the study (Ahmad & Schroeder, 2002). The participants who were likely to take part in the research were given all the necessary information about the research and also increased their enthusiasm to be part of the study. With the help of the nurses in charge who were also taken through the purpose and objectives of the study, any adolescent who fell within the inclusion criteria and visited the selected facilities within the period of the data collection was included in the study. The departments/units where these participants were selected from were, Family planning units, child welfare clinics, maternity wards, manual vacuum aspiration rooms, maternal and child health units and adolescent health centres/corners. The consent form explained that a participant was at liberty to withdraw from the discussions or interview anytime she deemed it necessary.

Trained nurses in the study facilities assessed each girl who came for Manual Vacuum Aspiration (MVA) services, family planning services, antenatal services, child welfare clinics and adolescent health corners and fell within the inclusion criteria for both the cases and control group. The nurses carried out the recruitment of the participants after the purpose of the research had been explained to eligible respondents after which informed consent was obtained. Eligible adolescents were not forced to take part in the research as they were permitted to decline to take part in the research at any stage in the study.

3.6 Sample size determination

The estimation of the sample size used is based on the following: the confidence level desired (95%), the level of power desired (80-95%), the ratio of controls to cases, the expected frequency of the exposure in the control group, and the odds ratio.

The sample size formula, $n = \frac{r+1}{r} \left[\frac{\bar{p}(1-\bar{p})(Z_\beta + Z_{\alpha/2})^2}{(p_1 - p_2)^2} \right] \dots (1)$ was used, where

n = the sample size in the case group,

r = the ratio of controls to cases,

$p_1 = 18.6\%$ is the proportion of controls that were exposed (proportion of adolescents whose pregnancy onset **does not** fall within 12-24 months of previous pregnancy outcome and p_2 is the proportion of cases that were exposed (proportion of adolescents whose pregnancy onset **falls within** 24 months of the previous pregnancy outcome (Tocce, K. M., Sheeder, & Teal, 2012). The latter was obtained by using $p_2 = \frac{p_1(OR)}{1+p_1(OR-1)} = 0.29$, assuming the odds ratio of 1.8

$$\bar{p} = \frac{p_1 + p_2}{2} = 0.2384.$$

For 80% power, $Z_\beta = 1.04$ and 0.05 significance level implies $Z_{\alpha/2} = 1.96$. Substituting for p_1, p_2, \bar{p} , and $r = 1$, the minimum number of cases and controls would then be 149 each. Assuming 35% (due to the sensitive nature of the topic) non-response rate, the final sample size for cases and control was 417 adolescents in all. Indicating 231 controls and 186 cases. These were the maximum numbers obtained from the various facilities during the time the data was collected.

Number of adolescents that were selected in a facility was determined by sampling proportionate to the number of adolescents visiting the particular facility (cases and controls). For instance, for facility A, the number selected was given by

Number to be selected from facility

$$= \frac{\text{Average number of adolescent visiting facility A}}{\text{Total number of adolescent visiting the 10 facilities}} \times n$$

Where n is the estimated sample size.

3.7 Data source and instrumentation

Questions used for this study were obtained from similar studies done in developed countries (Tocce, K. et al., 2012; Rosenthal et al., 2001; Baldwin, Maureen K & Edelman, Alison, 2013; Rigsby et al., 1998; Crittenden et al., 2009). Questions that were outlandish to the Ghanaian setting were altered to suit the country's cultural circumstances. The systematic review also helped the researcher to generate a few questions as well. In addition, some of the questions, especially on sociodemographic factors and contraception were selected from the standard GDHS questionnaire (GSS, 2015).

3.7 Data collection tools

Different research tools were used to collect data for the research. For the quantitative component, a structured questionnaire was used. Questionnaires are normally used to collect an extensive range of facts from participants such as their opinions, attitudes, knowledge or intentions on the issue of interest. Yet questionnaire respondents often have limited choices of answers, especially with closed-ended types. They may also not disclose or express their factual opinions or attitudes if they do not match the 'false

choice' (Walsh & Wiggins, 2003). The questionnaire was organized into eight sections, which defined the risk categories and outcomes. These included: socio-demographic characteristics; knowledge and use of contraceptives; sex education; media influence; support system; mental health; self-efficacy; and depression. The self-efficacy and depression sections included sets of validated items that measure same. The details of these items are shown in Appendix II. Briefly, for self-efficacy, each participant was asked to score six items measure on the Likert scale of 1 "very unsure" to 5 "very sure".

The Beck's Depression Inventory (BDI-II) was used to assess the severity of depression of the participants. It is a twenty-one item multiple-choice self-report rating inventory that measures characteristics, attitudes and symptoms of depression (Beck, Ward, Mendelson, Mock & Erbaugh, 1961). Each item was scored on the scale of 0 "normal" to 3 "extreme". Most psychometric measurements of the severity of depression use the BDI-II in various settings (Steer et al., 2000). In its current version, the BDI-II is designed for individuals aged 12 years and over, and is composed of items relating to symptoms of depression such as hopelessness and irritability, cognitions such as guilt or feelings of being punished, as well as physical symptoms such as fatigue, weight loss, and lack of interest in sex (Steer et al., 2000).

There are three versions of the Beck Depression Inventory (BDI) the original BDI, first published in 1961 and later revised in 1978 as the BDI-1A, and the BDI-II, published in 1996. This scale has not been validated in Ghana but has been validated in a study conducted in Nigeria (Adewuya, Ola, & Aloba, 2007). Due to the similarities between Ghana and Nigeria, it is possible that it could be used in Ghana. It has been found that there is a high correlation between mental health and measures of aggression and the study

further indicated how both may contribute to RRP, (Crittenden et al., 2009). The maximum possible score is 63, ranging from normal to extreme depression. The interpretation of the Beck’s Depression Inventory (BDI) scale is shown in Table 3.1.

Table 3.1: Interpretation of Beck’s Depression Inventory

Total score category	Level of depression (interpretation)
0-10	Normal
11-16	Mild mood disturbance
17-20	Borderline clinical depression
21-30	Moderate depression
31-40	Severe depression
41-63	Extreme depression

Source: Beck, Steer & Brown (1996)

3.8 Pre-testing

The pre-test was to identify any weaknesses, faults or omissions in the tools before they were used on a larger scale (Walsh & Wiggins, 2003). The research questionnaire and the interview guides firstly went through a thorough revision by my academic supervisors and some academic staff. They were also assessed by the nurses who were assisting in the data collection. This was done during their training for the fieldwork. They were asked to feel free to point out any aspects of the questionnaire that they thought will pose difficulties of understanding to the potential respondents. They made some suggestions and inputs which also contributed to a clear understanding of the questions.

The study instruments were then finally piloted at the Ghana Police Hospital in the Greater Accra Region among adolescents who were part of the inclusion criteria adopted for this research. It was observed that with the qualitative, giving the sensitive nature of the

research topic, the cases were not willing to give detailed information about their experiences when they were put into groups for FGDs. They opened up well with IDIs. Some questions were then modified for logical flow. The feedback from the pre-test indicated the need to refine the research instruments to help improve the study. All the processes were done to assess the clarity, reliability and completeness of the questions.

3.9 Sampling for both qualitative and quantitative components.

Both the qualitative and quantitative components were hospital-based. All adolescents who visited the selected facility during the time the data were collected and fell within the criteria for inclusion were carefully chosen for the research. With the selection of the health facilities for the In-Depth Interviews and Focus Group Discussions, 6 facilities each out of the 12 facilities were chosen for both. These facilities were chosen based on the number of participants who visited the place.

Both qualitative and quantitative data were drawn from the same hospitals. In each of the selected health facilities, FGDs, IDIs and the survey interviews were conducted concurrently. None of the participants taking part of the FGD was eligible for the IDI and vice-versa.

3.10 Main field work/Data management

The main data collection started in October, 2017 and ended in January, 2018. The questionnaire was administered to each participant after she had signed or thumb printed the informed consent form. Generally the questionnaire was self-administered by study participants who could read and write English. In instances where an adolescent did not have formal education, this was interviewer-administered. Each week, the student of this

thesis (hereafter referred to as principal investigator or PI) checked each completed questionnaire for completeness and consistency after which it was entered into a database designed for this study using SPSS version 21 platform (Nie, Bent, & Hull, 1975).

In-depth interviews were also held with every eligible adolescent who have had RRP (case) in six of the twelve health facilities selected for this study. These six facilities were selected out of the twelve because they recorded a relatively higher number of controls than the facilities which were not selected. Boyce & Neale (2006) describe in-depth interview as a qualitative research technique which includes conducting thorough individual dialogues with an individual (a participant) to explore their views on a specific idea, program or circumstances.

They tend to be very beneficial when the researcher needs comprehensive data about a person's feelings and attitude which influence a person's behavior, or wants to describe issues in depth, most often to be used to provide context to other data to offer a more complete picture. The main aim of the interviews was to come out with very comprehensive data on the adolescents' experiences, feelings and attitudes towards the use of contraception and birth spacing. In total, 11 adolescent girls were interviewed (Table 3.2). The guide were designed to elicit opinions and experiences that may potentially explain the quantitative results. For this reason, eligible study participants were probed so that they can freely share their concerns on topics such as RRP and how it can impact depression.

Table 3. 2: In-Depth Interviews with Adolescents with RRP

HOSPITAL	DISTRICT	NUMBER OF PARTICIPANTS
GA SOUTH	GA SOUTH	1
DODOWA	SHAI OSU-DOKU	2
USHER POLYCLINIC	AMA	3
MAMOBI POLYCLINIC	AMA	2
LA GENERAL	AMA	1
TEMA GENERAL	TEMA	2
	METROPOLITAN	
		Total- 11

Source: field data

FGD is a research method of collecting qualitative data where a group of participants meet to discuss a topic in order to generate data (Patton, 2002). FGDs are conducted to enquire participants' reason for holding certain point of views and also provide means of arguing and stimulating each participant's opinions to arrive at a valid conclusion. Patton, (2002) again talks about FGD as a means of interaction between people in a group where different topics of interest are posed to the participants. Each participant freely shares his/her opinions on a particular subject matter. In this way, FGDs can be a source of great wealth of information and for baseline information FGDs can indicate the range of a community's beliefs, ideas, opinions and attitudes.

Six FGDs were conducted in six out of the twelve study hospitals. A total of forty-six adolescents were involved in the FGDs (Table 3.3). This was done only among the control group. This method was used to find out how adolescents who have had one pregnancy do to prevent a second pregnancy. They discussed issues concerning knowledge and use of contraceptives, sex education, antenatal, perinatal and postnatal counselling and suggestions that will help in delaying child birth. Demographic information such as age, area of residence, religion, ethnicity and occupation were taken from all the participants before the commencement of both the IDIs and the FGDs. Codes were also given to the

FGD participants. The codes were used to address or call them during the period of discussion to enhance anonymity. Their consents were sought before the interviews took place. Akan (Twi) and Ga were the main languages used for the interviews.

Table 3. 3: FGDs with Adolescents without RRP

Hospital	Conducted	No. of Participants
DODOWA	1	8
MAMPROBI	1	8
LA GENERAL	1	9
TEMA GENERAL	1	7
AMASAMAN	1	6
LEKMA	1	8
Total	6	46

Source: Field data

The IDIs and FGDs were recorded using voice recorders. A moderator was assisted by a time keeper / notes taker during interviews for accuracy and precision. The moderators employed were female research assistants recruited from University of Ghana. The notes covered things such as facial expression of respondents during interviews or discussions, the mannerism of respondents and any other information that cannot be captured electronically. During FGDs, all participants were allowed to make their contributions on the subject matter before moving to the next question. These questions were discussed using the discussion guide (See Appendix I). All interviews lasted between 60-90 minutes and took place at the facilities where the respondents were recruited. The research team liaised with the hospital staff to identify suitable venues for the interviews which were mostly the conference rooms. These places were generally free from distractions as they were private and confidential areas. For the FGDs, the nurses invited them to the health facility on a scheduled date as soon as the optimum number of participants per group is

achieved through mobile phone calls. These participants were adolescent girls who have visited the particular facility within the last four weeks and fall within the inclusion criteria.

3.11 Study variable definitions

This sub section describes the dependent and independent variables for the study. Variables included in the research were captured in the questionnaire and the interview guides. All independent variables were computed using a number of related questions. The outcome variables were RRP and depression. RRP is the primary outcome measure while depression is the secondary outcome. These two outcomes were the variables that were expected to change as a result of a tentative influence of the independent variables. These dependent variables depend on other factors that are measured. For the purpose of this study, the definitions of these two outcomes are as follows:

Primary outcome measure: RRP was defined as pregnancy onset in less than 24 months of the previous pregnancy outcome. A participant who met this definition was considered a case, otherwise she was considered a control.

Secondary outcome measure: An adolescent was considered depressed if the depression category was at least borderline clinical depression that is a score of 20 and above on the BDI scale.

Independent variables

Independent variables are stable and unaffected by other variables that are being measured. It refers to the condition of an experiment that is systematically influenced by the investigator. It is normally the presumed cause. The independent variables that were measured in this study were background factors (age, area of residence, educational level,

religion and age at menarche) were directly measured in the questionnaires. Contraceptive use, pregnancy intention, sex education, peer influence, media influence, antenatal visits and postnatal counselling and social support were also assessed. Few questions on their past experiences such as rape, sexual violence, and adequate parental care were as well measured.

Participants were asked to indicate yes/no; where *yes* = 1 and *no* = 0; to questions on contraceptive use, sex education, peer influences, parental care, antenatal visits whereas age at sexual initiation, conception, sources of information, partners' age and issues on family and social support had multiple answers from which a selection was made.

Self-efficacy for contraceptive use: An adolescent was considered as having high self-efficacy if the self-efficacy score was above the median score.

3.12 Statistical analysis

Basic statistical analysis of variables of interest was done to measure the central tendency such as median and interquartile range coupled with frequencies and percent frequencies. These assisted in describing the distribution of the study population. Categorical variables were summarized using proportions whereas continuous variables were summarized using median and interquartile range. The distribution of most of the variables between cases and controls were skewed hence the use of median and the interquartile range. Each categorical variable was compared between cases and controls using the Pearson's Chi-square test of association, whereas continuous variables were compared using the Wilcoxon rank sum test. The Wilcoxon rank sum test was used instead of t-test because the variables were not normally distributed. In addition, the equal variance assumption required for two sample t-test was violated in most cases hence the use of the non-

parametric Wilcoxon rank sum test as an alternative measure to the parametric two sample t-test.

Multivariate logistic regression was used to identify factors independently associated with the odds of RRP. Most binary outcome variables are measured by using multivariate logistic regression (Kirkwood & Sterne, 2003). Variables that had likelihood a ratio of $p < 0.2$ with RRP were candidates for inclusion in the multivariate analysis. The level of depression among study participants was measured based on an ordinal Likert scale tool adopted from Beck et al., (1961). For each participant, the depression score was calculated by adding the self-reported score for each of the twenty-one questions. There were four responses on each of the twenty-one questions which added up to a score of sixty-three. The maximum obtainable score was sixty-three whereas the minimum for assessing depression for this study was seventeen. This score was used because the interpretation of the BDI shows a clinical borderline of depression from the seventeenth score.

For the depression outcome, log-binomial regression model was used to estimate the effect of RRP on risk of depression adjusting for age at menarche (continuous), partner support, age of partner, use of contraceptive, planned pregnancy, counseling, and married/living together. Log-binomial models were used to study the impact of a set of predictor variables on RRP, as they naturally offer relative risks instead of odds ratio estimates. That notwithstanding, odds ratios (OR) from normal logistic regression model could significantly overestimate associations between risk factors and common outcomes as indicated by Diaz-Quijano (2012). The Log binomial model in general produces an unbiased estimate of the adjusted relative risk (McNutt, Wu, Xue, & Hafner, 2003). All analyses were performed using Stata 15 MP (StataCorp, 2013).

3.13 Qualitative data analysis

All interviews and discussions were audio recorded. Two of the IDIs were conducted in English language while the rest were done mainly in Twi and Ga languages. Those done in Twi and Ga languages were transcribed word for word into English language. Absolute content of all the transcribed interviews were put in Microsoft word and reviewed by independent persons. These persons were recruited from the University of Ghana, Linguistics Department. The transcriptions were done immediately after an interview or a discussion was done to avoid losing nonverbal communications. The review involved listening to the voice recordings and comparing it with the transcripts. The transcripts were all typed manually and converted into a text-based electronic format.

Thematic content analysis was adopted for the analysis of the qualitative data. Thematic content analysis involved four interrelated steps consisting of reading through textual data, identifying themes in the data, coding those themes, and then interpreting the structure and content of the themes (Guest, MacQueen, & Namey, 2012). Conclusions and verification of the entire process is done to ensure that the conclusions are supported by the data (Guest, Macqueen, & Namey, 2012; Miles, Huberman, Huberman, & Huberman, 1994). These were useful in recognizing the main issues to be addressed for the study objectives.

Themes and sub-themes

The FGDs conducted were with the control group whereas the IDIs were with the cases. The themes formed were in relation to the responses given and also linked to the objectives of the study (Table 3.4). The results of the data were presented in narratives and supported by illustrative quotes from respondents.

Table 3. 4: Themes and sub-themes for FGDs and IDIs

Theme	Sub -Theme
Enabling factors that may lead to RRP.	<ol style="list-style-type: none"> 1. Peer influences 2. Financial constraints 3. Out of curiosity 4. Lack of parental control
Sex education and source	<ol style="list-style-type: none"> 1. Few from parents and guardians 2. Peers 3. Health professionals 4. Social media
Initiation of sex	<ol style="list-style-type: none"> 1. Friends 2. School teachers 3. Relatives
Social support	<ol style="list-style-type: none"> 1. Family- Monetary, clothes and food 2. Partners- Mostly monetary 3. Groups- Mostly monetary 4. sometimes words of encouragement
Contraceptive knowledge and use	<ol style="list-style-type: none"> 1. High level of knowledge 2. High patronage of the methods 3. Use of traditional methods
Life experience after pregnancy	<ol style="list-style-type: none"> 1. High occurrences of school drop out 2. Economic crises among self-employed participants 3. Continuous stress
Self-Efficacy on contraceptives	<ol style="list-style-type: none"> 1. Depends on the age of partner 2. Sure and likely to be able to make decisions personally 3. Depends on parents
** Consequences of RRP on depression among adolescents	<ol style="list-style-type: none"> 1. Low self esteem 2. Physical body changes 3. Mood swings and changes 4. Low finances to take care of self and kids

**** For cases only**

3.14 Quality control

Good data quality assures completeness, consistency, validity and reliability of information generated. Since adolescent reproductive health issues are sensitive and adolescents are vulnerable, professionalism and skill were employed during data collection. For this reason the health professionals (nurses in charge of the adolescent health corners) were trained to collect the data. The nurses in the adolescent-friendly centers/corners have been trained by the Ghana Health Service to provide effective health

services that reach adolescents and meet their health needs in different circumstances including psycho-social as well as physical needs.

These nurses were trained by the researcher at their various health facilities to equip them on the necessary knowledge and skills needed for the collection of data. Training topics included ethical interaction with human participants and respect for the individual study participants, the study area and the objectives of the research work. The principal investigator supervised and monitored activities of these nurses to ensure proper data collection. Field questionnaires were checked for completeness and accuracy on weekly basis. Data was cleaned to eliminate any irregularities.

3.15 Ethical clearance

The fundamental principles of ethical research makes it clear that the researcher must respect and protect the rights and welfare of those who volunteer to participate in the research. This study looked at adolescent girls sexual health issues. These issues are seen to be very sensitive. According to the Belmont principles to functional relevance in research, respect for persons requires a commitment to make sure that there should be autonomy of research participants, and, where autonomy may be diminished, to protect people from exploitation of their vulnerability (Bowman, 1991). The dignity of all research participants must be respected and people should not be used merely as a means to achieve research objectives. It also talks about “beneficence” which stipulates that in as much as possible the research should not bring injury or disabilities to the participants. These include minimising both social and psychological risks and increasing the way the research will assist the participants of the research (Bowman, 1991). At the end of the

research, all benefits and threats realized from the research should be fairly distributed (Bowman, 1991).

The demands on ethical principles in research, as described by the Ghana Health Service Ethical Review Committee were also followed. The following measures were taken to ensure that the study participants' safety was guaranteed and rights protected.

- Ethical approval was sought and obtained from the GHS Ethical Committee before the commencement of the study with approval number GHS-ERC 05/05/17.
- Further approvals were also sought from all the selected health facilities. These were obtained from the regional, metropolitan, municipal and the district health directorates in the Greater Accra Region.
- To assure privacy, all interviews were conducted in an enclosed and undisturbed area within the hospital.
- The study materials were handled confidentially and so no names are mentioned in the reports of the studies. The participants were assured of strict anonymity and confidentiality on any information given.
- Only the research team had access to the answered questionnaire. All materials including the tape recorders were securely kept under lock and key. The soft copies were kept on a very safe laptop which could only be accessed with a strong password by the research team.

3.16 Consent for participation in the study

Participants who take part in any research work must fully understand the aim and objectives of that particular study. In this way, they can decide to be part of the study or opt out. It could be in a written or an oral form. In this study, a written informed consent

was obtained from the participants after carefully explaining the key issues to be considered before giving consent. This meant that all persons who were interviewed had access to the information about the study objectives both orally and in a written document at the beginning of each interview. The written document was signed by the participants. Those who could not read and write had interpreters to assist them. The informed consent can be found in the appendix II.

The key issues included the aim and objectives of the research, the responsibility of each participant including the duration of the interviews or participation, the expected risks and benefits, including the psychological and emotional due to the sensitive nature of the study. The research avoided the situation where the participants were forced to take part in the study. Thus, participation was optional and withdrawing at each stage in the research was allowed with no penalties. It was also stated that extreme confidentiality will be maintained and protected. Again the contact address of the secretary to the ethical committee and that of the PI were provided to enable the research participants make contacts if they had any further enquiries about the research. Therefore all the adolescents who agreed to take part in the study consented.

3.16.1 Parental Consent Waiver (15-17year), Emancipated Minors.

Due to the confidential nature of this study, seeking consent from the parents of the adolescents under 18 years (minors) might prevent them from opening up to give out information. Answers might therefore be altered. Hence a parental consent waiver was granted by the Ethical Committee Board of the Ghana Health Service to ensure truthful responses from the adolescents.

3.17 Incentives for research participants

Giving incentives in research including human have been an issue of substantial sensitivity and debatable (Grant & Sugarman, 2004). Some researchers argue against incentives while others appreciate it as inoffensive depending on the situation. Grant & Sugarman (2004) explain that incentives are good for research work and do not pose any ethical issues. According to these two researchers, the two ethical questions that could arise with the use of incentives were:

- Can the use of incentives constitute “undue influence” or a coercive inducement to participate?
- Can the use of incentives compromise the dignity of the subjects?

They however cautioned against the use of incentives when the researcher does not issue any consent form but rather use incentives as a source to adhere the participants.

In this study the adolescents who took part in the self-administered questionnaire were refreshed by given them soft drinks (malta drinks) and biscuits, and five Ghana Cedi (GhC 5.00) for transportation. The same incentives were given to the adolescents who took part in the FGDs and the IDIs. In addition some money was given to the nurses who conducted the various interviews.

3.18 Field support and supervision

Field staff were monitored throughout the data collection process to ensure that standard data collection techniques were adhered to. There was a day to day intensive evaluation of report emerging from field data collection personnel. Secondly, data was evaluated by comparing different sources of information on a specific variable of interest. This helped

mitigate non-sampling errors resulting from incorrect data entry, and incorrect identification of sampled respondents. The unavailability of eligible participants during the time of the research did not result in missing information on that individual as participants were followed up for a maximum of three different occasions until the required information was solicited.

CHAPTER FOUR

RESULTS

4.0 Introduction

This chapter presents the results on the factors that affect RRP and the association between RRP and depression. It is presented using the study objectives and the conceptual framework used for this study. It also provides triangulation of the findings of both quantitative and the qualitative data of the study. Data have been collected through questionnaires, in-depth interviews and focus group discussions. The chapter also covers the description of the socio-demographic factors, knowledge and use of contraceptives, media influences, sex education and initiation of sex, transactional sex, support system, self-efficacy on contraceptive use and measurement of levels of depression. All these variables were compared between cases and controls. The chapter also shows the various statistical methods that helped in the analysis of the data obtained. The level of significance between different variables are shown. The findings were primarily to address the various study objectives.

4.1 Background characteristics of adolescents by case-control status.

This section describes the background characteristics of the study participants (Table 4.1). A total number of four hundred and seventeen (n=417) adolescents, comprising two hundred and thirty-one (n=231) controls and one hundred and eighty-six (n=186) cases were selected (Table 4.1). The age distribution among the adolescent girls who were interviewed ranged from 15 to 19 years. Two thirds (67%) of the cases were between the 18 and 19years age group. About (58%) of the girls in the control group were between the ages of 15 and 17 years. The median ages for both controls and cases were 18 and 19 years

respectively. The differences in ages between cases and controls were seen to be statistically significant ($p < 0.001$).

About 64% of the controls reported to be single whereas 38% of the cases reported to be single. The percentage of cases who were married and or cohabiting were seen to be (62%) (Table 4.1). This shows that respondents who had experienced RRP (cases) were more likely to be either married or cohabiting. This was also shown as significant between both cases and controls ($p < 0.001$).

There was no significant difference between cases and controls in terms of religion. About half of the respondents for both cases and controls were Christians (Pentecostals). There were a few Muslims comprising of 9% cases and 14% controls. The Traditionalists among them were two percent and four percent of cases and controls respectively. With regards to education, most of the adolescents had attained at least a junior high level of education. The distribution of highest level of education between cases and controls was not statistically significant (Table 4.1).

The adolescents who have dropped out of school gave several reasons for dropping out. These included financial constraints, completing desired level, family reasons, bad grades and health reasons. Eighty-four percent (84%) of the cases dropped out of school because they got pregnant compared to the (76%) controls, this difference was statistically significant ($p < 0.042$). It was observed that about four in every ten adolescents who took part in the study, (44%) and (45%) for both control and case groups respectively had four (4) or more siblings (Table 4.1). However, the number of siblings the respondents had did

not show any statistical significance. It was also found that, 62% of the control groups were working compared with 55% of cases.

In summary, Table 4.1 shows that both cases and controls were as comparable as possible and the distribution of the characteristics were similar. There was a slight differences of age range between cases and controls. This was adjusted for at the multivariate analysis stage.

Table 4. 1: Socio-demographic characteristics by case-control status

Characteristics	Control	Case	Pearson chi2 P-value
	Number of mothers (% of total) (n=231)	Number of mothers (% of total) (n=186)	
Age (Years) of the adolescent			
Median (IQR)	18 (17, 19)	19 (18, 19)	<0.001***
14-15	37 (16.0)	12 (6.0)	
16-17	94 (42.0)	49 (27.0)	<0.001
18-19	96 (42.0)	123 (67.0)	
Religion			
Orthodox*	75 (33.0)	52 (29.0)	
Pentecostal	115 (50.0)	87 (48.0)	
Other Christians**	14 (6.0)	10 (5.0)	0.325
Islam	20 (9.0)	25 (14.0)	
Traditionalist/none	5 (2.0)	8 (4.0)	
Marital status			
Single/divorced/separated/widowed	147 (64.0)	70 (38.0)	<0.001
Married and or living together	84 (36.0)	116 (62.0)	
Highest level of education			
None	17 (7.0)	18 (10.0)	
Primary	51 (22.0)	37 (20.0)	
Junior high school	111 (48.0)	92 (49.0)	0.790
Secondary+	52 (23.0)	39 (21.0)	
Sch. drop-out ¹	175 (76.0)	156 (84.0)	0.042
Currently working			
No	128 (62.0)	87 (55.0)	
Yes	80 (38.0)	72 (45.0)	0.189
Number of siblings			
None	5 (2.0)	7 (4.0)	
1	13 (6.0)	8 (4.0)	
2	46 (20.0)	33 (18.0)	0.806
3	64 (28.0)	54 (29.0)	
4+	101 (44.0)	83 (45.0)	

* Includes Catholic, Anglican, Methodist, Presbyterian,

**include SDA, Jehovah's witness etc.

*** P-value was estimated using Wilcoxin ranksum test

¹ stopped schooling with reasons other than pregnancy

Table 4.2 describes other socio-demographic factors that are associated with RRP. The research shows that, the median ages at menarche were 12 and 13 years for the adolescents

without and with RRP respectively with no significant difference ($p=0.104$) (Table 4.2). In both cases and controls, more than 50% of the respondents had their first sexual intercourse between the ages of 10 and 14 years. First intercourse between the ages of 15 and 17 years for both cases and control groups were 42% each (Table 4.2). The median age first intercourse was 14 years for both groups.

The ages at first sexual intercourse and first conception were not significantly different from that of the controls as seen from the p-values in Table 4.2. Over-all most of the adolescent girls had partners who were much older than themselves but partner-adolescent age difference for cases was not too different from controls. However, 59% and 55% of the cases and controls respectively had their partners five (5) or more years older than them (Table 4.2).

In summary, both cases and controls had similar characteristics in terms of socio-demographic backgrounds. There were however a few differences between them. Higher proportion of the cases were married or living with their partners whereas most of the controls were seen to be single. Though the Inter Quartile Range (IQR) of the age at menarche for cases and controls was found to be the same (Table 4.2), the median ages for both groups were found to be different. It was observed that most of the girls who experienced early menarche were involved in early sexual activity (age at first sexual intercourse) than those who did not. This difference were seen to be significant statistically between the cases and controls $p<0.001$.

Table 4.2: Other Socio-demographic characteristics by case-control status

Characteristics	Control	Case	Pearson chi2 P-value
	Number of mothers (% of total) (n=231)	Number of mothers (% of total) (n=286)	
Age (years) at menarche			
Median (IQR)	13 (12, 14)	12 (12, 14)	0.004*
10-14	184 (86.0)	153 (88.0)	
15-17	27 (13.0)	20 (12.0)	0.075
18-19	3 (1.0)	0 (0)	
Age (years) at first sexual intercourse			
Median (IQR)	14 (14, 16)	14 (13, 16)	0.413*
10-14	114 (51.0)	94 (53.0)	
15-17	94 (42.0)	74 (42.0)	0.541
18-19	16 (7.0)	8 (5.0)	
Age (years) at first conception			
Median (IQR)	16 (15, 17)	16 (15, 17)	0.348*
10-14	41 (19.0)	33 (19.0)	
15-17	130 (60.0)	122 (69.0)	0.074
18-19	45 (21.0)	22 (12.0)	
Age of the partner at first pregnancy			
Median (IQR)	22 (20, 25)	23 (20, 27)	0.075*
16-19	37 (17.0)	24 (14.0)	
20-24	108 (51.0)	77 (45.0)	0.211
25-29	51 (24.0)	47 (28.0)	
30+	16 (8.0)	22 (13.0)	
Partner-adolescent age difference (Years)			
Median (IQR)	4 (2, 8)	5 (2, 8)	0.914*
<1	8 (4.0)	13 (8.0)	
1-4	86 (41.0)	58 (34.0)	0.272
5-9	80 (38.0)	65 (39.0)	
10+	35 (17.0)	32 (19.0)	

* P-values were estimated using Wilcoxin ranksum test

4.2 Knowledge and use of contraceptive methods

In this study the knowledge of modern contraceptive was measured at a general level, that is whether the participants have heard or not about a particular contraceptive method and

if they are familiar with it. The ability of the participants to mention or recognize a contraceptive method when it is described is a simple assessment of a respondent's knowledge of the method but not necessarily an indication of the extent of her knowledge. According to the results, the types of contraceptive methods that respondents mentioned that they have heard about were Intra Uterine Device (IUD), implant, injectable, male and female condoms and pills. Eighty-six percent and eighty-two percent of both cases and controls respectively had some kind of knowledge about all the contraceptive methods listed (Table 4.3).

Even though the knowledge level was relatively high for both cases and control groups, the percentage of adolescents who had ever used any of these methods were relatively low (39%) among the cases compared with (61%) controls (Table 4.3). Evidence from the qualitative study showed that most of the cases indicated two major constraints that prevented them from accessing modern contraceptive methods. These were socioeconomic (financial constraint) and healthcare providers who do not offer adolescent friendly services when the adolescents visit the health facilities.

From Table 4.3 the proportion of controls who have ever used a form of modern contraceptives were seen to be higher as compared to the cases. This is because, from the qualitative results, most of the adolescents in the control groups have formed social/peer groups in the communities where they live. These groups are mainly run by Non-Governmental Organisations (NGOs). Some of the communities like Dodowa, Maamobi and James Town in the Accra Metropolitan Assembly (AMA) have adolescent social groups within the communities. These groups focus on training the adolescents especially the girls, educate them and sometimes provide those without formal education with some

form of vocational skills. The aim of these groups according to the adolescents during the interviews are to prevent adolescents' pregnancy and or termination. They take them through counselling before and after pregnancy. Because of this reason most of the girls who are part of these groups are put on a contraceptive method making RRP among them to be low.

“I thought family planning could make you bleed to death. After I joined our adolescent group, the people have taken us through almost all the methods and now I have a different view about it. I am currently on a method and will encourage every girl who has a boyfriend to do some.” (FGD, 1Control, 15 years, Ussher)

“I went to do family planning (the one they put under the skin) the first day I took my baby to weighing. I went to the nurses to tell them the type I wanted. I knew about it because of the group I joined. Most of my friends in our group are on a method. It has helped me personally because my partner doesn't have a good job and I can't afford to give birth again.” (FGD, Control, 15 years, Dodowa)

“My boyfriend's sister told me about this group..... (She mentions a name), at first I thought they go for meetings to gossip about people until I joined. They really teach us a lot. Especially as girls how to keep ourselves and prevent pregnancy.” (FGD, Control, 17 years, Mamobi)

The qualitative study also revealed that some of the nurses and health workers in the health facilities intimidate the adolescents when they go in for contraceptive methods. According to the respondents, these intimidations prevent them from accessing contraceptive methods,

“The nurses in this hospital do not treat us well when we come for the services. I walked in for family planning some time ago and the nurses were screaming at me to go and abstain from sex because I was too young”. (IDI, case, 15 years Dodowa).

“The nurses when you are young and you say you want to do family planning, the way they treat you as if you have killed a human being” (IDI, case, 16yrs, La General).

Contraceptive failure is a risk factor in the literature for RRP because it may lead to pregnancy. According to the quantitative data, out of the respondents who were on any method of contraceptives, 28% of the controls and 31% of the cases reported that a contraceptive method had ever failed them (Table 4.3). There was no statistical difference between cases and controls on the issue of contraceptive failure.

About 60% of the controls attended ANC during pregnancy compared with (41%) cases. There was statistical significant difference between cases and controls on the number of times the adolescents visited the clinic during pregnancy ($p < 0.001$).

Counselling on contraceptives during pregnancy and after delivery is very critical in addressing repeat pregnancy. Table 4.3 shows 62% and 63% of the controls and cases respectively received contraceptive and family planning counselling during their first pregnancies. Though not statistically significant, about 61% of the controls and only 3% of the cases used a form of contraceptives after first child delivery (Table 4.3).

Table 4. 3: Knowledge and use of contraceptive method by case-control status

Characteristics	Control	Case	Pearson chi2 P-value
	Number of mothers (% of total) (n=231)	Number of mothers (% of total) (n=186)	
Had knowledge of any method			
No	41 (18.0)	25 (14.0)	0.313
Yes	185 (82.0)	149 (86.0)	
Used any modern method			
No	87 (38.0)	114(61.0)	0.067
Yes	144 (62.0)	72(39.0)	
Contraceptive failure			
No	110 (72.0)	94 (69.0)	0.484
Yes	42 (28.0)	43 (31.0)	
ANC visits during first pregnancy			
<4	93 (40.0)	110 (59.0)	<0.001
4+	138 (60.0)	76 (41.0)	
Received counseling on contraceptives during pregnancy			
No	83 (38.0)	65 (37.0)	0.871
Yes	137 (62.0)	111 (63.0)	
Used LARC postpartum first child			
No	85 (39.0)	171 (97.0)	0.065
Yes	135 (61.0)	5 (3.0)	

¹ Modern method included Implants, IUD, Injectables, Pills, Condom, LAM

Perceptions on the use of contraceptives

The qualitative study revealed results on some of the perceptions that the respondents had on the use of contraceptives which prevented them from using any method.

Some of the adolescents mentioned that IUD and implant cause excessive bleeding which sometimes may lead to death and that was the reason why those two modern methods of contraceptive are not being patronized by them.

“...Oh yes I know a lot about contraceptives, some of my friends use it but my mother always warns me and my sisters against it because she said one of my senior sisters died after doing family planning.” (IDI, case, 17 years, Ga South).

“Madam, family planning is one thing that I am afraid of... one girl in my area did it and she felt very ill. She died eventually. They said she

was wearing the loop (IUD). According to her friends she was always bleeding and it caused her death.” (IDI, cases, 18 years, Ussher)

Some of the girls were of the view that some methods that were introduced to them earlier made them gain excessive weight.

“haha...my sister was very slim after she got married she started putting on weight excessively, and she said it is because she is on a family planning method because she had to finish school.” (IDI, case, 17years Mamobi)

“...well, I know a lot of people who have lost their shape (gained weight) after using a family planning method. Friends, my own mum and my sister- in-law. I cannot afford that, I might even lose my boyfriend.” (FGD, control, 15years, Amasaman,)

One respondent also stated that prolonged use of contraceptive may cause fibroid.

“... hm as for family planning I am very scared to do it. One lady who stays in our house, she did it (family planning) and she was always complaining about abdominal pains and bleeding. At the long run the doctors said she had fibroid or so.” (FGD, control, 15 years, Dodowa).

The fear of infertility was also one of the reasons that was mentioned for non-use of any modern contraceptive method.

“Some of my friends told me not to do family planning for long, because I might not be able to give birth after I stop using it. So I am just doing the loop (IUD) for one year and then remove it afterwards”. (FGD, control, LEKMA, 17years).

“My aunty is almost 50years, but she does not have a child. She has been married for about 18 to 20 years now. She said she used to be on implant when she was young and this has caused her infertility. Now we are all trusting God for her. I do not want to go through that situation. I will rather give birth to any number God gives to me.” (IDI, cases, 17years, Ussher)

The adolescents mentioned some of the folk methods they use in replacement of the modern contraceptives. According to them, these methods have been very efficient.

Urinating or washing the vagina immediately after sexual intercourse was one of the methods some of the respondents reported using in preventing pregnancy.

*“For me right after sex I rush to urinate and wash my private part thoroughly with a lot of water. I have done this for about two years now without doing any family planning.” (FDG 6, 15 years, Ga South).
... Oh yes it really works oh...if you wash the place after sex it works.
“(FGD, control, 16 years, Ga South)*

“After any intercourse I just “squeeze myself” for the sperms to come out, then I wash it out thoroughly. I think that is what has helped me through after I gave birth years ago.” (FGD, control, 18 years, Lekma hospital)

Other traditional methods that were mentioned included some forms of herbs, the gas in carbonated drinks such as coke (that is the effervescence that comes out when a bottle of coke is opened. They put it at the tip of the cervix for the gas to enter the cervix).

“Coke has a very strong gas inside. I usually buy a bottle of coke during intercourse so that right after I just open it and let the gas enter my private part (vagina). I push it inside so that the gas will kill all the sperms. oh yes it kills them. My senior sister showed me that trick.”(FGD, control, 15 years, Mamprobi)

“That coke thing it works oo. I thought I was the only one who uses it. I have also been doing it for some time now.” (FGD, control, 17years, Mamprobi)

Drinking a lot of water after sex was also one of the methods some mentioned as a way of preventing pregnancy.

“I have been drinking a lot of water after sex. I do this quite often. The times I do not drink plenty water after sex I normally get pregnant and I have to abort because I am in school.” (IDI 3, 16 years, Ussher polyclinic).

“When you drink a lot of water you urinate a lot and this will help you urinate the sperms out. After sex I make sure I drink a lot of water so that the sperms can come out with the urine.”(FGD, control, 16 years, Amasaman,)

Some also were in the view that contraceptives were for ‘older’ people.

“Me I am too young to use contraceptive, ei how...” (FGD, control, 15years Tema general)

“My cousin’s mum took her to wear the loop. I was very surprised because these things are for older people not us.” (FGD, control, 16 years, Mamobi)

4.3 Sex Education

Sex education is an important step towards gaining control of one’s sexual health. The adolescents were asked whether they have had any sex education in their lives and the source of the education. Table 4.4 shows that 79% of controls and 77% of cases had received some form of sex education. Out of these percentages, 44% and 43% were from their own peers. The FDGs and the IDIs conducted also revealed that their peers had influence on their sexual life. Most of them felt more comfortable discussing issues concerning sex with their peers than any other source,

“My friend showed me how to use the postinor 2 pills (emergency contraceptive pill) after every sex I use it. I make sure I have some on me anytime so that anytime I have sex I can take it..... I use that one because my boyfriend doesn’t like the condom.” (FGD, control, 15 years, Ga South)

“I normally hear these issues concerning sex when we meet as friends, we talk about things that we have heard on sex and share experiences.”(FGD, control, 17years, Tema).

“Though our madam in class tells us things about sex and how to keep ourselves when we menstruate, most of my friends feel shy to ask questions because the boys are around. We normally discuss sex and sex education among ourselves after school. It is more comfortable discussing with friends than in class.” (IDI 3, 16 years Ussher polyclinic).

The results also revealed that (61%) of the control group who have ever received any form of sex education obtained it from health professionals as compared with 31% of the cases. From Table 4.4 their parents and guardians were among the few sources of information. From the qualitative data, the adolescents mentioned that sex education was a very

sensitive topic which made their parents find it difficult to discuss. Some of the respondents (mostly cases) brought out the fact that their parents even started talking to them on sex after they saw them pregnant. Others also mentioned that their mothers especially were the ones who normally try to talk to them on sex when they started menstruating. The results again indicated that even with those whose parents are able to discuss sexual issues with them, the content was normally limited.

“It was when I came to join the adolescent group that was when I got to know a lot of things about sex education. My mother was sometimes telling me a few things about sex when she saw that I had started menstruating. I didn’t really understand most of the things though.” (FGD, control, 16 years, Dodowa).

“In my house we don’t talk about sex my father will “kill” you if he hears that....Yes because we are Muslims.....They will be very disappointed if they see that I have a boyfriend let alone done abortions. He (father) might even disown me.” (IDI, cases, 16 years, Mamobi).

“We (her peers) mostly talk about sex things when we meet in town to sell. I stay with my aunty and she hardly discusses such issues with me.” (IDI, cases, 18 years, Ussher).

4.4 Social and Media Influences

As shown in Table 4.4, more than half of both cases (56%) and controls (55%) did not belong to any social media group. However, about 44% and 45% of the cases and controls respectively reported belonging to mostly WhatsApp and Facebook. Out of the respondents who belonged to a social media group, majority 78% and 77% of both cases and control groups respectively said social media did not have any influence on their sexual health. This results was not too different from that of the qualitative responses.

“I do not have a mobile phone to even use WhatsApp and the rest.” (IDI, cases, 16 years, Mamobi).

“Yes, I am on Facebook and WhatsApp, but I normally check pictures and videos. They do not have any influences on me.” (IDI, cases, 17 years, Ussher).

“I do a lot of businesses, like selling the things I sew on Facebook, WhatsApp, Instagram and the others, I do watch movies and pictures too but those things do not have any influence on me.”(FGD, control, 18 years, Lekma).

4.5 Initiation of sex

From literature, numerous factors are known to be correlated with early onset of sexual activity. These factors may include alcohol influence, financial hardships, rape, peer pressure, and sometimes the decision borne out of curiosity. According to this study, more than 50% of the adolescent girls for both cases and controls stated that they did not go through any coercion as there was consensual agreement between their partners and themselves during their first sexual intercourse as seen in Table 4.4. Some of the adolescents engaged in consensual sex for financial gains and these were mainly transactional (29% and 24% for controls and cases respectively) whereas a few engaged in the act under the influence of alcohol. Nine percent of the cases and five percent of the controls had their sexual debut through rape. There was no significant difference though between cases and controls with regard to how they were initiated into sex (Table 4.4). This result on initiation of sex was not much different from the qualitative responses conducted.

There were several responses on who initiated these girls into sex. Friends introducing them to other friends (men) constituted about 70% for cases and 75% for controls. The percentages for siblings and relatives were relatively low, 4% for controls and 5% for cases (Table 4.4). Others included teachers in their schools, neighbors and family friends.

In the qualitative study, some of the cases indicated that their class/school teachers initiated them into sex. Some of the reasons why they gave in to them were for poor

academic performances in class, financial gains and the fear of being punished. Other people who initiated them into sex were male cousins, siblings, family friends and some men in the societies in which they live. Some also specified that they were initiated by their own boyfriends out of pleasure and consensus.

“When I was in class 6 (primary school) my mathematics teacher became my friend because he wanted to help me with that subject.... Mathematics was very difficult so he used to help me till we started having an affair. I got pregnant and he helped me to abort. The second time I aborted again but some was left in my stomach (womb) my parent realized it and took me to the hospital for abortion.” (IDI 1, 18 years, La)

“My teacher used to beat me a lot until I showed interest in him. We did about two abortions in class 6. I was not interested in school again so I stopped and he left me. But now I live with my boyfriend (partner) at Teshie.” (IDI, case, 16 years La General)

“My mum used to leave us (my siblings and I) home with our cousin who was older than us. He used to send my sisters to buy things outside so that we can have sex. He started ones and we did it till he left for Kumasi.” (IDI 1, 16 years, Mamobi)

“I took a boyfriend when I was 13 years. Because most of my friends were doing it. I felt I had to get one so that I could fit in among my friends. Through that I got pregnant.”(FGD, control 16years, Amasaman)

Table 4. 4: Sex education, media influence and initiation of sex by case-control status

Characteristics	Control	Case	Pearson chi2 P-value
	Number of mothers (% of total) (n=231)	Number of mothers (% of total) (n=186)	
Received any form of sex education			
No	47 (20.0)	42 (23.0)	0.499
Yes	183 (79.0)	139 (77.0)	
Main source of information on sex education			
Peer	44 (24.0)	43 (30.0)	0.168
Parent	34 (18.0)	37 (26.0)	
Mass media	18 (10.0)	10 (7.0)	
Social media	10 (5.0)	9 (6.0)	
Health professional	61 (33.0)	31 (21.0)	
Other	18 (10.0)	15 (10.0)	
Who initiated you into sex			
Friend	160 (75.0)	120 (70.0)	0.491
Sibling	8 (4.0)	8 (5.0)	
Relative	9 (4.0)	13 (8.0)	
Other	35 (17.0)	29 (17.0)	
How were you initiated into sex			
Alcohol influence	11 (5.0)	17 (9.0)	0.279
Financial gain	63 (29.0)	43 (24.0)	
Rape	19 (9.0)	11 (6.0)	
Consensual	118 (54.0)	105 (58.0)	
Belong to any social media group			
No	122 (55.0)	95 (56.0)	0.945
Yes	99 (45.0)	76 (44.0)	
If yes, does it have any influence on your sexual behavior?			
No	75 (78.0)	53 (77.0)	0.842
Yes	21 (22.0)	16 (23.0)	

4.5.1 Transactional sex

The quantitative results as seen in Table 4.5 show that 22% and 27% of controls and cases correspondingly, their partners asked for sex anytime they requested for financial support or assistance from them. These differences between the cases and the controls were not statistically significant ($p < 0.25$). This was explored further in the qualitative studies which brought out some reasons and in depth explanations on the issue. Among the cases, transactional sex was very common. About half of them said they exchanged sex for gifts (monetary and non-monetary). Most of the unmarried girls mentioned that, transactional sex made them experience RRP. This was because when they went through financial hardships with the first pregnancy, they try to seek for help elsewhere especially from other men. These men also try to take advantage of them by having sexual intercourse before the request is granted.

“I was raped by a certain boy who was staying with us and I had my first baby but he ran away. Though my parents support me, there are some personal things that I cannot ask from them. I met this man in our area and he kept on talking to me so that I can be psychologically sound due to the rape case. He said I could fall on him anytime I needed money. Later I realized he was always asking for sex before he gives me. It went on for few months and now I am pregnant again. My baby is still small.oh my baby is only seven months old.” (IDI, case, 17 years, Ussher)

“I don’t really want to talk about these things, but hmm... I live with some married couple as a house help, my madam’s husband first raped me when she wasn’t around, and afterwards he has been giving me money every time and ask for sex in returns. We do abortion anytime I get pregnant. I wish I could stop all these things but I need money too”. (IDI, case, 15years, Mamobi)

“It has become their habit oh, if you ask for money to even go and do your hair they want to have sex with you before... my partner was not like that when he met me. He helped me terminate an abortion earlier which was not for him. I moved to his place though he has not come to see my parents (paid bride price). Anytime I ask him for money he also ask for sex and I got pregnant again hm.” (IDI, case, 16 years, La General)

“I have been surviving... this is about my fourth termination. Since I take care of myself and sometimes my small brother, anybody who comes in

to help me I accept. This very abortion that ended me up here, it was my father's friend who was very kind to me initially by giving me and my siblings money. Later he said I have "caught his eyes" and he could not help it so though he is married and far older than me, we started having a secret affair." (IDI, case, 19 years, Tema General)

A few of the cases who were married also said their partners sometimes requested for sex in returns for money.

"Every time I need money from my husband, we would have to have sex that night so if I am not in the mood for sex I do not ask for money". (IDI, case, 17 years, Ussher)

Ok... I am used to that thing, I think it is normal because since he has come to pay your bride price he does not have to spend too much on you. Anytime I need money we have sex." (IDI, case, 17 years, Mamobi)

According to the focus group discussions that were conducted with the controls, a few made comments on this issue. They do some form of transactional sex mainly non-monetary. An example cited by a respondent was that when a boyfriend buys a mobile phone as a gift, one could give sex as a means of thanking him. A few also said that during occasions such as birthdays and festive seasons like Valentine days their boyfriends take them out and afterwards they expect that you thank them with sexual intercourse.

"Anytime my boyfriend buys me a gift, I sleep over in his house and we usually have sex." (FGD, control, 16 years, Lekma)

"As for this one it is the order of the day oh. The buyer must be the one to enjoy (they all laugh). Oh yes it is true. My partner expects me to know that, so he does not even ask for it (sex) after he sends me mobile money or buys some gifts for me during my birthdays, I thank him with sex." (FGD, control, 15 years Mamprobi)

"I normally receive gifts from my partner on Valentine days, Christmas and festive seasons but sex usually follows afterwards." (FGD, control, 18 years, Amasaman)

4.6 Support system

The social support available to adolescents according to this study were seen to also contribute to RRP. The study sought to find out if there were any support systems available for the adolescents after pregnancy. Their families, partners, groups and the communities in which they lived were some of the support structures that they depended on during pregnancy and after delivery.

The findings showed that most of the adolescents (both cases and controls) did receive some form of support from parents/guardians (Table 4.5). Out of those that received support, 75% and 66% of both cases and controls respectively indicated things like money, food, shelter and clothes for themselves and their babies as the kind of support that were received. There was a statistical difference between cases and controls ($p < 0.045$). For both cases and controls, financial support was the main type of support received from partners. The adolescents indicated further that some of their partners were not providing support the way they expected. Though the partners provided them with some financial aids, according to the adolescents these financial assistance were often inadequate. They further reported that most of their partners were not providing any form of emotional support which made the girls feel some sense of rejection sometimes.

“...hm...I don't care about anything, I mind my own business. I'm not interested in anybody. My boyfriends treated me like a 'rag', he does not give me any money or any kind of support. I have really suffered and it's only by the grace of God that I'm here talking to you. This is my third termination and I don't think I can go into any relationship again.”
(IDI, case, 16 years, Ussher)

Most adolescents who were married reported that their partners supported them financially but they received insufficient support which forced them to start work as soon as they

delivered their babies. This situation sometimes drives them to go for support from other sources and other men.

“I started selling chewing stick when I asked my partner for money and he said NO. I cannot go and beg for money or do prostitution while I am pregnant. I had to force myself so I wake up at dawn and go to the bus stations every day to sell though I was not feeling too well. That caused me the miscarriage.....” (IDI, case, 16 years, La General)

“He sends money occasionally but it is just not enough for even the two kids alone.” (IDI, case, 17 years, Ga south)

“My partner was sending me money every three months when I was pregnant. He stopped when I delivered but sent me money occasionally. My parents felt very disappointed with him because he was really delaying in sending money sometimes. I got another man four months after I gave birth who behaved as if he was caring and always providing for me so I started “dating” him. That was how I got pregnant the second time.” (IDI, case, 17 years, Mamobi Hospital).

Majority of them mentioned their parents as their main source of support during and after delivery.

“As for me, my mother has been taking care of me since the first day I got pregnant, she sells things in the market, when she is coming back from the market she brings food and buys the things we need. That is why I don’t even want to look at the father of my child’s face.”(FGD, control, 19 years, Amasaman)

“Though the man I gave birth with (partner) gives me money, most often it is not enough so my mother normally supports me with food, clothes and sometimes money for myself and my baby”(FGD, control, 16 years, Tema General).

“When I gave birth to my daughter the guy (partner) was taking care of me very well until the second pregnancy came. He changed suddenly because he said he didn’t ask me to get pregnant again. From the time I told him about the pregnancy that was when the pregnancy was about two months old till this time that my baby is 9 months and I am coming for weighing (child welfare clinic), he has not minded me. It is my parents who have been fending for me.” (IDI, case, 18 years, Lekma)

Issues of repeat miscarriages is a form of repeat pregnancy. Having miscarriages is a major risk factor for RRP. Although 66% and 93% of both cases and the controls, had never had any history of miscarriages, there were relatively high percentage (34%) of

cases who have had some history of miscarriages compared to controls (7%) as shown in Table 4.3 ($p < 0.001$).

There was no significant association between variables like adolescent mothers who were in a relationship with the father of the first child and use of hard drug. However, some of the respondents (41%) and (52%) of controls and cases correspondingly specified not having had adequate parental care in their life time. The qualitative study also confirmed this finding.

“My parents brought me here from the north to do house help business. I went to stay with a family in Mamobi as a house help. The woman’s husband was always having sex with me when the woman goes to sell in the market. I called my parents and told them but they said since he gives me money I should keep quiet and stay. I found out that I was pregnant and the woman sacked me from the house. It was a friend who took me to do abortion at some place”. (FGD, control, 16 years, Dodowa)

“I don’t know my father, my mother has four children with different men. We all survive on our own. I try to use a lot of means to get money to cater for myself and sometimes my small brother.” (IDI, case, 19 years, Tema General)

The adolescents were assessed on their self-efficacy on the ability to make decisions in relation to the use of contraceptives and capabilities to stop their partners from sexual activities that are not suitable for them. This assessment was scored from the first to the fifth quintile in the order of magnitude. About 14% and 23% of the controls and cases who fell within the first quintile reported that they would not be able to stop their partners from any sexual act. Nineteen percent of controls and twenty-four percent of cases also who were in the fifth quintile indicated that they are able to stop their partners during sexual intercourse to use condoms as shown in Table 4.5 ($p = 0.026$). They are able to make decisions on which contraceptive methods they want without consulting their partners.

In summary, Table 4.5 reported on the support systems that the adolescents normally receive, whether they planned their pregnancy, transactional sex, history of miscarriage, sexual violence and abuse, relationship with the father of first pregnancy and self-efficacy on contraceptive use. It was revealed in the quantitative data that the proportions between the cases and controls on those who had history of miscarriages were higher as well as adolescents who had some form of support after pregnancy or delivery. It was also seen that 41% controls and 52% cases reported that they never had adequate parental care ($p < 0.030$) (Table 4.5). There was no significant different score between cases and controls on their level of self-efficacy. There were also some qualitative responses on these issues that supported the above findings.

Table 4.5: Support system, mental health, and self-efficacy by case-control status

Characteristics	Control	Case	Pearson chi2 P-value
	Number of mothers (% of total) (n=231)	Number of mothers (% of total) (n=186)	
Support from parents/guardians after first pregnancy			
No	57 (25.0)	62 (34.0)	0.045
Yes	168 (75.0)	118 (66.0)	
Partner support after first pregnancy			
No	77 (34.0)	47 (26.0)	0.078
Yes	149 (66.0)	134 (74.0)	
Planned last pregnancy			
No	202 (77.0)	156 (90.0)	0.006
Yes	7 (3.0)	18 (10.0)	
In a relationship with father of first child			
No	84 (39.0)	77 (43.0)	0.341
Yes	134 (61.0)	101 (57.0)	
Transactional sex			
No	159 (78.0)	126 (73.0)	0.25
Yes	45 (22.0)	47 (27.0)	
Percentage who had history of miscarriage			
No	197 (93.0)	115 (66.0)	<0.001
Yes	15 (7.0)	58 (34.0)	
Percentage who suffered sexual violence or abuse			
No	187 (81.0)	146 (78.0)	0.534
Yes	44 (19.0)	40 (22.0)	
In their opinion felt they had adequate parental care			
No	91 (41.0)	94 (52.0)	0.030
Yes	129 (59.0)	86 (48.0)	
Use hard drug			
No	208 (95.0)	152 (93.0)	0.257
Yes	10 (5.0)	12 (7.0)	
Self-efficacy score, max 29			
Median(IQR)	21 (16, 23)	20 (15, 23)	0.211*
Quintiles			
1	32 (14.0)	43 (23.0)	0.026
2	49 (21.0)	34 (18.0)	
3	49 (21.0)	35 (19.0)	
4	57 (25.0)	29 (16.0)	
5	44 (19.0)	45 (24.0)	

* P-values were estimated using Wilcoxin ranksum test

4.7 Risk factors for Rapid Repeat Pregnancy

Table 4.6 presents information on factors that could be associated with RRP. The key factors considered in the analyses were age at menarche, age of participant, age of partner at first pregnancy, whether the pregnancy was planned, and history of miscarriage. The rest were self-efficacy, partner and parent support, marital status, counselling during antenatal and postnatal, Ante-Natal Care (ANC) visits and use of family planning method.

When these factors were considered individually in a univariate analysis, the results showed that the odds of RRP was more likely to be increased by about 41% for a one year increase in the age of the adolescent (odds ratio (OR)=1.41; 95% confidence interval (CI)= [1.22-1.63]; $p<0.0001$), whereas the odds of RRP among those who planned their last pregnancy was about three times that among those who did not plan the last pregnancy (OR=3.33; 95%CI= [1.36-8.17]; $p=0.009$) (Table 4.6). The odds of RRP among those who had history of miscarriage was about seven times that among those who did not have history of miscarriage (OR=6.62; 95%CI= [3.59-12.22]; $p<0.0001$). For those who were married or living with a partner, the odds of RRP was about three times that found among those who were single or divorced or separated (OR=2.90; 95%CI= [1.94-4.33]; $p<0.0001$) (Table 4.6). Those who felt they had adequate parental care had a 35% reduction in odds of RRP (OR=0.65; 95%CI= [0.43-0.96]; $p=0.031$) (Table 4.6). Similarly, there was about 33% reduction in odds of RRP among those who had counselling after their last pregnancy (OR=0.67; 95%CI= [0.44-1.03]; $p=0.066$). For those who had at least four ANC visits, the reduction in odds of RRP was about 53% (OR=0.47; 95%CI= [0.31- 0.69]; $p<0.0001$) (Table 4.6).

When the factors that were individually associated with the odds of RRP at $p < 0.2$ were considered together in a multivariate analysis, the odds of experiencing RRP among the adolescent girls increased by 51% for each year advancement in age (adjusted OR (aOR): 1.51, 95% CI= [1.20-1.89], $p < 0.0001$) (Table 4.6), suggesting as expected, that the older adolescents are more likely to experience a rapid repeat pregnancy compared to younger adolescents.

There was also evidence that the odds of RRP for the adolescent with the history of miscarriage were about eight times higher to have RRP than that among those who have never had a miscarriage (aOR=7.92; 95%CI: 3.18 - 19.71; $p < 0.0001$) (Table 4.6). Those who were married or living with partner were two times more likely to have RRP compared to those who were single or not living together (aOR=2.19; 95%CI: 1.22 - 3.94; $p = 0.009$) (Table 4.6). The odds of women having rapid repeat pregnancy for mothers who planned their last pregnancy is 3.4 times the odds of women having rapid repeat pregnancy if they do not plan their last pregnancy [95% CI: 0.96-12.21; $p = 0.058$].

For women who had support from their partners, the odds of rapid repeat pregnancy was 1.9 times as high as mothers who never had support from their partners [95%CI: 0.97-3.70; $p = 0.059$].

Women that received counselling on contraceptive use had 47% decreased odds of having rapid repeat pregnancy compared to those who did not receive counselling on contraceptive use [95%CI:0.28-1.01; $p = 0.052$]

Table 4. 6: Factors independently associated with odds of rapid repeat pregnancy among adolescent girls aged 15-19 years (n=274)

Factors	Crude OR [95%CI]	OR	p-value	Adjusted OR [95%CI]	Wald p-value
Age (years) at menarche ¹	1.07 [0.94, 1.21]		0.301		
Age of the adolescent ¹	1.41 [1.22, 1.63]		<0.0001	1.51 [1.20, 1.89]	<0.001
Age of the father at first pregnancy ¹	1.03 [0.98, 1.08]		0.206		
Stopped schooling with reasons other than pregnancy (sch. drop-out)	1.66 [1.02, 2.72]		0.043		
Planned last pregnancy	3.33 [1.36, 8.17]		0.009	3.42 [0.96, 12.21]	0.058
Had history of miscarriage	6.62 [3.59, 12.22]		<0.0001	7.92 [3.18, 19.71]	<0.001
Self-efficacy (>= median score)	0.73 [0.50, 1.08]		0.115		
Partner support after first pregnancy	1.47 [0.96, 2.27]		0.078	1.90 [0.97, 3.70]	0.059
Married or living with partner	2.90 [1.94, 4.33]		<0.0001	2.19 [1.22, 3.94]	0.009
Had support from parents/guardian after first pregnancy	0.65 [0.42, 0.99]		0.046		
Felt I had adequate parental care	0.65 [0.43, 0.96]		0.031	0.66 [0.37, 1.17]	0.157
Had counseling after first pregnancy	0.67 [0.44, 1.03]		0.066	0.53 [0.28, 1.01]	0.052
Had at least 4 ANC visits during first pregnancy	0.47 [0.31, 0.69]		<0.0001	0.64 [0.35, 1.17]	0.144
Used any modern contraceptive	0.96[0.64,1.42]		0.827		
Used LARC postpartum first child	0.39 [0.14, 1.09]		0.074		

¹ These variables were modelled on a continuous scale so that the effect corresponds to a unit increase. All other variables were modelled on a binary scale, the reference category was omitted in the presentation

4.8 Risk of depression by key background characteristics

This section of the study is finding out whether RRP has any association with depression among adolescents. The Beck Depression Inventory scale was used in assessing the level of depression.

Table 4.7 showed the risk of depression among participants and how these vary by key background characteristics. The term “risk” instead of “odds” was used here to describe the fact that the Becks Depression Inventory (BDI) scale was to measure the participant’s experience following their last pregnancy or birth. This means that the depressive symptoms that were assessed was intended to be a consequence of RRP, even though this was done retrospectively and may have potential for recall bias.

About 52% (214 out of 415) of the participants experienced depression following last pregnancy or birth (Table 4.7). The percentage of participants who experienced depression was 57% (104/184) among those who had RRP compared to 48% (110/231) among those who did not have RRP ($p=0.071$) (Table 4.7). The risk of depression appeared higher among adolescents with younger partners compared those with older partners (Table 4.7). For example, adolescent girls with partners aged between 16 to 19 years were found to be more depressed (67%) than those who had partners 30 years and above (34%). The results showed that the older the partner the less likely the level of depression ($p=0.002$).

Regarding whether or not the participants intended or planned to get pregnant, the results showed that the risk of depression among those who planned their pregnancy was 28% (7/25) which was lower in comparison to that among those who did not plan to get pregnant 63% (191/358) ($p=0.014$) (Table 4.7). Interestingly, those who had high self-

efficacy were more likely to be depressed 55% (118/213) compared to that 48% (96/202) among those with low self-efficacy to make decisions in relation to contraceptive use (Table 4.7).

The girls who were married or co-habiting were less depressed 43% (85/198) than those who were not living with their partners 59% (129/217) ($p=0.001$) (Table 4.7). Forty-six percent (99/215) of those who felt they had adequate parental care were depressed compared to 58% (107/185) of those who felt they did not ($p=0.019$) (Table 4.1) Fifty-six percent (143/256) of those who used any modern family planning method were depressed compared to 45% (71/159) of those who did not use any ($p=0.026$) (Table 4.7).

Table 4. 7: Risk of depression among adolescent girls aged 15-19 years by background characteristics

Characteristics	Number of mothers (% of total)	# (%) depressed	95%CI	Pearson chi2 p-value
Rapid repeat pregnancy				
No	231 (56.0)	110 (48.0)	[41, 54]	0.071
Yes	184 (44.0)	104 (57.0)	[49, 64]	
Age (years) at menarche				
10-14	336 (81.0)	177 (53.0)	[47, 58]	0.786
15-17	47 (11.0)	23 (49.0)	[35, 63]	
18-19	3 (0.1)	2 (67.0)	[9, 97]	
Age (years) of the adolescent				
12-15	49 (12.0)	26 (53.0)	[39, 67]	0.663
16-17	143 (34.0)	78 (55.0)	[46, 63]	
18-19	217 (52.0)	108 (50.0)	[43, 56]	
Age (years) of the father at first pregnancy				
16-19	61 (15.0)	41 (67.0)	[54, 78]	0.002
20-24	185 (45.0)	97 (52.0)	[45, 60]	
25-29	98 (24.0)	40 (41.0)	[31, 51]	
30+	38 (9.0)	13 (34.0)	[21, 51]	
Stopped schooling with reasons other than pregnancy (school drop-out)				
No	86 (21.0)	44 (51.0)	[41, 62]	0.933
Yes	329 (79.0)	170 (52.0)	[46, 57]	
Planned last pregnancy				
No	358 (86.0)	191 (53.0)	[48, 58]	0.014
Yes	25 (6.0)	7 (28.0)	[14, 49]	
Had history of miscarriage				
No	312 (75.0)	164 (53.0)	[47, 58]	0.579
Yes	73 (18.0)	41 (56.0)	[45, 67]	
Self-efficacy				
Low (<median score)	202 (49.0)	96 (48.0)	[41, 54]	0.109
High (>=median score)	213 (51.0)	118 (55.0)	[49, 62]	

Table 4.7: Cont' Risk of depression among adolescent girls aged 15-19 years by background characteristics

Characteristics	Number of mothers (% of total)	# (%) depressed	95% CI	Pearson chi2 p-value
Partner support after first pregnancy				
No	124 (30)	76 (61)	[52, 69]	0.010
Yes	283 (68)	134 (47)	[42, 53]	
Married or living with partner				
No	217 (52)	129 (59)	[53, 66]	0.001
Yes	198 (48)	85 (43)	[36, 50]	
Had support from parents/guardian after first pregnancy				
No	119 (29)	69 (58)	[49, 67]	0.074
Yes	286 (69)	138 (48)	[42, 54]	
Felt I had adequate parental care				
No	185 (45)	107 (58)	[51, 65]	0.01[9
Yes	215 (52)	99 (46)	[39, 53]	
Had counseling after first pregnancy				
No	123 (30)	62 (50)	[42, 59]	0.763
Yes	269 (65)	140 (52)	[46, 58]	
Had at least 4 ANC visits during first pregnancy				
No (<4 visits)	202 (49)	101 (50)	[43, 57]	0.534
Yes (4+ visits)	213 (51)	113 (53)	[46, 60]	
Used any contraceptive method				
No	159(38)	71(45)	[37,53]	0.026
Yes	256(62)	143(56)	[50,62]	
Used LARC postpartum first child				
No	369 (89)	196 (53)	[48, 58]	0.044
Yes	20 (5)	6 (30)	[14, 53]	
Total	415	214 (52)	[47, 56]	

When the depression score was classified according to the Beck Inventory Depression scale, the results showed that of the 417 participants, 26 (6%) had extreme depression, 58 (14%) were severely depression, 85 (20%) had moderate depression, and 45 (11%) were

on the borderline clinical depression (Figure 4.1). The proportion of participants with moderate depression was 22.8% among participants who had RRP compared to 18.6% among those who did not have RRP (Figure 4.2). Severe depression was higher among those with RRP compared to those without RRP (15.8% vs 12.6%) (Figure 4.2). The median depression score among participants who experienced RRP was 18.5 (IQR=10, 28) compared to 16 (IQR=9, 27) among those who did not experience RRP.

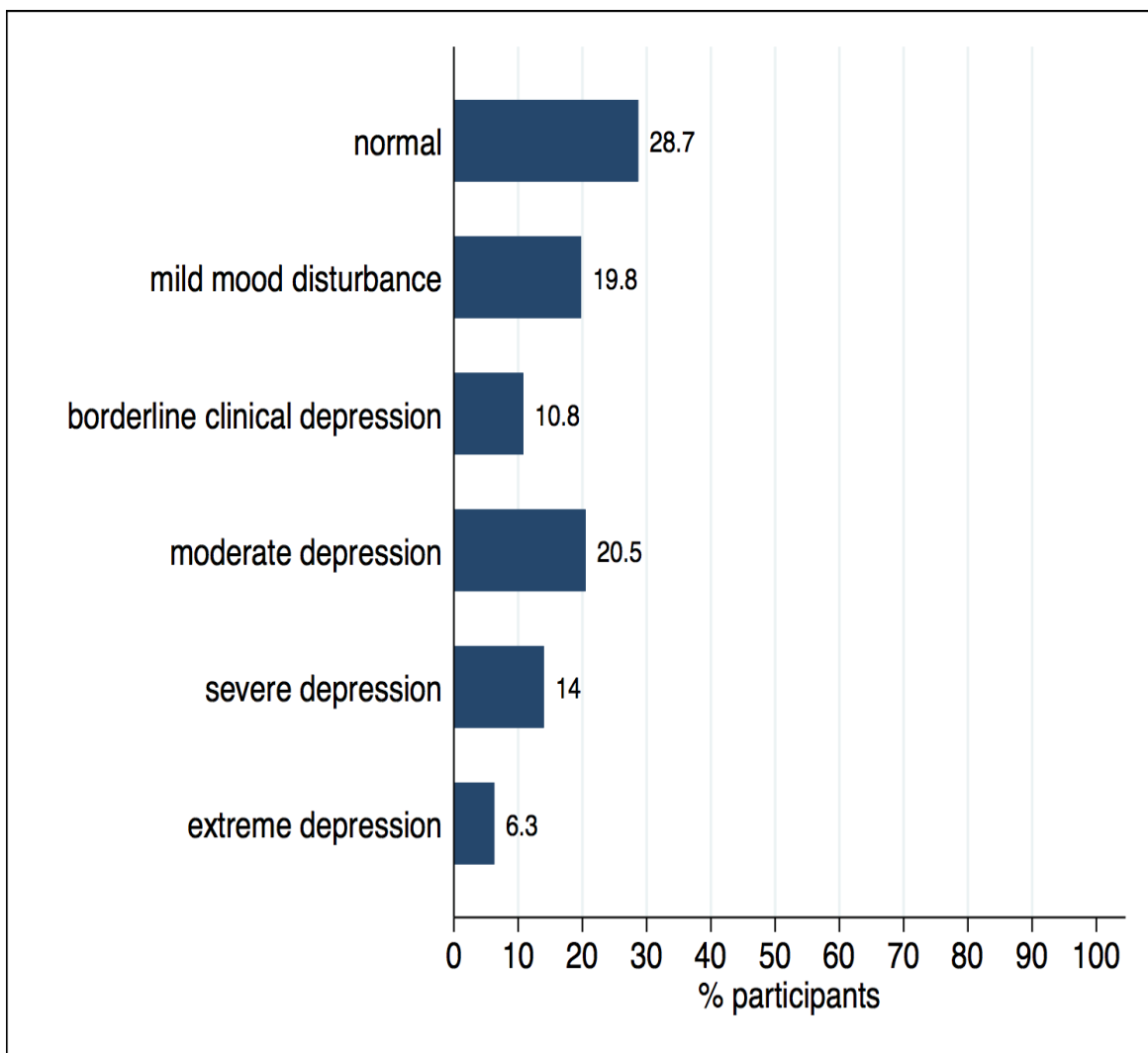


Figure 4. 1: Percentage of participants who were depressed according to Beck's Inventory Depression Scale

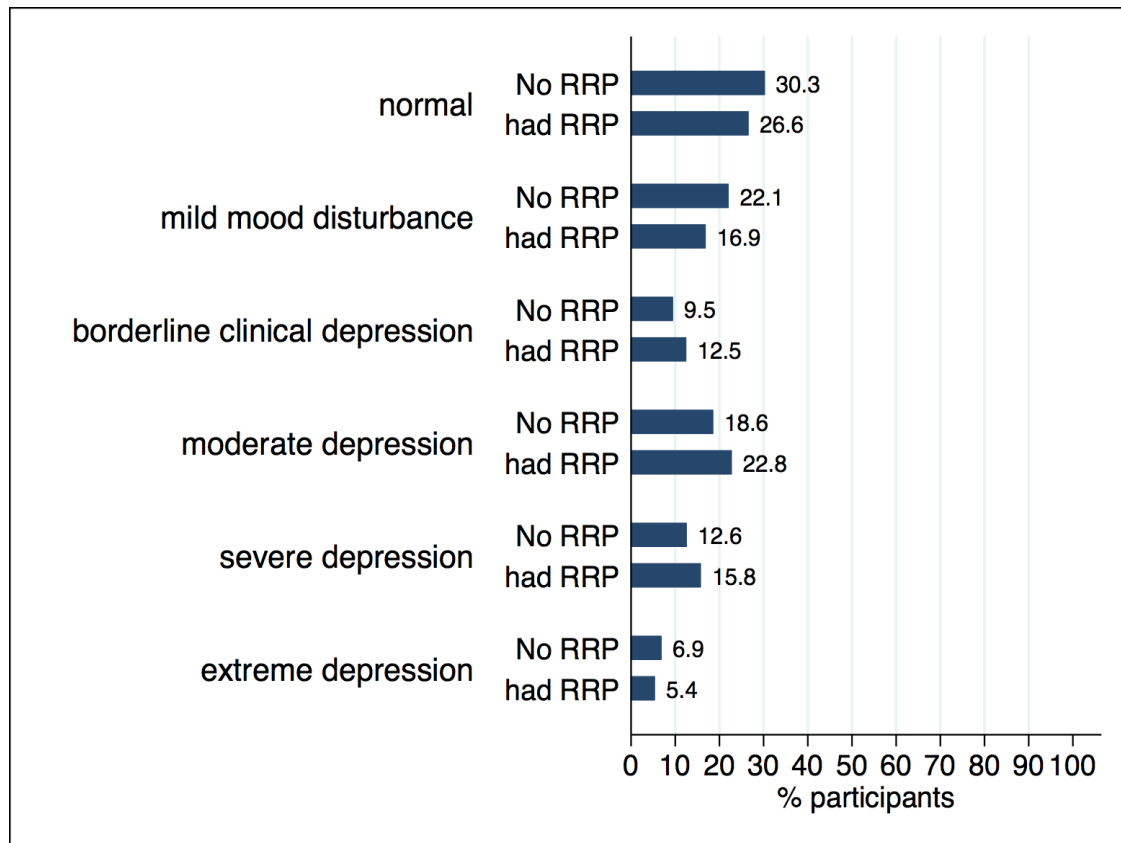


Figure 4. 2: Percentage of participants who were depressed by RRP status

4.9 Effect of rapid repeat pregnancy on depression

Table 4.9 showed the effect of rapid repeat pregnancy on risk of depression. Since the rapid repeat pregnancy was the exposure of interest in this analysis the other background characteristics were considered as potential confounders and therefore their effects on depression were not reported and interpreted. The demographic factors adjusted for, as potential confounders, were identified based on the literature. The interpretation focused on the adjusted effect estimate of RRP.

When depression was modelled on RRP alone in a univariate analysis using log-binomial regression, the risk of being depressed among those who have had more than one pregnancies was about 19% higher than those who do not have RRP (crude risk ratio (RR)=1.19; 95%CI=[0.99, 1.43]; p=0.070) (Table 4.9). When variables that were

individually associated with depression were controlled for, the effect of RRP increased the risk of depression significantly to 36% (adjusted RR=1.36; 95%CI=1.11 to 1.68; $p<0.003$), suggesting evidence of an association between RRP and depression (Table 4.9). The variables that were controlled for included age of partner, planned pregnancy, partner and parent support, marital status, adequate parental care, use of any modern family planning method, and self-efficacy (Table 4.9).

In summary, rapid repeat pregnancy had positive association with risk of depression.

Table 4.8: Adjusted effect of rapid repeat pregnancy on risk of depression among adolescent girls aged 15-19 years

Factors	Crude RR [95% CI]	p-value	Adjusted RR [95% CI] f	LR p-value
Rapid repeat pregnancy				
No	ref		ref	
Yes	1.19 [0.99, 1.43]	0.070	1.36 [1.11, 1.67]	0.003

f Estimates were adjusted for age of partner (continuous), planned pregnancy, partner and parent support, marital status, adequate parental care, use of any modern contraceptive method, and self-efficacy.

CHAPTER FIVE

5.0 DISCUSSION

This chapter provides a comprehensive discussion of the results from both the quantitative and qualitative data of the study and compares these results with the relevant literature reviewed. It also provides the strength and limitations of the study and further provides the unique findings in the study as contributions of the study to knowledge. The main purpose for this study was to find out the risk factors that could influence adolescent girls to have a repeat pregnancy within a relatively short period (24 months) from the onset of a previous pregnancy and whether the pregnancy could affect their being depressed. The structure and content of this chapter is organized into two sections;

1. Risk factors of RRP
2. Effect of RRP on depression.

5.1 Risk factors of rapid repeat pregnancy among adolescents.

This section provides discussion of the various risk factors that affect RRP in the study. There were several factors that were measured statistically to find out the risk factors of RRP. The main factors that could influence the risk of RRP were;

- The age of the adolescent.
- Married or living with partner
- Age at menarche
- History of miscarriage
- Parental care and Support
- Antenatal visits

There were other factors that showed borderline associations with RRP in the quantitative study but were very substantial in the qualitative study. These were;

- Knowledge and use of contraceptives
- sex education and initiation of Sex
- Transactional sex
- Support system

5.1.1 Age of adolescents

The age distribution among the adolescent girls was from 15 to 19 years. Majority (67%) of the cases were between the 18-19years age group which constitute the late adolescent period compared with (42%) controls. The differences in ages between cases and controls were seen to be statistically significant ($p < 0.0001$) with median ages of 19 years for cases and 18years for controls. This shows that the older the adolescent the more likely she will experience RRP. This has been confirmed by Rigsby, et al, (1998) who stated that when adolescents conceive at a younger age, the probability that the adolescent will experience RRP is high. Another study by Nelson (1990), reported that RRP is highly prevalent among adolescents within the ages of 17 to 19. According to the study adolescent age is a high risk factor for RRP. Although Trussell and Menken did not precisely research on RRP, they found that women who gave birth at a younger age at first birth (15-17 years) had higher total number of children within 3 to 5 years.

5.1.2 Marital status of adolescents

The concept of early marriage plays an important role in adolescents' experiencing RRP (Stock et al., 1997). The results showed 62% of cases to be either officially married or not married but living together with their partners (cohabiting) as compared to the controls which 64% were seen to be single. Though the result was statistically significant between

the two groups, it is not clear whether the marital residential arrangements preceded or followed RRP. Nonetheless, from the study marriage is seen to predict RRP. Several researchers over decades ago have found a positive correlation between early marriage (12-19 years) and RRP among adolescents. [(Rigsby et al., 1998); (Stock et al., 1997), (Furstenberg Jr et al., 1987)]. Most of the cases in the qualitative study explained that they got married after their first birth which in addition may lead to further pregnancies. This could probably mean that those marriages occurred to legitimize child birth and these marriages usually end in divorces (Furstenberg Jr et al., 1987).

5.1.3 Age at menarche

The age of menarche is decreasing due to several factors, including genetics, environmental factors, educational level, nutritional status, sedentary lifestyle, life habits, and socio-economic conditions (Herrman, 2007). The age at menarche has generally decreased across the globe and that in most countries it is now about twelve to fourteen years (Golub et al., 2008). The decrease in the age at menarche suggests that pregnancy is possible at earlier ages than used to be the case. According to Deardoff et al., (2005), adolescents worldwide are now engaging in sexual activity with a resultant increase in teenage pregnancies. For both cases and controls, the median ages at menarche were between 12 and 13 years respectively. According to Ameade & Garti, (2016), urban dwellers as well as middle to high income earners in Ghana experience early menarche as compared with adolescents who reside in the rural areas.

Adadevoh, Agble, Hobbs, and Elkins (1989) were the first to report on menarcheal age of the Ghanaian female. The study that was done over three decades ago found out that, the mean age at menarche then was 13.98 ± 1.42 year. This current study shows a decline in

age at menarche especially among the cases (median age at menarche for cases= 12 years) as seen in Table 4.2. The early age at menarche may be a significant factor affecting the sexual and reproductive health of adolescent girls this confirms a systematic review conducted by Ibitoye et al. (2017) for low and middle income countries.

5.1.4 History of miscarriage among adolescents

According to Pal et al. (1997), younger teenagers are at higher risk of miscarriage and complications from pregnancy than the average adult woman. Another study by Conde-Agudelo & Belizan (2005) shows a higher threat of miscarriage among nulliparous adolescents who are below 18 years of age. Comparing cases and controls with respect to history of miscarriages, 34% of the cases have had either one or more miscarriages whereas 7% of the controls reported to have had one miscarriage. This result contradicts that of Conde-Agudelo & Belizan (2005) and Pal et al. (1997) who stated that teenagers are at higher risk of miscarriage and complications from pregnancy than the average adult woman.

From the qualitative data most of the adolescents indicated that they did not know that they were pregnant until they started bleeding. This could probably be because many of them might be experiencing irregular periods and menstrual cycles since they are so new to entering their reproductive age as teens. However, because of their naivety, they did not know when they can expect their next period (Radford & Hughes, 2015). Czukas, 2018 proposes that adolescents who get pregnant can lower many of the health risks associated with pregnancy that could eventually lead to the risk of miscarriage. Activities such as regular prenatal care, being conscious about the intake of balanced and well nutritious diet, and avoiding smoking and drinking, or use of drugs that are prohibited.

5.1.5 Parental care and support

Many researchers have examined the link between adolescents' sexual behavior, pregnancy outcomes and family characteristics such as parental support and child affection with parents. Most of the results to these studies show consistency care and support from parents reduce adolescents' pregnancy. Parents play significant role in influencing adolescent involvement in risk behavior. Adolescents are less likely to engage in sexual activity when parents provide emotional support, accept them and have a close relationship with their children especially the girls. In this study the adolescents were asked to recall the care their parents gave to them before pregnancy and after the first delivery. In the qualitative results, majority of the cases (IDI responses) reported that their parents did not care about them, they did not have control over them and could not supervise them before they even got pregnant. The quantitative results also showed a similar finding where more than half of the cases (52%), in their own opinion felt they never received adequate parental support compared to 42% controls. Adequate parental care includes regulation and monitoring, communication of family principles, beliefs and expectations, and regular discipline method (Mayseless & Scharf, 2009).

Comparing the results of parental upkeep between cases and controls it was clear that most of the controls had good parental care and support during their up bring and after their pregnancy than the cases. This might have probably influenced the risk of RRP among the cases. Although most traditional systems encourage some religious institutions, educational systems and other organizations to provide information, supervision and monitoring to these adolescents, their parents play very vital and protective roles in their lives (Simpson, 2001). The period of adolescence is more of peer-oriented stage, yet parents must try to influence them to enhance their good health and better sexual

behaviours. Generally this study found out that most of the girls who thought they never had proper parental care engaged in sexual intercourse at a relatively early ages than their peers who had parental. The care and support provided to adolescents by their parents appeared to have some influence on the girls.

It is essential for the family especially parents to provide supports to adolescents because, the family is the foundational system support for a healthy youth development (Kumpfer & Alvarado, 2003). The supports adolescent receive from home have a lot of influence in their decision making. From the results it can be established that lack of support and closeness or care from parent can increase the influence of peers on adolescent sexual activity. According to Klerman (2004), the support and care that are usually provided by families to adolescents especially those who get pregnant for the first time if not adequate can contribute to RRP.

5.1.6 Adolescents ANC visits during pregnancy

Fife (2010), defines ANC as the routine care of pregnant women provided between conception and the onset of labour. The new WHO antenatal care model recommends that the first antenatal care visit, takes place within the first trimester which is gestational age less than 12 weeks (WHO, 2015). Eight ANC visits are recommended during the entire pregnancy period (WHO, 2015). The number of times the adolescents visited ANC during their first pregnancy were categorised into two (<4 times and 4+ times). Comparing cases and controls, about 59% of the cases visited the health facility less than four times within the gestational period for antenatal care while 41% of the controls also visited the same number of times. Studies have shown that timely, appropriate, adequate ANC practices

among pregnant adolescents in Kenya increased the high contraceptive usage postpartum and decreased repeat pregnancy (Fosu-Brefo & Arthur, 2015 ; Pell et al., 2013).

Some of the benefits of ANC visits as stated by Pell et al. (2013) include, adequate knowledge on the methods of contraceptive, counselling and support for women and their families. Both the qualitative and the quantitative evidence of this study confirms that, four or more ANC visits among pregnant helped them and also reduced RRP. As seen in the results majority (60%) of the controls went for antenatal visits more than four times which is almost closer to the WHO recommendations for ANC visits during the entire pregnancy period (WHO, 2015).

5.1.7 Knowledge and use contraceptives

Knowledge on contraceptives enable one to be well informed and make decisions in terms of the method to use (Darroch et al., 2016). It is said that the knowledge on contraceptives and its use is a major factor in population administration and national development especially among adolescents since they are the future of every nation (GSS, 2015). The study revealed a high percentages (86%) and (82%) of adolescents for both cases and controls respectively, had knowledge on contraceptive methods. This confirms the 2014 report from the GDHS on the knowledge on modern contraceptives among adolescents in Ghana (GSS, 2015). Although a higher percentage of both groups had knowledge on these methods, (61%) of the cases were not on any modern contraceptive method. Coard et al, (2000) in their study, reported that female adolescents need to use contraceptives to avoid unintended pregnancy which often leads to abortion or childbirth and repeat pregnancy. Their study showed several factors that influence the use of contraceptives, this may include knowledge of contraceptive methods, their use, and accessibility to these methods,

its failure and sometimes socio-demographic characteristics (Coard et al., 2000). The qualitative study showed that almost all the cases who were married were not on any modern contraceptive method. The GDHS report also shows a similar findings of lower (16.7%) modern contraceptive usage among married adolescents in Ghana (GSS, 2015). This could probably be because they are in the early stages of family building and would like to finish child bearing early.

Source of information on Contraceptive methods: The common source of information regarding contraceptive use among both the cases and the control groups were mainly health professionals and peers. Knowledge of at least one contraceptive method varied between the cases and the controls. According to these adolescents, they are taking through counselling by the health professionals during ANC through to post-natal. Most of the girls reported that prior to the pregnancy they did not have any idea about right contraceptive methods. This is because they claimed they always felt embarrassed going to the health facilities for information or services pertaining to sex and contraception. This could be due to the fact that, they supposed they might be met with an unfriendly behavior because most of these service providers are the same adults living with them in the community.

Darroch, et al (2016) mentioned several barriers to accessing contraceptives which includes restrictions regarding the selling of contraceptives based on age and marital status and the unwillingness to acknowledge adolescent sexual health needs. They also stated that health worker bias in terms of providing contraceptives to a younger adolescents and adolescents own inability to access contraceptives due to financial challenges influences the risk of RRP (Darroch et al, 2016). Low contraceptive use among adolescents may lead

heavily to Unplanned and unwanted pregnancies and eventually RRP (Baldwin & Edelman, 2013).

From the study, the commonly used contraceptives that were mentioned were Implant, IUD Pills and male Condoms. Although many of these adolescents presented history of using contraceptive method before, generally the use was not supported after the pregnancy or it was interrupted within a period of time. The continuity of contraception over long term is certainly a challenge for adolescents who are at risk of abandoning contraception between the relationships and resuming sexual activities before restarting the use of contraception. Most of them who consistently used a method were significantly less likely to have RRP and these were among the control groups. A study by Tocce, Sheeder & Teal (2012) identifies postpartum adolescents who received a contraceptive implant immediately after delivery to be less likely to get pregnant within one year than those who do not receive an implant.

Use of LARC: Use of long acting reversible contraceptive (LARC) after delivery among the adolescents was low (3%) and (7%) between both cases and controls. Studies have shown that postpartum or post abortion initiation of LARC have been found to reduce rates of rapid repeat adolescent pregnancy and abortion within 12-24 months (Baldwin, Maureen & Edelman, Alison 2013; Langston et al. 2014). Many research works have also shown that, there is a higher level of acceptance of the LARC methods amongst adolescents and approval is high when these methods are offered to teenagers and young women in the postpartum period especially the first few days of delivery (Klerman, 2004; Kelly et al. 2005; Langston et al. 2014).

The qualitative study revealed some reasons why the adolescent willingly did not want to prevent pregnancy or RRP. Due to the cultural and social dynamics among mostly the Ga communities some of these girls saw nothing wrong with repeat pregnancy. The other reasons why they did not adhere to family planning and contraceptive methods. Relatively extravagant outdoor ceremonies are usually organized for their babies when they give birth. It is termed in Ghanaian language (Ga) as “Kpojeimo”. According to the respondents, this ceremony brings honor to them. It is also a kind of competition among young girls. They also brought out the fact that most of them share rooms with all their nuclear family members, a number of people in a room could be more than 7. When one gives birth, all the occupants would have to leave the room for her, the baby and one elderly woman (most often the mother) who would assist. This also gives them some joy. They can enjoy the room to themselves till the baby is about six (6) to eight (8) months. Nonetheless they made mentioned some traditional methods that they think may be classified as contraceptives. These methods are discussed below:

5.1.7.1 Myths/misperception on contraceptives.

Misconceptions are defined here as specific and extensive beliefs about the purpose or outcome of contraceptives that are false or unsupported by the best available evidence or sources. In spite the high knowledge about contraceptive among adolescents, evidence from the qualitative study shows that there are myths and misconceptions about all the modern contraceptives and these false beliefs appear to extend across most of adolescent girls. These myth are different from documented issues about the side-effects that studies have shown about these methods. According to this study the following were some of the concerns raised as reasons for not using family planning. Even though most women who use contraceptives do not die or bleed to death, or experience any sort of infertility, some

of the girls mentioned these reasons as the main purposes of not using any modern method of contraceptive.

Fear of infertility resulting from contraceptive use: Though it is obvious that the discontinuation of all the family planning and contraceptive methods do not lead to infertility, several studies have shown that it is a prominent and a principal concern by women especially adolescent girls (Russo et al. 2013; Adongo et al., 2014; Chipeta et al., 2010). This was not different from the responses of the adolescents interviewed in this study.

Misperceptions can lead people to make decisions that are not in their best interest, often resulting in both personal and societal costs (Russo et al. 2013). Unsubstantiated fears about contraceptive safety can lead adolescents to forgo contraceptive use completely, use a less effective method, or not use effective methods rightly (Rashid, 2006). This may increase their overall health risk.

5. 1.8 Initiation of sex

In the earlier days societal and cultural restrictions governed premarital sex and early onset of sex to reduce the risks of pregnancy and unwanted childbirth (Adadevoh et al. 1989). In most cases sexual intercourse was prohibited before initiation rites have been performed (Bearinger et al. 2007). It is not so today. Risk taking behaviors are considered by most adolescents to be normal. Experimentation such as joining friends for parties, alcohol intake and involving into sexual activities out of curiosity represents an adolescent (Dunbar et al. 2008). Among these risks is the early onset of sexual intercourse. According to this study, more than 50% of the adolescent girls for both cases and controls stated that

they did not go through any coercion that is there was consensual agreement between their partners and themselves during their first sexual intercourse. Some of the reasons for the consensual sex were for financial gains and these were mainly transactional.

Sexual activities have increased tremendously as the years go by which is affecting the mean/median age of the start of sexual life causing a gradual decrease. According to the study majority of the girls had their first sexual intercourse at the age of 15 years or even younger, though a lot of the girls are delaying in marriages worldwide lately (Golub et al. 2008). The adolescent girls aged between 15 and 19 years who have had premarital intercourse keep on increasing due to early initiation of sex (Deardoff et al. 2005). Again, adolescents who initiate sexual activity at young ages tend to have more sexual partners and less likely to use contraceptives than those who initiate sex later. These adolescents are mostly at higher risk of repeating pregnancy during the teenage years (Tonlaar & Ayoola, 2014).

From this study there were several responses on who initiated these girls into sex. Higher proportion of both cases and controls indicated that friends introduced them to other friends (men). Those who indicated that they were initiated by their own siblings and or relatives were comparatively low. Others indicated that their class teachers in their schools initiated them where as others specified neighbors and family friends.

5.1.9 Sex Education

Experimentation with sexual behavior and involving into sexual activities out of curiosity represents an adolescents' willful decision to engage in activities with an amount of risk of

life threatening consequences (Shtarkshall et al. 2007). Sex education is said to be a strong factor that could influence their decision making.

In Ghana many parents, societies and cultures frown on discussing sexual matters with their adolescents. Sexual intercourse in Ghana is seen as a preserved of only married adults due to religious, cultural, and social reasons (Agyei, Biritwum, Ashitey, & Hill, 2000). In this study more than 70% of both cases and controls had received some form of sex education. Out of these percentage about forty percent of both groups had their source of education from peers. Most of them indicated that, their parents did not feel too comfortable discussing issues on sexual health with them. Shtarkshall et al, (2007) identifies sex education as a most sensitive and divisive topic to be discussed in most homes around the world. Issues regarding sex and contraception may not be discussed at home, particularly amongst adults and young people. Some of the respondents (mostly cases) brought out the fact that their parents even started talking to them on sex after they saw them pregnant. Even those whose parents were able to talk to them on sex education, the content of the subject is mostly restricted.

This scenario is likely to limit adolescent's access to information on issues related to sexuality and sex health education. It is generally agreed that formal education should include sex education. Asmal (2001), showed in a study that teachers play an influential role in the development of children's identity and sexuality. According to this study a few pointed out that they had sex education from their school teachers, rather majority mentioned that they received sex education from health professionals. According to the adolescents this normally happens when they are already pregnant and visiting the facility for antenatal care.

5.1.10 Transactional Sex

To be able to gain intuition into the risk and protective factors that either place adolescent girls at risk of unprotected sex and unplanned pregnancies, or provide resiliency to them in a risky environment, it is very important to gain an understanding of the context of adolescents' sexual relationships. One aspect which was identified in this study was adolescents' relationships in transactional sex. Though it was seen to be low for both controls (22%) and cases (27%) in the quantitative results, results from the qualitative showed that in most instances for the cases, the transactional sex preceded the pregnancy. It comes before the pregnancy and mostly within a contained school environment where they trade sex for marks and academic excellence. Whereas with the cases transactional sex was very prominent and paramount after the first pregnancy where they need cash and other things to fend and support themselves and their babies so any man who comes around willing and able to support with money is received. This can make it difficult to negotiate safe sex, as receiving gifts may make people feel like they have to give in to any requests made by the one providing, including having sex without a condom which could also lead to another pregnancy.

The qualitative study again showed a higher number of adolescent girls who indulge in exchanging love/sex for money with most at times the partners being far older than them. The control which an older person has over their younger partner can lead to manipulation, emotional harm and physical violence (Stoebenau et al. 2011) . It can also lead to serious health issues. By not using a condom, transactional sex can also lead to STIs and unwanted pregnancies (Henry & Fayorsey, 2002). Transactional sex could be either directly or indirectly in exchange for material support and other needs. The directly ones

are the types where the recipient gets support for either survival or for luxury goods like mobile phones, cosmetics, food or shelter.

In this study most of the adolescents who reported that their partners requested for sex when they asked for support indicated that, gifts like mobile phones, gifts received during festive seasons like Valentine day, Christmas and birthdays, and monies when received from their partners they normally give sex in returns as a means of showing appreciation. A study by Moore et al. (2005) also shows how in relationships the financial providers exchange financial assistants and other supports with sex.

5.1.11 Support system

Adolescents are usually faced with the problems of social neglect and denial (Martino et al., 2006). According to Klerman, (2004), Adolescents' assessments of the quality of support they receive from their families and their partners may reveal unmet emotional needs. Teenagers who feel that they do not receive adequate support may be more prone to seek sexual intimacy. This confirms with this study findings. Most of the control groups had joined groups in the community in which they live. Places like Dodowa, Maamobi and James Town, the health facilities have liaised with some NGO's to support adolescents. These groups focus on training the adolescent girls, educate them and sometimes provide those without formal education with some form of vocational skills. The aim of these groups according to the adolescents during the interviews are to prevent adolescent's pregnancy and or termination(s).

They take them through counselling before and after pregnancy. According to the girls these groups extend helping hands to them when they give birth. According to the adolescents this prevented them from going in for help from men to engage in sexual

activities. They also indicated that, the social support they receive help them to be more confident about themselves. Adolescent mothers have a greater need for emotional, psychological and social support as compared to women aged 20 to 24years (Alford et al. 2005). Aside these groups none of the adolescents revealed any other support from groups. Some community members however gave support in the form of encouragement and sometimes clothes for their babies. On the other hand, limited social support and life stress have consistently emerged as significant predictors for depressive symptoms in pregnant and child bearing adolescents (Logsdon, 2004; Marcus, 2009; Logsdon, 2004).

5.2 Effect of rapid repeat pregnancy on depression

This section discusses the consequences of rapid repeat pregnancy among adolescent. It further explains the association between adolescent pregnancy and depression and the extent to which adolescent mothers are depressed.

Depression among adolescent mothers is mainly a global health issue. There is a negative correlation between depressive symptoms in adolescent mothers and a range of negative effect for the adolescent mother and her child. Earlier studies have shown that numerous factors come together to influence the level of depression among adolescents which could lead to RRP where as some studies have identified RRP as the main cause of depression.

This study sought to conduct a systematic review on RRP among adolescents and its effect on their level of depression. Studies found were mainly on depression among adolescents after pregnancy. They did not indicate whether the pregnancies were repeat or not. However, all the nine articles revealed that teenagers who have had pregnancies were seen to be more depressed that those who have never been pregnant.

A study by Gavin Lindhorst & Lohr (2011), estimated the associations between correlates and elevated depressive symptoms during five distinct developmental periods of the life course. In a multivariable logistic regression analysis, they reported that parity was independently associated with increased odds of elevated depressive symptoms at the third developmental period with a mean maternal age of 19.1-24 years. Iacobelli et al. (2014) in their case control study showed that 3.6% of adolescent mothers (cases) had major depressive disorders compared to 1.9% of adult mothers (controls).

In this study RRP was the exposure of interest, therefore the other background characteristics were considered as potential confounders and therefore their effects on depression were not reported and interpreted. Depression was however modelled on RRP alone in a univariate analysis, the risk of being depressed among those who have had more than one pregnancies was about 19% higher than those who do not have RRP (crude risk ratio (RR)=1.19; 95%CI=[0.99, 1.43]; p=0.070) (Table 4.9). A study by Nielsen et al., (2012), showed a similar findings where the odds of becoming depressed among adolescents who have experienced pregnancies increased 2 times in unadjusted estimates. However there was no significant association after adjusting for some factors like low socioeconomic status, drug use, and antisocial behavior. The associations were similar among women who were nulliparous and women who had had a prior pregnancy over the one year period of study (Hall, Kusunoki, Gatny, & Barber, 2014). Other studies examined a number of obstetrical risk factors primiparity status, number of previous pregnancies, full-term births, miscarriages, premature births, and stillbirth. There was no significant correlation between the variables measured with the overall score of BDI.

Two issues are of particular concern, these are, teenage pregnancy is linked with greater health threats and psychosocial difficulties (Klein 2005), and the other is mostly essential for adolescents. Many research works have established the fact that symptoms of depression after pregnancy are about twice as common in adolescents as in adults (Barnet et al., 2008; Figueiredo, Pacheco, & Costa, 2007) with one study indicating that as many as 68 % of pregnant adolescents attending school reported depressive symptoms (Logsdon, 2004).

In this study, when variables that were individually associated with depression were controlled for, the effect of RRP increased the risk of depression significantly to 36% (adjusted RR=1.36; 95% CI=1.11 to 1.68; $p<0.003$). This suggests a strong evidence of an association between RRP and depression (Table 4.9). The variables that were controlled for included age of partner, planned pregnancy, partner and parent support, marital status, adequate parental care, use of any modern family planning method, and self-efficacy (Table 4.9).

Tackling symptoms of depression among adolescent mothers at an early stage could lead to greater results for their children and themselves. Strong evidence suggests that pregnancies may have an association on depression and eventually have a negative impact on the mother especially if she is an adolescent and her child (Marcus, 2009; Rahman et al. 2008).

5.3 Strengths and limitations of study

5.3.1 Strengths of the Study

1. Qualitative and quantitative research approaches have inherent strengths and limitations. In contrast, by combining these two techniques (mixed method), research can integrate the strengths of both approaches. This study combined both methods of research methodologies which helped the researcher to provide more data to understand the issues about RRP among adolescents and depression. The approach also gave a broader perspective on the over-all issues that were discoursed.
2. The goal of this study was to retrospectively determine the exposure of the risk factors of RRP from each of the two groups, (cases and controls). The study design used sort to address the goal. RRP is a very rare condition but exists within the society. Case-Control study design was used to establish association between the identified risk factors and the outcome.
3. Unlike several studies that looked at pregnancies among adolescents, this study is one of the few studies conducted in Ghana to look at Rapid Repeat Pregnancies among adolescent girls and also accessing their levels of depression. This could be an enhancement over the numerous previous studies conducted on adolescent pregnancies.
4. The adolescent girls (participants) who were used for this study were very open and most often poured out their experiences though the subject matter was very sensitive. This was because the interviewers were relatively younger and they felt they were their colleagues which encouraged them to feel very easy and free discussing their sexual behaviors with them. This enabled greater validity of the study results.

5. Finally, though the study was conducted only in Greater Accra Region, out of the ten regions of Ghana. Findings may however not be a clear representation of the views of all adolescent girls, but according to GDHS 2014, adolescents across the country have similar characteristics. This study results therefore could be generalized for the whole country.

5.3.2 Study limitations

1. The consequences of RRP may be associated to depression and may not be the sole causal effect of depression. It may therefore be difficult to work out whether the exposure came first, so causation may be confirmed by more rigorous studies. There could also be recall bias in assessing the level of depression.
2. The study also was limited in its examination of other factors that may influence an adolescents' RRP and Depression. Potentially important but unmeasured covariates include access to healthcare and Healthcare providers' attitude towards these adolescents.

5.4 Contribution to knowledge

The study has identified the main risk factors that contribute to RRP and has shown evidence of effect of RRP among adolescents on their level of depression. This results from the study has provided an insight into designing targeted interventions to address rapid repeat pregnancy among adolescents. It has also informed policy makers, parents and all stake holders who are interested in adolescents' welfare.

CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter presents a summary of the key findings of the study, conclusions based on the findings and specific recommendations suggestions for further research and for policy makers. Given the research gap in respect to RRP, the objective of this study was to answer questions about the following question:

- What underlying mechanism explains the relationship between RRP and depression?
- How socio-behavioral and cultural factors influence pregnancy within 12-24 months of a teenager giving birth for the first time
- The effect of RRP on depression

6.2 Summary of key findings

The summary of the main findings is devoted to give a brief recap of the achievements of the objectives. The main objective of the study was to identify the risk factors of RRP and its effect on depression. Below are the findings obtained from the analysis of the data gathered from the research conducted.

6.2.1 Summary of key findings

The study employed both qualitative and quantitative approaches (mixed method) to identify the risk factors of RRP and its consequences on depression among adolescents in the Greater Accra Region. A case control study design was used to conduct a survey with 231 controls and 186 cases. Six FDGs were conducted among the controls in six of the

hospitals and a total of forty-six adolescents were involved in the FGD. Eleven In-depth interviews were also held with adolescents who have experienced RRP (case) in six of the health facilities selected for the study. There were two sections of the study, risk factors of RRP and effect of RRP on depression. The study was conducted among adolescents aged between 15 and 19 years. The main findings of the study include:

Major risk factors of RRP

- Among the Socio-Demographic factors, adolescent age and marital status happened to be statistically significant between cases and controls. The median age for cases and controls of the adolescents were 19 years and 18 years respectively. According to the findings most of the girls who were 17 years and above had either given birth to two, terminated more than twice or had one parity and two gravida. All the respondents that were interviewed have had either one or multiple pregnancies.
- The median ages at menarche between cases and controls were 12 and 13 years respectively and it was observed that most of the girls who experienced early menarche were involved in early sexual activity than those who did not. This was determined by assessing the age at which they had their first sexual intercourse.
- It was also revealed in the study that the number of times a pregnant adolescent visits the hospital for ANC had some form of influence on her repeating the pregnancy within a short period.
- The study found that peers were the main source of information on issues of sex among the cases as compare to the control group. Most of the cases received sex education from their friend. They reported that they felt more comfortable discussing issues like that with friends than their parents and other people.

- Transactional sex was very common among the cases than the controls. They reported that it was “normal” to use sex to thank a partners after he has bought a present or given money. They also included that, to be able to support themselves, it is important to get someone to assist them financially in returns of sex.
- The number of times an adolescent visits ANC clinics has influence on the adolescents having repeat pregnancy in the very near future.
- There were high proportions of adolescents (both cases and controls) who had knowledge on contraceptives but the usage among the control group was seen to be low this suggest that there is a relatively high fertility among the adolescents who experience RRP hence the low usage of contraceptives.

Effect of RRP on depression

- The risk of being depressed was seen to be high among the cases. This shows that adolescents who experience RRP are severely depressed.

6.3 Conclusion

Significant predictors of rapid repeat pregnancy included younger age, low socioeconomic status, low education of adolescents, early marriage, intended or desired first pregnancy, and use of a contraceptive methods. Contraceptive use right after delivery decreases the risk of RRP. There is a slight consensus as to which risk factors are the most important predictors of tendency. Since many adolescent mothers conceive again within two years, there is a need for the development of intervention strategies for all these young women. Findings from the study indicated that among the ages 15 to 19 years, most pregnancies occurred at age 16 years. The factors responsible for teenage pregnancy include; early menarche, early marriage, early sex initiation and lack of parental care and support.

Regarding the knowledge on contraceptive use and sexual health education, findings indicated that a few number of the mothers knew about adolescent body changes with the main sources being from their school teachers followed by parents. However, majority of them consulted their own peers for information on sexual health. Almost the adolescents used for the research were sexually active by age 14 years. Most of the study participants had knowledge about contraceptives but its usage was low. The risk of being depressed was seen to be high among those with rapid repeat pregnancy.

This study has investigated the extent to which having subsequent birth in less than 24 months (rapid repeat pregnancy) could unfavorably affect the psychological state of an adolescent mother.

6.4 Recommendations

In view of the above conclusions drawn from the findings, the following recommendations are made to stakeholders to contribute to the wellbeing of adolescent girls, the prevention of RRP and issues on adolescent sexual and reproductive health as a whole.

6.4.1 Parents and family

- To prevent adolescents from seeking information from their own peers, parents must ensure that adolescent girls, obtain adequate sex education at home. This must begin early in life, before young people develop secondary sexual characteristics “*catch them young approach*”.
- It is essential for the family especially parents to provide supports and care to adolescents because, the family is the foundational system support for a healthy youth development

6.4.2 Ministry of Health (MOH) / Ghana Health Services (GHS)

Adolescence is a time of major transition between childhood and adulthood. It is a stage when substantial changes of the body such as physical, psychological, and behavioral happen. This is also the period that young people develop several habits, attitudes and relationships that could be carried into their adult lives. The health system plays a very pivotal role in enhancing healthy lifestyle and avoiding repeat pregnancies during adolescence.

- MOH/ GHS and other stakeholders must support the effective and efficient delivery of all-inclusive youth-friendly health-care package of services. Which may include: Universal access to accurate sexual and reproductive health information, a range of safe and affordable contraceptive methods, sensitive counselling to adolescent girls and quality obstetric and antenatal care for all pregnant adolescent girls.
- Since the study revealed that healthcare providers (especially the older nurses) do not treat the adolescents well when they go for services, the healthcare providers especially the young ones should go through adequate training to offer adolescent friendly services to the adolescents.
- MOH/GHS should integrate adolescent health services into home visits/outreach package of CHPs and also encourage adolescents who are pregnant to frequently visit ANC as recommended by WHO.
- MOH/GHS should provide counselling services for adolescents with repeat pregnancies to avoid or prevent them from experiencing severe depression during that period and beyond.

6.4.3 Ghana Education Service (GES) and Ministry of Health (MOH)

- Family planning and contraception knowledge between cases and controls though adequate the usage was seen to be relatively low. It is therefore important to introduce sex education, contraception and family planning in primary schools. This will enable the adolescents to be well informed at early stages.
- GES with the help of MOH must intensify the school health programs to include a better comprehension of interconnections of the reproductive health experience (age at menarche) and reproductive behavior such as initiation of sex (age at coitarche) to provide valuable information that can feed into improved pregnancy prevention interventions for young adolescent girls in school.
- From the study most of the adolescent girls dropped out of school due to pregnancy, the GES should be able to accept the adolescent girls who have had first pregnancy in school to prevent them from having repeat pregnancy.
- The study shows a clear evident that most of the early initiation of sex occurs in the primary schools. Ghana Education service and private schools unions must adopt appropriate strategies to put all teachers who practice such acts to serious punishments this will prevent and discourage such acts.

6.4.4 Recommendations for future research

- No study directly linked RRP to depression during the systematic review. In addition to my study, other research could be done in different settings to establish the relationship between RRP and depression.
- Further research is required to explore on the access to healthcare, contraceptive and healthcare providers' attitude towards these adolescents in terms of their sexual health needs.

- The current study used a case-control study design to identify the risk factors of RRP and further asked the adolescents to recall on the experiences on depression after delivery. This process could introduce recall bias to the results. Future research should employ prospective cohort study to follow the adolescents up during the period of pregnancy to assess their level of depression to prevent any form of biases.

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APPENDICES

Appendix I; Quantitative data collection tool Questionnaire: instruction, Do not write your name, tick only one response on each question and multiple response where applicable. Only adolescent girls aged between 15 and 19years are eligible for this study.

Date.....Study Site.....code.....
Cod

SOCIO-DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS		
01	In what month and year were you born?	Month ____ Year __
02	How old were you at your last birthday?	_____
03	Are you currently in school?	No.....1 Yes.....2
04	What is your highest educational level?	No formal education.....1 Primary.....2 Junior High School.....3 Senior High School.....4 College/Tertiary.....5
05	What is your religion?	Catholic.....1 Protestants.....2 Pentecostal.....3 Muslim.....4 Traditional.....5 Other.....6
06	What is your tribe?	Ga.....1 Ga Adamgbe.....2 Akan.....3 Ewe.....4 Other(Specify).....5
07	What's your marital status?	Not Married.....1 Married.....2 Living together.....3 Other (specify).....4
08	Are you currently working?	No.....1 Yes.....2

09	If yes, what is your current occupation?	Clerical/Salaried worker.....1 Trading/Small scale business.....2 Artisan.....3 Apprentice.....4 Other (Specify).....5
10	What is your mother's occupation?	Housewife.....1 Trader/small scale business.....2 Government/NGO employee.....3 Artisan.....4 Other (specify).....5
11	What is your mother's age?
12	What is your father's occupation?	Farming/Fishing.....1 Trader/small scale business.....2 Government/NGO employee.....3 Artisan.....4 Other (specify).....5
12	Where do you live? That is your area of residence.	
13	How many siblings do you have?	None.....1 one.....2 two.....3 three.....4 other, specify.....5

Knowledge and Use of Contraceptives

14	Have you heard of any method that can be used to prevent pregnancy?	No.....1 Ye.....2
15	How likely is it that you will use contraceptives next time you have sex, within the next 3 to 6 months?	Unlikely.....1 Likely.....2 Very likely.....3 Extremely li.....4
16	If yes, Which of the	17. Which type of contraception do you use? <i>Kindly tick</i>

	following method(s)? <i>kindly tick</i>	
	Implants	Implants
	IUD	IUD
	Injectable	Injectable
	Pills	Pills
	Condoms	Condoms
	Periodic Abstinence	Periodic Abstinence
	LAM	LAM
	Withdrawal	Withdrawal
	Rhythmic	Rhythmic
	Any Traditional Method	Any Traditional Method
	Others specify	Others specify
18	How often do you use any of these methods?	
	Condoms	Never used.....1 Once a while.....2 Every time.....3
	Emergency Contraceptive Pills	Never used.....1 Once a while.....2 Every time.....3
	Periodic Abstinence	Never used.....1 Once a while.....2 Every time.....3
19	Did you attend antenatal during your first pregnancy?	No.....1 Yes.....2
20	How many times?	Monthly.....1 Every 2 months.....2 Every 3 months.....3 Twice in the entire pregnancy.....4 Ones.....5 Other, specify.....6

Sex Education		
19	Have you received any form of sexual education?	No.....1 Yes.....2
20	Where/ Who is your main source of information on sexual and reproductive health?	Peer.....1 Parents/guardian.....2 Mass media.....3 Social media.....4 Health professional.....5 Others specify.....6
21	Have you ever had sex education classes/lessons in school?	No.....1 Yes.....2
22	Will it be easy and comfortable to discuss issues on sex with your family and friends?	No.....1 Yes.....2
23	Did you receive counselling services after first pregnancy?	No.....1 Yes.....2

24	Do you have many friends who are adolescent parents?	No.....1 Yes.....2
25	At what age did you experience your first period or menses?	10 years1 11 years.....2 12 years.....3 Other, (specify).....4
26	At what age did you have your first intercourse?	Below 12 years.....1 13 years.....2 14 years.....3 15 years.....4 Other(Specify).....5
27	If I may ask, who initiated you into sex?	Friend.....1 Sibling.....2 Relative.....3 Other (specify).....4
27	How were you initiated into having sex?	Under the influence of Alcohol.....1 For financial gains.....2 Rape.....3 Consensual Sex.....4 Other (specify).....5
28	Did you use any form of protection against pregnancy?	No.....1 Yes.....2
29	If yes which form of protection did you use?	Condom.....1 Pills.....2 Emergency contraceptive.....3 Other (specify).....4

	Do you belong to any social media group platform?	No.....1 Yes.....2 <i>If No skip this section(Q30- Q35)</i>
	If yes, which do you belong? <i>(tick as many as applicable)</i>	Facebook.....1 Instagram.....2 Twitter.....3 WhatsApp.....4 Other, (specify).....5

	What is the purpose for using the social media?	Education.....1 Business.....2 Socialization.....3 Entertainment.....4 Other, (Specify).....5
	What do you normally watch on these media?
	How often do you use Social media?	Almost every day.....1 At least once a week.....2 Less than ones a month.....3 Other, (Specify).....4
	Does it have any influence on your sexual behavior?	No.....1 Yes.....2
	If yes, how does it have influence?
Support System		
	Did you receive any support from your parents/guardian after you're your first pregnant?	No.....1 Yes.....2 <i>If No Skip to Q38</i>
	If yes, What form of support did you receive?
	Have you been receiving support from your partner after your first pregnancy?	No.....1 Yes.....2 <i>If No Skip to Q40</i>
	In what way does he support?
	Do you receive any form of support from your community, group or friends after you got pregnant?	No.....1 Yes.....2 <i>If No Skip to Q42</i>
	In what way do they support?
	How did your partner react upon hearing about your pregnancy?	Angry.....1 Denied responsibility.....2 Happy.....4 Other,(Specify).....5

43	At what age did you conceive your first child?	Below 12 years.....1 13 years.....2 14 years.....3 15 years.....4 Other(Specify).....5
44	Did you ever intended or desired your second pregnancy?	No.....1 Yes.....2
45	Are you in a relationship with the father of the first child or first pregnancy?	No.....1 Yes.....2
46	Is he the same person responsible for the second pregnancy? For controls only	No.....1 Yes.....2
47	Have you had any previous abortion? For controls only	
48	Have you had any previous miscarriages? For controls only	No.....1 Yes.....2
49	What was the interval between first and second pregnancy? Controls only	Less than 3 months.....1 After 3 months.....2 At 6months.....3 After 6 months.....4
50	Have you encountered any health problems in your pregnancy?	No.....1 Yes.....2

51	If yes what health problem have you encountered
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		Mental Health	
5 2	Have you received any form of physical interpersonal violence and abuse?	No.....1 Yes.....2	
5 3	Have you received any form of sexual interpersonal violence and abuse?	No.....1 Yes.....2	
5 4	From your opinion, have you received adequate parental care?	No.....1 Yes.....2	
5 5	If I may ask have you had any experience of being raped?	No.....1 Yes.....2	

Appendix IV Beck's Depression Inventory

The Becks depression inventory scale has been adapted to determine the mental state of the adolescents prior to pregnancy. Possible responses below have been altered to suit the researcher's objectives.

1. 0. I was not well
 1. I was sad
 2. .I was sad all the time and I couldn't snap out of it
 3. I was so sad and unhappy that I couldn't stand it

2.
 0. I was not particularly discouraged about the future.
 1. I felt discouraged about the future
 2. I felt I have nothing to look forward to.
 3. I felt the future was hopeless and that things couldn't improve.

3.
 0. I didn't feel like a failure
 1. I felt I had failed more than the average person
 2. As I looked back on my life, all I could see was a lot of failures
 3. I felt I was a complete failure as a person.

4.
 0. I got as much satisfaction out of things as I used to.
 1. I didn't enjoy things the way I used to.
 2. I didn't get real satisfaction out of anything anymore.
 3. I was dissatisfied or bored with everything

5.
 0. I didn't feel particularly guilty
 1. I felt guilty a good part of the time.
 2. I felt quite guilty most of the time.
 3. I felt guilty all the time

6.
 0. I didn't feel disappointed in myself.

1. I was disappointed in myself.

2. I was disgusted with myself.

3. I hated myself.

7.

0. I didn't feel I was any worse than anybody else.

1. I was critical of myself for my weakness or mistakes.

2. I blamed myself all the time for my faults.

3. I blamed myself for everything bad that happened.

8.

0. I didn't have any thoughts of killing myself.

1. I had thoughts of killing myself, but I would not carry them out.

2. I wanted to kill myself.

3. I wanted to kill myself if I had the chance.

9

0. I wasn't cry any more than usual.

1. I cried more than I used to.

2. I cried all the time now.

3. I used to be able to cry, but now I can't cry even though I want to.

10.

0. I was no more irritated by things than I ever was.

1. I was slightly more irritated then.

2. I was quite annoyed or irritated a good deal of the time.

3. I felt irritated all the time.

11.

0. I had not lost interest in other people.

1. I was less interested in other people than I used to be.

2. I had lost most of my interest in other people.

3. I had lost all of my interest in other people.

12.

0. I made decisions about as well as I ever could.

1. I put off making decisions more than I used to.
2. I had greater difficulty in making decisions more than I used to.
3. I couldn't make decisions at all anymore.

13.

0. I didn't feel that I looked any worse than I used to.
1. I was worried that I was looking unattractive
2. I felt there were permanent changes in my appearance that made me look unattractive
3. I believed that I look ugly.

14.

0. I could work about as well as before.
1. It took an extra effort to get started at doing something.
2. I had to push myself very hard to do anything.
3. I couldn't do any work at all.

15.

0. My appetite was no worse than usual
1. My appetite was not as good as it used to be.
2. My appetite was much worse now
3. I had no appetite at all anymore

16.

0. I hadn't lost much weight, if any, lately
1. I had lost more than five pounds
2. I had lost more than ten pounds
3. I had lost more than fifteen pounds

17.

0. I was no more worried about my health.
1. I was worried about the physical problems like aches, pains, upset stomach, or constipation
2. I was very worried about physical problems and it was hard to think of much else
3. I was so worried about my physical problems that I couldn't think of anything else.

18.

0. I had not noticed any change in my interest in sex
1. I was less interested in sex than I used to be
2. I had almost no interest in sex
3. I have lost interest in sex completely.

THANK YOU VERY MUCH FOR YOUR TIME AND COOPERATION!!!

Appendix II; Qualitative data collection tool.

Interview guide

Interview Guide

Socio-demographic data: age, sex marital status, education level, reproductive history

Enabling factors that may lead to RRP.

1. What do adolescents do to prevent pregnancy?
2. What are your views about method use to prevent adolescent from becoming pregnant?
3. What is the attitude of adolescents to use of modern methods of preventing pregnancy?
 - a. In which places in your community can one get contraceptives
4. What are the reasons for adolescent refusal to use contraceptive
 - a. Probe on availability of contraceptive
 - b. Probe o
5. What affects are responsible for repeat pregnancy among adolescents?
 - a. Probe on lack of sexual education
 - b. Probe on non-use of contraceptive
 - c. Probe on poverty
6. What led to you becoming pregnant immediately after your previous pregnancy? (For those with RRP only)
 - a. Probe on peer influence
 - b. Probe on media
 - c. Probe on family support

Sex education

7. What are the main source of information on sexual and reproductive health?
 - a. Probe on role of social media
 - b. Probe on parents
 - c. Probe on health workers
8. What are the barriers to sexual education?
9. What forms of support are available for adolescents?
10. What is your view about these support system regarding their ability to prevent RRP?
11. What form of family support are provide to adolescents in your community?
12. How makes a decision on whether an adolescents should use a contraceptive or have protected sex?
 - a. Probe on adolescent autonomy in making these decision
 - b. Probe on force sex

Consequences of RRP on depression among adolescents

13. In your opinion what are the consequences of RRP on an adolescents?
14. How does RRP affect the health of adolescents?
 - a. Have there been a change in your health after RRP?

- i. Describe to me the changes in your health after RRP?
 1. Probe on mood changes
 2. Probe on attitude to family members
 3. Probe on attitude to man responsible for the pregnancy
15. Can you share with me your experience of getting pregnant immediately after a previous pregnancy? (only for those with RRP)
 - a. What are the effects on RRP on your mental well-being
 - b. What are the effects of RRP on physical health
 - c. What are the effects on financial resources