

**SCHOOL-BASED SEXUAL AND REPRODUCTIVE HEALTH  
SERVICES FOR PREVENTION OF ADOLESCENT PREGNANCY  
IN HOIMA DISTRICT, UGANDA: CLUSTER RANDOMIZED  
CONTROLLED TRIAL**

**TRIAL RESULTS**

BY

**GLORIA KIRUNGI KASOZI**

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NKUMBA UNIVERSITY

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**Supervisors**

Prof. Dr. Miph Musoke Ph.D. (N.S.W)

Dr. Frank Pio Kiyangi (Ph.D)

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## **ABBREVIATIONS**

ASRH	Adolescent Sexual and Reproductive Health
CAO	Chief Administrative Officer
CONSORT	Consolidated Standards for Reporting Trials
CRCT	Cluster Randomized Controlled Trial
DEO	District Education Officer
DHO	District Health Officer
HBM	Health Belief Model
HIV	Human Immunodeficiency Virus
HIWA	HIV/Health Initiative in Work place Activity
IRB	Institutional Review Board
ITT	Intent to Treat
LDCs	Least Developed Countries
MoES	Ministry of Education and Sports
MOH	Ministry of Health
PRB	Population Reference Bureau
RCT	Randomized Controlled Trial
RMNCH	Reproductive Maternal Newborn and Child Health
SBHCs	School Based Health centres
SBSRH	School Based Sexual and Reproductive Health
SLT	Social Learning Theory
SPSS	Statistical Package for Social Sciences
SRH	Sexual and Reproductive Health
STIs	Sexually Transmitted Infections
UBOS	Uganda Bureau of Statistics
UDHS	Uganda Demographic Health Survey
UNCST	Uganda National Council for Science and Technology
UNFPA	United Nations Fund for Population Activities
UNICEF	United Nation's Children Fund
WHO	World Health Organization

## OPERATIONAL DEFINITIONS

Adolescent Fertility Rate	The number of births per 1,000 women ages 15 to 19 years
Adolescent Pregnancy	Any girl aged 10 – 19 years who has had a live birth or who is pregnant with their first child
Adolescent	An individual aged 10-19 years
Birth Rate	The annual number of births per 1,000 total population
Contraceptive Use	The percentage of currently married, in union or sexually active women of reproductive age (15-49 years) who are currently using any form of contraception. Modern methods include clinic and supply methods such as the pill, IUD, condom, and sterilization.
Cue to Action	The stimulus needed to trigger the decision-making process to accept a recommended health action, these are a form of incentives such as bangle with the printed message "stop adolescent pregnancy or reminder messages
Death Rate	The annual number of deaths per 1,000 total population
Early Sexual Debut	Having had first sexual intercourse at or before age 14 years
Infant Mortality Rate	The annual number of deaths of infants below one year per 1,000 live births. Decimals indicate national statistics reported as completely registered; those without are estimates from the sources cited above. Rates shown in italics are based upon fewer than 100 annual infant deaths and, as a result, are subject to considerable yearly variability; rates shown for such countries are averages for a multiple-year period.
Life Expectancy at Birth	The average number of years a newborn infant can expect to live under current mortality rates.
Maternal Mortality	Death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes
Maternal Mortality Rate	Number of women deaths associated with pregnancy and childbearing per 1,000 woman-years of exposure
Maternal Mortality Ratio	Number of maternal deaths per 100,000 live births
Older Adolescent	An individual aged 15-19 years.
Risky Sexual Behaviour	Refers to sexual behaviour that has a high probability of a person contracting sexually transmitted diseases, getting or making a female pregnant. These include unprotected intercourse and multiple sex partners.
Safe Sexual Behaviour	Refers to sexual behaviour that has a low probability of a person contracting sexually transmitted diseases, getting or making a

	female pregnant. These include protected intercourse and single sex partners.
Self-efficacy	Self-efficacy refers to an individual's belief in his or her capacity to execute behaviours necessary to produce specific performance attainments. Self-efficacy reflects confidence in the ability to exert control over one's own motivation, behaviour, and social environment.
Sex	A biological state of being male or female
Sexual Behaviour	A broad spectrum of behaviours in which humans display/demonstrate their sexuality such as sexual arousal, partnered sex (intercourse, oral sex, non-penetrative sex, etc.) that is engaged in periodically.
Sexual Debut	Having had first sexual intercourse
Sexuality	<del>is</del> The way people experience and express themselves sexually. This involves biological, erotic, physical, emotional, social, or spiritual feelings and behaviours.
Susceptibility	Likely or liable to be influenced or harmed by a particular thing.
Total Fertility Rate:	The average number of children a woman would have assuming that current age-specific birth rates remain constant throughout her childbearing years (usually considered to be ages 15 to 49).
Very Young Adolescent	An individual aged 10-14 years is referred to as a young adolescent or very young adolescent
Youths	An individual aged 20-24 years

## ABSTRACT

**Introduction:** The prevalence of adolescent pregnancy in Uganda has remained high at 25% for the last 10 years despite the numerous interventions that have been implemented by the Ministry of Health and other stakeholders. The purpose of this study therefore was to evaluate the effect of providing School Based Sexual and Reproductive Health services on prevention of adolescent pregnancy and sexual behaviour change among adolescent girls in school. In addition, the study sought to advance a suitable School Based SRH model for use in adolescent pregnancy prevention programs in Uganda and other developing countries.

**Methods:** The study used Cluster Randomized Controlled Trial (CRCT) design. Twenty secondary schools (clusters) were selected using cluster sampling and randomly allocated 1:1 into control or intervention group. A total of 1,182 girls aged 15-19 years were selected using simple random sampling, the average cluster size of the study was 60. The intervention group received tailored SRH information, in-school SRH services delivery and referral for a period of ten months. The control group received no intervention from the research team but had access to the existing public health facilities. Data was collected at baseline and end of study; descriptive statistics and inferential analysis was done as well as structural equation modeling using SPSS.

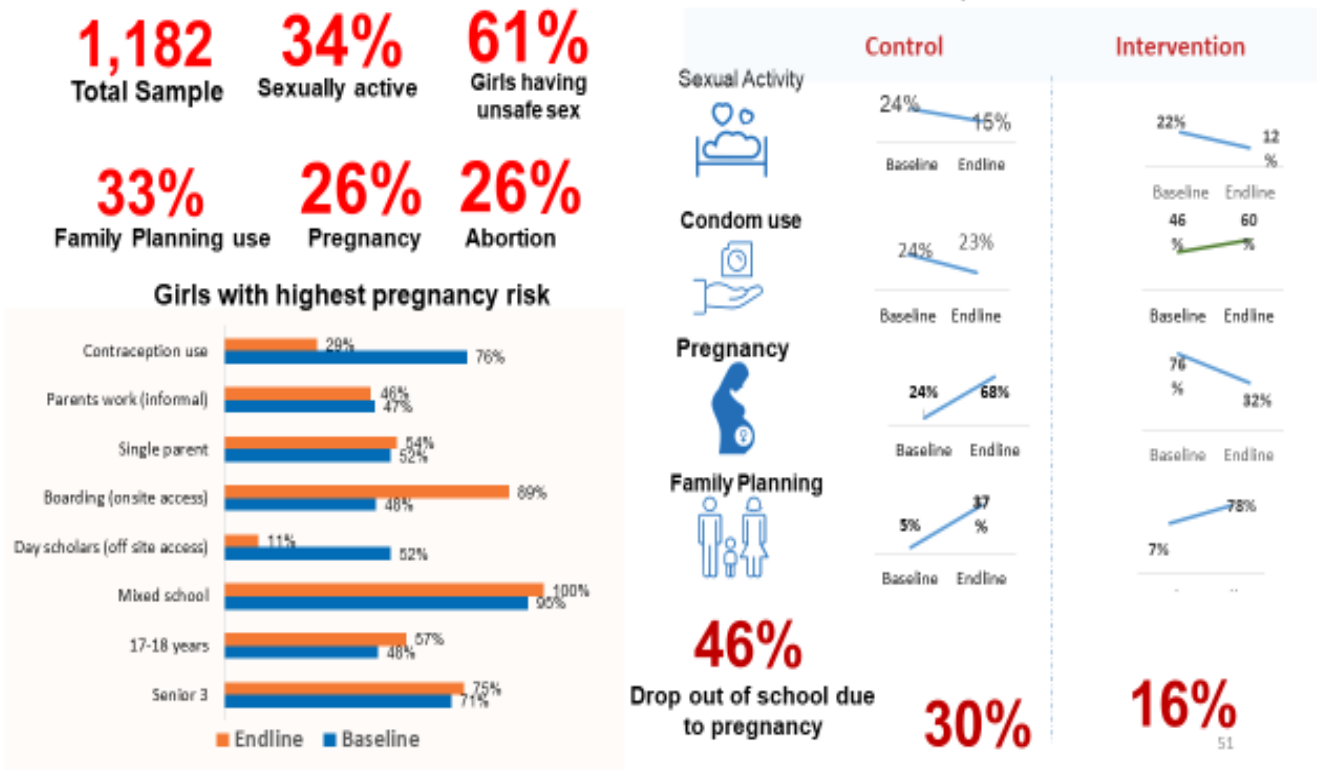
**Results:** Provision of School Based SRH services (OR= 41.52; 95% CI 17.07-100.99;  $p < 0.001$ ) had a statistically significant effect on the occurrence of adolescent pregnancy among school girls. Provision of School Based SRH services (OR= 0.29; 95% CI 0.11-0.73;  $p < 0.05$ ) had a statistically significant effect on the sexual behaviour among school girls in the intervention group. At bivariate level, the factors that influenced the utilization of SRH services (IV) were age of the school girls ( $\chi^2 = 8.980$ ,  $p < 0.05$ ) and parents' marital status ( $\chi^2 = 3.954$ ,  $p < 0.05$ ). The factors that predisposed the girls to adolescent pregnancy were Religion ( $\chi^2 = 6.231$ ,  $p < 0.05$ ), school resident category ( $\chi^2 = 5.090$ ,  $p < 0.05$ ), sexual behaviour ( $\chi^2 = 13.781$ ,  $p < 0.05$ ), ever had abortion ( $\chi^2 = 57.300$ ,  $p < 0.05$ ), ever been pregnant ( $\chi^2 = 31.531$ ,  $p < 0.05$ ) and ever using family planning ( $\chi^2 = 3.886$ ,  $p < 0.05$ ). Although location of SRH services was not statistically significant, the proportion of girls who utilized SRH services was higher (67%) in the intervention group compared to 25% in the control group. At multivariate level, the factors that were statistically associated with SRH utilization was age of the school girl (AOR=0.38; 95% CI 0.19-0.74;  $p < 0.05$ ). School section (day scholar or boarding section) category of the school girl (AOR= 4.093; 95% CI (1.156 – 14.497;  $p < 0.05$ ) and sexual behaviour of the school girls (AOR= 3.021; 95% CI (1.008 - 9.053;  $p < 0.05$ ) were strongly associated with adolescent pregnancy.

**Conclusion:** Provision of School Based SRH services is an effective intervention in the prevention of adolescent pregnancy among school girls. Establishment of school based SRH services and adoption of the Consensus Adolescent Pregnancy Prevention (CAPP) model in all adolescent pregnancy prevention programs would significantly contribute to the prevention of adolescent pregnancy in Uganda and the world.

GRAPHICAL SUMMARY

Effect of School-based SRH on Adolescent Pregnancy Trial

Comparison of indicators



## **SECTION ONE: INTRODUCTION**

### **1.1. INTRODUCTION**

Adolescent pregnancy has been widely and globally recognized as a huge public health problem in need of urgent and effective prevention measures. On the other hand, School-Based Sexual and Reproductive Health (SB-SRH) interventions are recognized as the most important and widespread ways to help adolescents to recognize and avert risks and improve their reproductive health (WHO, 2008). However, most school based interventions focus on provision of information excluding actual service delivery. This study therefore sought to provide both education and service delivery to enhance access and utilization of SRH services among school girls in Uganda for the prevention of adolescent pregnancy among school girls in school.

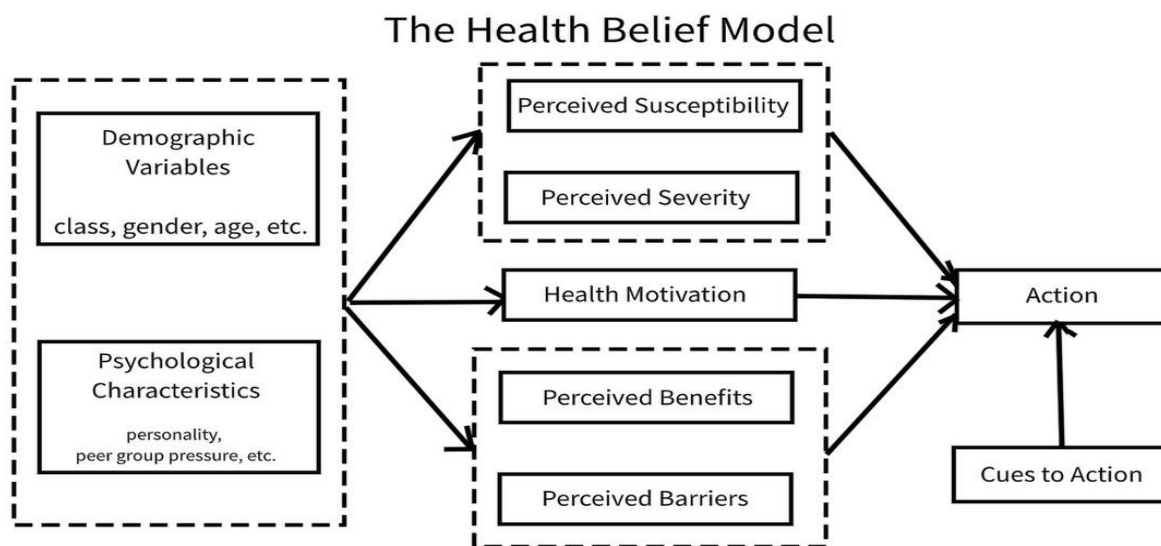
#### **Theoretical perspective**

A *priori* approach was used because the intervention was derived from existing theories without appealing to any individual experiences; the model was implemented and tested during the study. This study was hinged on several theories aimed at changing high risk sexual behavior consequently resulting in the prevention of adolescent pregnancy using the school-based sexual and reproductive health services. The theories included: Social Learning Theory (SLT) by Albert Bandura in 1963 which emphasized learning by observation; Trans-theoretical Model which was developed by James Prochaska and Carlo DiClemente in 1957/9 which explored the ways that people succeed in changing behavior; and the Health Belief Model (HBM) by Godfrey Hochbaum, Irwin Rosenstock and Stephen Kegels in 1950s, this model focused on change of health related behavior based on the anticipated negative consequences.

The study was however mainly hinged on the Health Belief Model (HBM) because of the application in health promotion and disease prevention programs. HBM is used to explain and predict individual changes in health behaviors particularly in regard to uptake of health services which is the gist of this study. HBM has been used widely in promotion of appropriate sexuality behavior, uptake of health services and health promotion hence HBM was considered the most appropriate model to inform this study on SRH services.

#### **Health Belief Model (HBM)**

The Health Belief model was developed in 1950s by Social psychologist Godfrey Hochbaum, Irwin Rosenstock and Stephen Kegels in response to the failure of a free tuberculosis health screening program (RECAPP, 2017). *Figure 01* shows the HBM Theoretical framework adapted from Becker (1974).



*Figure 1: HBM Theoretical framework*  
Adapted from Becker (1974).

In view of the above, this model was aimed at fully engaging the target person or audience in adopting behaviour based on the new knowledge acquired. The HBM was based on an assumption that a person would take a health-related action such as contraceptive use if that person (1) feels that a negative health condition (adolescent pregnancy) can be avoided, (2) has a positive expectation that by taking a recommended action (such as ASRH information and services), he/she would avoid a negative health condition (adolescent pregnancy) and (3) believes that he/she can successfully take a recommended health action comfortably and with confidence (Becker, 1974; Turner *et al.*, 2004). Therefore, the HBM was used to inform this study in designing programs that are aimed at motivating young girls to take positive health action (abstain or use condoms and contraceptives) to avoid negative health consequences (pregnancy).

#### **Application of the HBM in this study**

The study was based on an assumption that adolescent girls adopted Positive health actions (action) because the anticipated adolescent pregnancy (negative consequence) could be avoided by changing risky behaviour as a result of the utilization of the school based SRH information and services. The desire to prevent adolescent pregnancy may be considered as the motivating factor for adolescents to utilize SRH services so as to change behaviour positively. The positive health actions for this study were delaying first sexual debut, consistent use of condoms and use of contraceptives. Based on the six concepts of the Health Belief model, the theory of Change for this study is illustrated in *Figure 02* while *Table 1* shows the HBM conceptual construct of the study.

## THEORETICAL BACKGROUND: Theory of Change

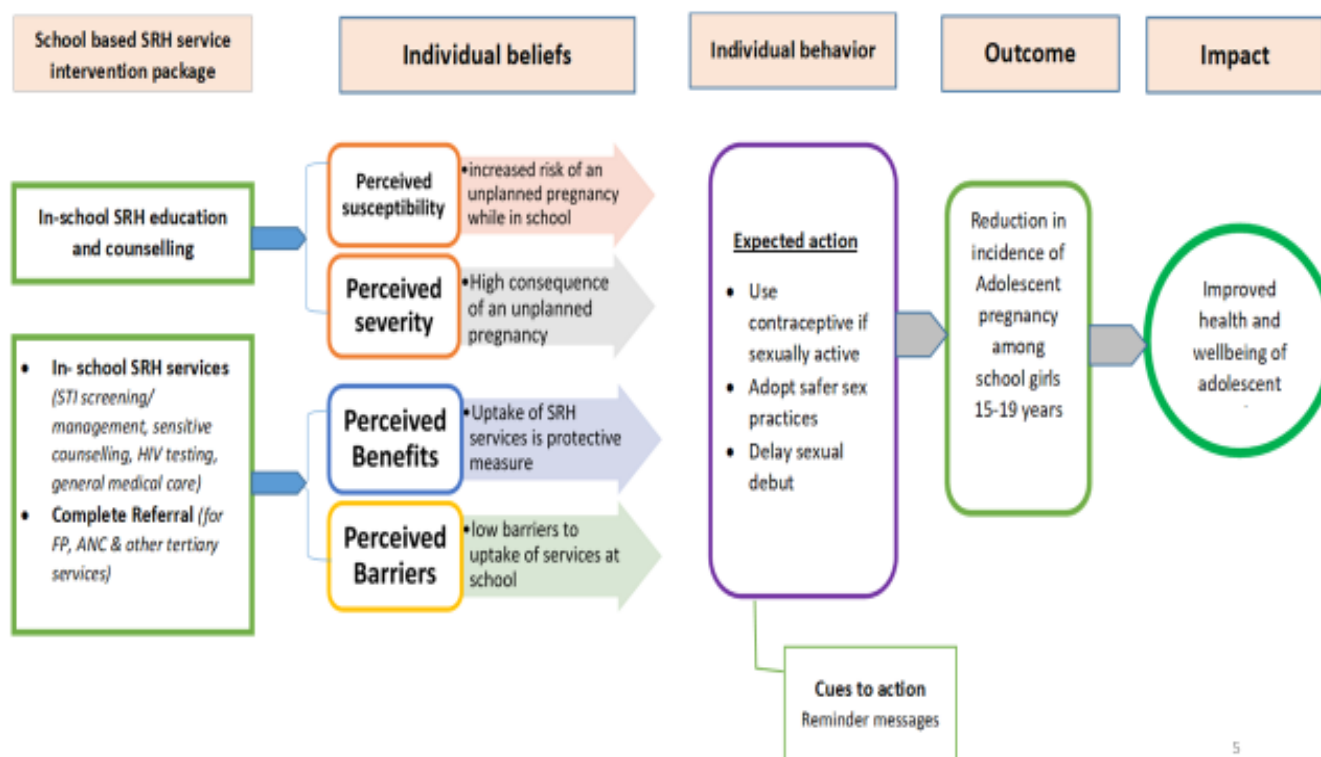


Figure 2: Theory of Change based on the HBM

Data source: Primary, 2019

### Contextual perspective

Uganda has consistently had high prevalence of adolescent pregnancy at 25 % for the last ten years compared to 18.8% in Sub Saharan Africa and 11.6% globally (Kassa, 2018). The prevalence has been coming down gradually but steadily: in 1995, it was 43%, in 2000-2001 it dropped to 31% (UBOS & ICF International, 2017), mainly because of the sexuality education program that was started in schools and community targeting young girls.

According to the Uganda Bureau of Statistics (UBOS & ICF International, 2012; UBOS & ICF International, 2017), one in every four teenage girls between 15 and 19 years is pregnant or has had their first child in Uganda. This indicates that of the 1.2 million pregnancies recorded annually, 25 per cent of these are teenage pregnancies and these are more than 300,000 adolescents who get unwanted pregnancies which end up in unintended births or abortion. According to the 2016 UDHS (UBOS & ICF International, 2017), about 14 per cent of young women and 16 per cent of young men had their first sexual encounter before the age of 15 while 57 per cent of young women had their first encounter before the age of 18. The 2016 Uganda Demographic Health survey (UBOS & ICF International, 2017) indicates that adolescent childbearing is more common in rural than in urban areas (27 versus 19 percent, respectively). Furthermore, there is regional variation, with Teso sub region having the highest proportion of adolescents who have begun childbearing and Kigezi sub region having the lowest (31

and 16 percent respectively). The top five sub regions in Uganda with the highest prevalence of adolescent pregnancy are Teso (31.4%), Tooro (30.3%), North central (30.3%), Bukedi (29.5%) and Bunyoro (29.0%) as reported in the UDHS (UBOS & ICF International, 2017). Bunyoro region is constituted by Masindi, Hoima, Buliisa, Kibaale and Kiryandongo Districts.

Bunyoro region continues to grapple with a higher percentage of adolescent pregnancies at 29% compared to the national level of 25% as identified in the 2016 UDHS conducted by UBOS and ICF International, (2017). Therefore, Hoima District is a representative area for high adolescent pregnancy in Uganda. This study focused on prevention of adolescent pregnancy by improving access and availability of sexual and reproductive health information and services to adolescent girls aged 15 to 19 years in selected secondary schools in Hoima District, Uganda.

## **1.2. PROBLEM STATEMENT**

The average percentage of adolescent pregnancy in developing countries is 19% compared to 16% in developed countries (UNFPA, 2013) and Uganda has 25% adolescent pregnancy. Therefore, Uganda has a problem of high adolescent pregnancy at 25% for the last 15 years. Many dynamics underlie this high prevalence of adolescent pregnancy in Uganda but this undesirable situation is potentially correctable through a number of carefully crafted interventions.

Bunyoro region has persistently had a high prevalence of pregnancy of 29% among girls 15-19 years of age, this is higher than the 25% national level. The Hoima District Health Information System (DHIS) shows that the District had an average of 23.5% (34,469/ 146,858) adolescent girls aged 10-19 years seeking antenatal care for a pregnancy and 23.3% (10,007/43,006) girls delivering babies between 2017 and 2019. (MOH-DHIS2, 2017-2019). The proportion of girls who get pregnant while at school or out of school is unknown in Hoima District and there is no disaggregation of data in the national health management information system.

In addition, 19% adolescent girls are sexually active and 57% of those who are sexually active do not use condoms which predisposes the girls to pregnancy (UBOS & ICF International, 2017). The level of SRH service utilization among adolescent is low (30%) which mainly results from the low (39.5%) access to SRH services. Research shows that majority of the population live outside the catchment area (5km or more) of the public health facilities and (UBOS & ICF International, 2017; Ivanova *et al*, 2019) in Bunyoro region, high costs for SRH charges and long waiting time at the health facilities have been sighted as key contributing factors to low SRH service utilization (Yakubu & Salisu, 2018; WHO, 2019; Restless development, 2012). Consequently, adolescent pregnancy complications still account for 17% of all pregnancy related mortality in Uganda and 25% are from unsafe abortions (MOH, 2011). This is a public health problem.

The Ugandan Ministry of Health (2017) has implemented three service delivery models for ASRH interventions: a) community based (outreach services): services and information are offered to

adolescents within the community settings; b) clinic based: services and information are offered to adolescent based at health facilities; and c) school based: information is offered to adolescents within the school setting. While adolescent out of school have access to multiple and comprehensive ASRH services at the public health facilities, the adolescents in school only have SRH information based on the 2017 MOE sexuality education framework. This therefore creates a gap in access to and utilization of SRH services among adolescents in school which may be a contributing factor to the persistent adolescent pregnancy in the country. In line with the WHO (2018) recommendations on the use of school based interventions to provide widespread ways and avenues for addressing SRH issues among adolescents, this study therefore sought to provide comprehensive SRH services in schools and to assess the effectiveness of the school based SRH services on prevention of adolescent pregnancy in Hoima District.

### **1.3. PURPOSE OF THE STUDY**

The purpose of the study was to evaluate the effect of providing School Based Sexual and Reproductive Health services on prevention of adolescent pregnancy and determine associated factors among school going adolescents aged 15-19 years in Hoima District.

The provision of SRH services on the school premises was aimed at removing the barriers to access of these services among sexually active adolescents and youths so as to enable timely access to and utilization of SRH services. The study sought to advance a suitable school based SRH model for use in adolescent pregnancy prevention programs in Uganda and other developing countries.

### **1.4. OBJECTIVES**

1. To investigate the effect of School Based SRH services provision on adolescent pregnancy among school girls' aged 15-19 years in Hoima District, Uganda.
2. To investigate the effect of School Based SRH services provision on sexual behaviour among school girls aged 15-19 years in Hoima District, Uganda
3. To determine the association between sexual behaviour and adolescent pregnancy among school girls aged 15-19 years in Hoima District, Uganda.
4. To examine the factors associated with utilization of SRH services and adolescent pregnancy among school girls aged 15-19 years in Hoima District, Uganda.

### **1.5. HYPOTHESIS**

#### **Hypothesis one**

**H<sub>0</sub>:** School Based SRH services provision has no effect on occurrence of pregnancy among school girls aged 15-19 years

**H<sub>1</sub>:** School Based SRH services provision has an effect on occurrence of pregnancy among school girls aged 15-19 years

**Hypothesis two**

**H<sub>0</sub>:** School Based SRH services provision has no effect on adolescent sexual behaviour among school girls aged 15-19 years

**H<sub>1</sub>:** School Based SRH services provision has an effect on adolescent sexual behaviour among school girls aged 15-19 years

**Hypothesis three**

**H<sub>0</sub>:** There is no associated between sexual behaviour and adolescent pregnancy among school girls aged 15-19 years

**H<sub>1</sub>:** There is an associated between sexual behaviour and adolescent pregnancy among school girls aged 15-19 years

**Hypothesis four**

**H<sub>0</sub>:** There are no factors associated with the utilization of school based SRH service and adolescent pregnancy among school girls aged 15-19 years

**H<sub>1</sub>:** There are factors associated with the utilization of school based SRH service and adolescent pregnancy among school girls aged 15-19 years

## **1.6. JUSTIFICATION**

To develop a framework for the introduction of comprehensive SRH services for adolescents in schools with the aim of addressing adolescent SRH health needs by identifying barriers to services, surveying the current state of SRH among adolescents and assessing how adolescents respond to specific forms of SRH interventions.

## **1.7. SCOPE OF THE STUDY**

The scope of the study addresses the geographical, content and time scope.

**Geographical scope**

The study was conducted in Hoima District found in Bunyoro region located western Uganda which is approximately 230 kilometers from Kampala. Hoima lies between longitudes 33° 48' E - 34° 18' E and latitudes 1° 38' N – 2° 20' N. Banyoro is the main ethnic group and Runyoro is the local language. According to the National Population and Housing Census (2014), Hoima District had a population of 572,986 (287,906 males & 285,080 females). The District has total geographical area of 5735.3 square kilometers and is bordered by Buliisa, Masindi, Kyankwanzi, Kibaale, Ntoroko Districts and Democratic Republic of Congo across Lake Albert.

**Content Scope**

The study sought to determine the effect of providing school based sexual and reproductive health information and services on the occurrence of adolescent pregnancy and other sexual behaviours among girls in school aged 15 to 19 years in Hoima District, Uganda. The research was based on the Health Belief Model theory that focused on uptake of an action to avoid a perceived negative outcome.

The intervention included the provision of on-site adolescent sexual and reproductive health services to adolescents 15-19 years old in secondary schools. This study used the concept of the School Based Health Clinics (SBHCs) which were conducted twice every week from 8am to 6pm to provide ample time for the students to access the services.

The ASRH services included behavioural change communication, health education, sensitive counseling, general medical care, STI screening and treatment and referral. Key variables of interest were utilization of the ASRH services, occurrence of pregnancy, sexual behaviour change, socio-demographic factors which together influence the key outcome –the occurrence of pregnancy among the adolescents.

### **Time scope**

The study focused on adolescent pregnancy in Uganda from 2006 to 2016, this is the period when Uganda has reported a high prevalence of adolescent pregnancy consistently for 10 years without any significant change in the prevalence despite the numerous interventions implemented during the period. UDHS reports over time indicate that Uganda had an adolescent pregnancy prevalence of 43% in 1995, 31% 2000-01, 25% in 2006, 24% in 2011 and the most recent 25% in 2016 (UBOS, 1995; UBOS & IMF, 2001; UBOS & ICF International, 2006; UBOS & ICF International, 2011; UBOS & ICF International, 2017). SRH service delivery and utilization among the adolescent girls during this period also critically informed the interventions of the study.

Data collection and the implementation of the intervention were conducted between October 2018 and September 2019. This time period was chosen to avoid interference with the National level examinations for the study participants who would be in candidate classes after 10 months of implementation. National level examinations are usually conducted between October and December of every year, therefore the girls who were in pre-candidates at the time of enrollment would be candidates at the time of final data collection. This ensured that final data collection was done before October 2019 to enable the girls to prepare intensively for the final examinations without any interference from the study obligations.

## **1.8. CONCEPTUAL FRAMEWORK**

The conceptual framework highlights the key independent (IV), dependent (DV), Mediating (MV) and Moderating (M) variables considered in this study. *Figure 3* shows the conceptual framework on school based SRH services for prevention of adolescent pregnancy among adolescent girls.

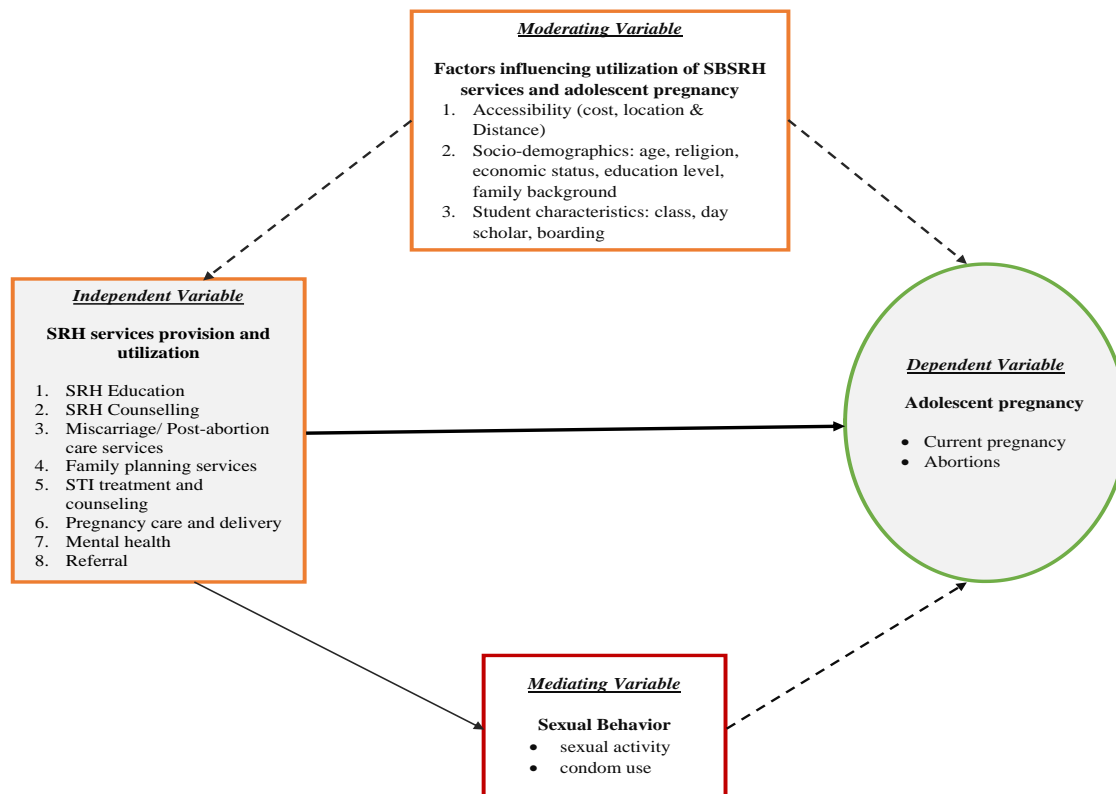


Figure 3: Conceptual framework on School Based SRH services for prevention of adolescent pregnancy among adolescent girls aged 15-19 years. Source: Primary data 2017

**The independent (Predictor) variable (IV)** is the SRH services and was measured by: (1) provision of comprehensive services which was directly linked to how many services the student received at the clinic; and (2) the level of utilizations of the services, this was determined by the use of at least one SRH service during the time of the study.

**The dependent (outcome) variable (DV)** is adolescent pregnancy which was measured based on the occurrence of adolescent pregnancy in terms of the girls who (1) report to be currently pregnant at the time of data collection and those who (2) report to have aborted within the period of the study. It was anticipated that the occurrence of adolescent pregnancy would be directly influenced by the level of utilization of services (IV).

#### The cause- effect relationship between the IV and DV

The IV of the study is SRH services (predictor) while the DV is adolescent pregnancy (outcome variable). Any manipulation or change in the IV (SRH services) influences the occurrence of adolescent pregnancy. In this study, the SRH services were changed from the usual public health facilities and brought within the school setting for the girls within the intervention arm to access easily at no cost hence the term ‘School based SRH services). Therefore, the relationship between SRH services as the cause of the effect in the occurrence of adolescent pregnancy explains the cause-effect link between the IV and DV.

However, the direct relationship between the IV and DV was moderated by the factors that influence the utilization of SRH services and adolescent pregnancy; and mediated by the sexual behaviour of the school girls.

**The moderating variables (MV)** are the factors influencing the utilization of school based SRH services (IV) and adolescent pregnancy (DV). This was measured by the proportion of participants who utilized the services and by the number of services participants utilized. A participant who received no service or less than three services was considered to be low utilization while those who received more than three services were considered to be high (comprehensive) SRH services. It was assumed that factors (MV) would influence the utilization of SRH services (IV) and adolescent pregnancy (DV) among the participants. However, the factors (moderating variable) are not caused by the IV so are termed as moderating variables.

**The mediating variable (M)** was considered to Sexual behaviour which was measured by condoms use at last sexual encounter and sexual activity within the previous ten months among the participants. Sexual behaviour is assumed to be a causal result of the independent variable (SRH service utilization) which then qualifies sexual behaviour to be termed as a mediating variable. The occurrence of adolescent pregnancy can be influenced by utilization of school based SRH services; however, sexual behaviour directly mediates the IV and DV.

With this conceptual framework, the study therefore sought to investigate these effectiveness of school based SRH services on adolescent pregnancy as a whole.

## SECTION TWO: RESEARCH METHODOLOGY

### 2.1. RESEARCH PHILOSOPHICAL POSITIONS

*Table 1* shows the summary of the philosophical position of the study to assess the effectiveness of providing school based sexual and reproductive health services on prevention of adolescent pregnancy.

*Table 1: Summary of Philosophical position of the study*

Paradigm	Approach	Ontology	Epistemology	Axiology	Strategy	Theory
Positivism	Deductive	Objective	Objective	Value – free	Quantitative	Priori
Post positivism	Deductive & Inductive	Objective & Subjective	Objective & Subjective	Value - free & Biased	Qualitative & Quantitative	Priori & Posteriori

*Primary source, 2018*

### 2.2. RESEARCH DESIGN

The study used an experimental research design and phenomenological approach to get quantitative and qualitative data respectively with triangulation of the methods.

The Cluster Randomized Controlled Trial (CRCT) design was used as a gold standard in conducting this evaluation research as recommended by Hayes and Bennet (1999). The nature of the study required provision of health services and hence it would be difficult to randomize some individuals in the same cluster (school) to either group because there would be too much shared knowledge and overlap of personnel. Therefore, a cluster randomized trial was used to minimize or prevent contamination among the cluster members. CRCT reflect real life service delivery, it is convenient and the intervention is better delivered in a group rather than individuals.

This design was chosen to maximize comparability between the intervention and control groups and it gives a strong evidence of a causal relationship between the intervention and the outcome (Campbell & Walters, 2014). Based on the above, CRCT studies are used for evaluation of health interventions that are implemented in communities or groups of people and are key in assessing the cause-effect relationships. The study was guided by the Consolidated Standards of Reporting Trials (CONSORT) guidelines (Campbell *et al.*, 2012) and guidelines from Campbell and Walters (2014) throughout the study proposal development, implementation and reporting of this clinical trial.

The unit of randomization was at cluster level. The 20 cluster (eligible schools) were randomly allocated to either the intervention (10 schools) or the control (10 schools) arms of the study at a ratio of 1:1.

The CRCT research approach has profound effect on the researcher's capacity to determine whether a cause-effect relationship exists between the control and intervention arms of the study (Campbell & Walters, 2014). This means that the research triangulated the occurrence of pregnancy and sexual behaviour among the adolescent girls in both the intervention and control groups of the study. The study was descriptive, comparative and correlational in nature.

Campbell and Walters (2014) stated that the manipulation of the independent variable causes a measureable change in the dependent variable. Therefore, this study sought to use this design to manipulate the independent variable (SBSRH services) to cause change in the dependent variables (adolescent pregnancy-incidence of pregnancy, sexual behavioural change and service utilization). This was done by introducing the intervention (SBSRH services) to the intervention group only and the change was compared to the control group which did not receive any intervention. The study was randomized in clusters and allocated to either the control or the intervention group of the study.

This study in particular was focused on clusters of schools and the adolescent girls there in hence the specific design called the CRCT design. This was selected because individual randomization is impossible in a community setting. Additionally, the design was particularly effective in preventing contamination between individuals assigned to different treatments (intervention and control groups).

### **Blinding**

**Double blinding** was done to prevent systematic biases stemming from foreknowledge of group allocations among the participants and research aim outcomes as per RCT study standards (Campbell & Walters, 2014). Blinding was done through the following:

- a. The provision of the SRH package (experimental package) was provided by professional skilled health worker in the intervention group while the control group had the already existing sexuality education by the senior teacher at school which acted as the identical control package for the control group as recommended by Karanickolas *et al.* (2010) and Schulz & Grimes (2002).
- b. Pre-determined information such as research hypothesis was concealed from the participants, data collectors and cluster heads (such as head teachers, teachers and matrons) so as to prevent biases at all levels of the research.
- c. Data collectors were not aware of the study arm in which the different clusters belonged to.

In order to avoid misleading biases, the study used the Intent To Treat (ITT) approach for analysis. Every participant allocated to a treatment group was considered to be part of the trial. ITT was used in an attempt to avoid potential bias and identify the true effect of the intervention.

The research also used a pre-test-post-test control group approach (Aparasu, 2011). This is where pre-intervention (baseline) measures on the prevalence of pregnancy were conducted to allow for explicit evaluation of the pre-to-post changes. Additionally, this design was also used to control for threats on the internal validity (Aparasu, 2011). Based on the above, baseline data was collected from the study participants before the intervention in the selected schools.

***Qualitative research design:*** The study employed qualitative descriptive phenomenological design. This approach was an inductive and subjective way of gaining social insight about the occurrence and drivers of adolescent pregnancy (Holloway & Wheeler, 2002). Phenomenological design was used to provide a rich description of the lived human experience which informed the social aspects of adolescent pregnancy.

## **2.3. VARIABLES**

### ***Dependent variable***

The dependent variable (DV) is the outcome variable, therefore the outcome changes depending on the predictor variable (IV). In this study, the DV was Adolescent pregnancy. This means that the occurrence of adolescent pregnancy (effect) among the study population was dependent on the provision of SRH services (cause).

Adolescent pregnancy was measured as occurrence of adolescent pregnancy among the girls aged 15-19 years of age. A pregnancy was considered to have occurred when the girl reported to;

1. Be currently pregnant at the time of data collection
2. Have aborted during the previous ten months prior to data collection

### ***Independent variable***

SRH services: These were considered in terms of provision of comprehensive services and utilization of the services by the participants. The services included; (1) SRH Education; (2) SRH counselling; (3) miscarriage/post-abortion care services; (4) family planning services; (5) STI treatment and counseling; (6) pregnancy care and delivery; (7) mental health; and (8) referral.

Provision of School Based SRH services was measured based on the number of services the school girls received;

1. Less services: when a girl reported not to have used any services or received less than three services during the study time or 10 months prior to data collection
2. Comprehensive services: when a girl reported to have received more than three services during the study time prior to data collection

Utilization of school based SRH services was measured by the use of at least one service by the school girl.

### ***Moderating variables***

Factors influencing utilization of school based SRH services and adolescent pregnancy;

- availability of SRH services: type of services, referral pathway, knowledge about the services
- accessibility of SRH services in terms of location (within or near school premises), cost of the services and distance to the SRH clinic
- Socio-demographic factors: age, religion, nationality, parental characteristics, socio-economic status, education level, school type.

## Mediating variable

The mediating variable was Sexual behaviour of the participants. This was considered to be either safe or risky sexual behaviour by the level of sexual activity and condom use. The categorization was considered as follows:

- Safe sexual behaviour: condom use at the last sexual activity or no sexual activity during the last ten months of the study prior to data collection
- Risky sexual behaviour: no condom use at the last sexual activity and or sexual activity during the last ten months of the study prior to data collection

## 2.4. STUDY AREA

The study was conducted in Bunyoro region and is constituted by Masindi, Hoima, Buliisa, Kibaale and Kiryandongo Districts. The region is bordered by West Nile, Lango, North Central regions as indicated by the 2016 UDHS (UBOS & ICF International, 2017). Bunyoro region was randomly chosen out of the top five regions in Uganda with a high percentage of adolescent pregnancies. The top five sub regions in Uganda with the highest prevalence of adolescent pregnancy are Teso (31.4%), Tooro (30.3%), North central (30.3%), Bukedi (29.5%) and Bunyoro (29.0%) as reported in the UDHS (UBOS and ICF International, 2017).

**Location:** Hoima District was also randomly chosen from among the five districts that make up Bunyoro region at the time of the study. The district is located in Mid-western Uganda, approximately 230 kilometers from Kampala. The geographical coordinates of Hoima District are given by longitudes 33° 48' E - 34° 18' E and latitudes 1° 38' N – 2° 20' N.

At the time of the study, the district had a total geographical area of 5735.3 square kilometers. Hoima is bordered by Buliisa District to the north, Masindi District to the northeast, Kyankwanzi District in the east, Kibaale District to the south, Ntoroko District to the southwest and Democratic Republic of the Congo across Lake Albert to the west as shown in *Figure 04*.

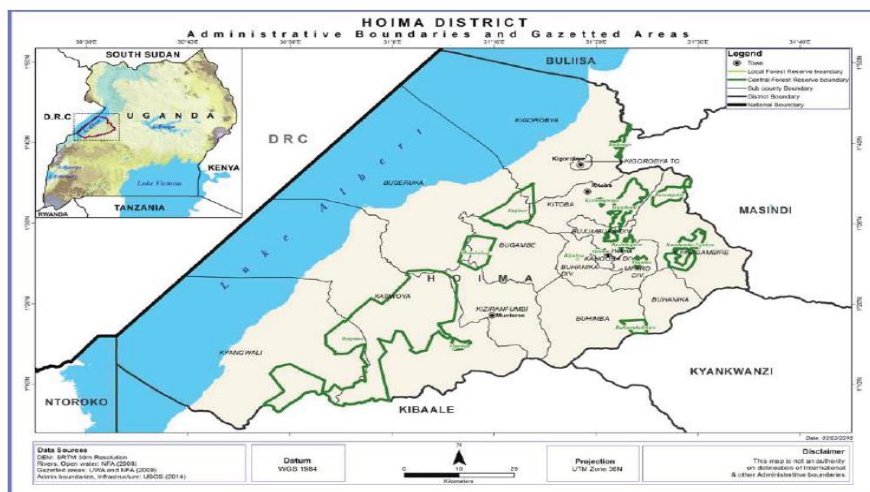


Figure 4: Map showing administrative boundaries and gazetted area of Hoima District, MDPR, 2016

At the time of the study, Hoima District was divided into four counties namely are Kigorobyia, Bugahya, Buhaguzi and Hoima town council. In addition, the district had 10 sub counties (Buhanika, Buseruka, Kigorobyia, Kitoba, Kyabigambire, Bugambe, Buhimba, Kabwoya, Kiziranfumbi and Kyangwali), 1 town council (Kigorobyia town council), 1 municipality (Hoima Municipality), 54 parishes and 681 villages. The 4 divisions in Hoima Municipality include: Bujumbura, Busiisi, Kahooru and Mpuro.

**Physiography/ Geomorphology:** The topography of Hoima District is part of the dissected African surface characterized by broad, flat -topped ridges of about 1,000 m to 1,100 m in height, whose formation is given as upper Cretaceous (65 - 135 million years ago). The surface rises to a plateau, which ranges between 600 m and 800 m above sea level. Therefore, the district can be divided into three main topographic zones namely:

- (1) *Dissected plateau:* This is the most dominant landscape in the district characterized by topography which is either flat topped and capped with lateritic duricrust or rounded and deeply weathered.
- (2) *Escarpment stretch:* This zone covers a watershed running throughout its length approximately parallel to Lake Albert from Kyangwali through Buseruka to Kigorobyia sub-counties and has been affected by rift valley faulting. The topography is deeply incised by streams and rivers. A typical example is River Wambabya flowing off the escarpment.
- (3) *The Rift Valley:* The area lying in the rift valley is occupied by Lake Albert. This is represented by early Pleistocene or Acholi surface. It is essentially a flat area of sand beaches with gradients of less than 1 percent. The rift valley is one of the most important topographical features that influence environmental processes in Hoima District. The topography of the rift valley has presented problems mainly associated with soil erosion, scarcity of land for farming and settlement. However, some parts of the district are characterized by gentle undulating hills like those found in the western part of the district. The terrain drops sharply on the rift valley escarpment to form wide valleys often occupied by wetlands (MDPR, 2016).

**Soils:** According to the report by Ministry of Disaster Preparedness and Refugees (2016), Hoima's soils are ferralitic and generally acidic. The soils are typically loam and deep on the valley slopes but tend to be shallower on the upper slopes. The water table is high with soils frequently water logged. The soils of Hoima are defined by a number of parameters, which include parent rock, age of soil and climate.

**Population:** Hoima District has the Banyoro as the main ethnic group and Runyakitara was the local language at the time of the study. According to the recent National Population and Housing Census conducted by the Uganda Bureau of statistics (2017), Hoima District had a population of 572,986 (287,906 males & 285,080 females).

**Economic activities:** Majority of the population in Hoima District (75 – 78%) engages in subsistence agriculture where cultivation of crops such as bananas, maize, beans, soya beans, cocoa, coffee, sim sim, cassava, groundnuts and sweet potatoes is dominant. However, crops such as cotton, tea, tobacco, sugarcane and rice are grown on a large scale for commercial purposes. A considerable number of the

households practice livestock production and the animals reared are cattle, goats, sheep, pigs and chicken. There is minimal fishing along Lake Albert, the thriving oil industry and small scale trade.

**Secondary schools:** The district had a total of 36 registered secondary schools at the time of the study and only 20 clusters (schools) were randomly selected to participate in the study.

### **Reasons for selection of study area**

- Hoima is located in Bunyoro region which is among the top five regions with the highest adolescent pregnancy in Uganda: Teso (31.4%), Tooro (30.3%), North central (30.3%), Bukedi (29.5%), Bunyoro (29.0%)
- Hoima has a thriving oil and agricultural sector.
- There is a high influx of migrants, growing economy, which increases exposure and vulnerability of the adolescents to unsafe sexual practices.

## **2.5. STUDY POPULATION**

Population is defined as the total number of potential units for observation; or an entire group of people, objects, or events having at least one variable (Burns, 1997). The Nkumba University PhD guidelines (2015) describe study population as the people, objects and events from which the study sample is drawn.

### **Target population**

Target population was estimated from a total of 136,813 adolescents (10-19 years) to be 10,119 adolescent girls within the age bracket of 10-19 years that were reported to be attending secondary school in the District (UBOS and ICF International, 2017). There was no further age disaggregation in the census report.

The target population was derived from the total population of adolescents in Hoima District which was estimated to be 136,813 (68,260 males and 68,553 females) adolescents aged 10-19 years as per the 2014 National population and housing census conducted by the Uganda Bureau of Statistics (2017). Out of the 136, 813 adolescents aged 10-19 years, only 20,382 (10,263 males and 10,119 females) adolescents aged 10-19 years were reported to be attending secondary school in Hoima District by December 2017.

### **Accessible population**

The accessible population was 1,992 adolescent girls attending school at the 20 selected secondary schools in Hoima District at the time of data of the study. Data was based on the individual school enrollment for adolescent girls aged 15 to 19 years.

## Study participants

The study population was 1,182 eligible adolescent girls aged 15-19 years who were attending the 20 selected secondary schools in Hoima District and formally consented, assented or their parents/guardians consented on behalf of the girls below 18 years to participate in the study.

## Reason for selection of adolescent girls aged 15-19 years as study participants

- Policy and standards: Adolescent girls aged 15- 19 years were chosen as the study population because they are considered as adolescents (UNFPA, 2013) and are eligible to access SRH services in Uganda as per the Reproductive Maternal Newborn and Child health sharpened plan of Uganda (2015) and Health policy (2018).
- The National Adolescent Health Policy, Guidelines and Service Standards 2012 and Global Standards for Quality Health-Care Services for Adolescents 2015 of Uganda categorize adolescents in 3 groups namely: (1) 10-14 years as young adolescents; (2) 15-19 years as older adolescents; and (3) 20-24 years as youth. This study focused on category two, 15-19 years who are the older adolescents.
- Existing literature: The existing literature specially the UDHS 2016, defines adolescent pregnancy as '*Percentage of women age 15-19 who have had a live birth or who are pregnant with their first child, and percentage who have begun childbearing*', very minimal data is found on young adolescents below 15 years, therefore the basis for the study would be scanty if the category of 10-14 years was to be considered.

## Qualitative study population

The estimated target population for the qualitative data collection was 130 participants and included; parents of adolescent girls in school, district officials, school leadership, adolescent boys, local council leadership, axillary school staff, health workers and religious leaders as indicated in *Table 2*

*Table 2: Target population for qualitative data collection*

Category of respondents	No. at which saturation point was reached	Sampling techniques
Adolescent boys in school	6	Purposive sampling
School staff (matron, head teacher, deputy head teachers, teachers)	9	Purposive sampling
District staff ( CAO, DHO, ADHO-Adolescent health, health worker)	2	Purposive sampling
Opinion leaders (religious leaders, police officer, LC1 leaders)	3	Purposive sampling
Parents of adolescent girls in school	1	Purposive sampling
Adolescent girl (dropped out of school due to pregnancy)	1	Purposive sampling

*Primary source, 2019*

All samples were based on Creswell (1998) guidance that 5-25 individuals are adequate sample for qualitative studies.

## 2.6. INCLUSION AND EXCLUSION CRITERIA

### Inclusion

- i. Girls aged 15 to 19 completed years at the time of the study. This age group was included because they are considered as older adolescents National Adolescent Health Policy of MOH (MOH, 2012) hence eligible to access and receive comprehensive SRH services in line with the study.
- ii. Currently in secondary school in Hoima District because it was assumed that girls there were no girls aged 15 – 19 years in primary schools.
- iii. Schools either enrolling both sexes or those enrolling girls only (single sex) schools because girls were the primary study population.
- iv. Ability to read and write English language
- v. Formal informed consent form signed by the parent or guardian for girls aged 15-17 years
- vi. Formal informed assent form signed by girls aged 18 and 19 years

### Exclusion

- i. Girls below 15 years completed years at the time of study. The girls aged below 15 years were not considered because they are considered as ‘young adolescents; in the National Adolescent Health Policy of MOH (MOH, 2012) therefore are ineligible to access comprehensive SRH services including contraceptives.
- ii. Girls above 19 years at the time of the study. The girls aged above 19 years were not considered because they are considered as ‘youths’; in the National Adolescent Health Policy of MOH (MOH, 2012).
- iii. Girls who are unable to read and write English language
- iv. Girls with no formal informed consent from parent/guardian and herself

## 2.7. SAMPLE SIZE

### Sample size calculation for quantitative data

The sample size was calculated using the formula cited by Campbell and Walters (2014) for comparing differences in prevalence and or proportions between two groups and determining the number of subjects per group  $n_{\text{Individual\_Binary}}$  for a two-sided significance level  $\alpha$  and power  $1-\beta$

$$n_{\text{Individual\_Binary}} = \frac{(Z_{1-\alpha/2} + Z_{1-\beta})^2 [\pi_T (1 - \pi_T) + \pi_C (1 - \pi_C)]}{(\pi_T - \pi_C)^2}$$

### Considerations

- $\pi_T$  = Proportion of pregnant girls in group 1 approx. 29% (0.29). This is the current pregnancy prevalence in Bunyoro region (29%)
- $\pi_C$  = Proportion of pregnant girls in group 2 approx. 22.4% (0.224), this is the expected reduction in prevalence of adolescent pregnancy after the intervention. According to the 2016 UDHS (UBOS & ICF International, 2017), Bunyoro region is bordered by 3 major regions with varying adolescent prevalence that include Lango

(27.9%), North central (30.3%) and West Nile (22.4%). The prevalence of 22.4% was considered desirable because it is the lowest among the regions bordering Bunyoro region hence it was considered to be an attainable prevalence.

Effect size	=	10% [ $\delta_{\text{Binary}} = (\pi_T - \pi_C)$ ] which is 0.1
$\alpha$	=	0.05 (two-sided)
$\beta$	=	0.2
$Z_{\alpha/2}$	=	Desired significance level at 5% (1.96)
$Z_{1-\beta}$	=	Desired power at 80% (0.842)
Type of test	=	2 sided

Relative Risk Reduction is the target difference in event prevalence between two groups =6.6% (difference between desired prevalence of 22.4% and the current prevalence of adolescent pregnancy of 29%)

**Step one:** Formula for determining the number of subjects per group  $n_{\text{Individual\_Binary}}$  for a two-sided significance level  $\alpha$  and power  $1-\beta$

$$\begin{aligned}
 n_{\text{Individual\_Binary}} &= \frac{(Z_{1-\alpha/2} + Z_{1-\beta})^2 2[\pi_T(1 - \pi_T) + \pi_C(1 - \pi_C)]}{(\pi_T - \pi_C)^2} \\
 &= \frac{(1.96 + 0.842)^2 [0.29(1 - 0.29) + 0.224(1 - 0.224)]}{(0.29 - 0.224)^2} \\
 &= (2.802)^2 [0.2059 + 0.173824] \\
 &= (7.851 \times 0.3797) / 0.0044 \\
 &= 677.5 \\
 &\textbf{~678 individuals for the entire study} \\
 &\textbf{~339 individuals for each of the study arm}
 \end{aligned}$$

**Step two:** In order to adjust for the clustering effect, the sample size ( $n_{\text{Individual\_Binary}}$ ) was inflated by a Design Effect (DE) to get an adjusted sample size ( $n_{\text{Cluster\_Binary}}$ ) (Campbell and Walters, 2014). Therefore, to determine the adjusted sample size per study group ( $n_{\text{Cluster\_Binary}}$ ) for a Cluster Randomized Controlled Trial (cRCT), with a binary outcome, the sample size for individuals was multiplied by Design Effect (DE).

$$\begin{aligned}
 n_{\text{Cluster\_Binary}} &= n_{\text{Individual\_Binary}} \times \text{Design effect} \\
 n_{\text{Cluster\_Binary}} &= n_{\text{Individual\_Binary}} \times [1 + (m-1) \rho]
 \end{aligned}$$

Where  $m$  is the fixed cluster size and  $\rho$  is the Intra-cluster correlation coefficient (ICC). ICC is the ratio of the between-cluster variance to the total variance of an outcome variance and quantifies the correlation between the outcomes of any two individuals within the same cluster (Campbell and Walters, 2014). Since there was no previously published data/study in Uganda documenting the ICC, an ICC of 0.01 was considered because it is within the recommended inter-quantile range ICC (0.011-0.094) for previously undocumented ICC. Campbell and Walters (2014) recommend a minimum cluster size of 50 subjects per cluster to cater for secondary outcomes, therefore, the fixed cluster size of 60 individuals was considered for this study.

$$n_{\text{Cluster\_Binary}} = n_{\text{Individual\_Binary}} \times \text{Design effect}$$

$$n_{\text{Cluster\_Binary}} = n_{\text{Individual\_Binary}} \times [1 + (m-1)]$$

$$= 339 \times [1 + (60-1) \times 0.01]$$

$$= 539.01$$

~ 539 adolescent girls per study arm

= 539\*2 (multiplied by 2 because the study had 2 study arms)

**=1,078 individuals for the entire study (539 per study arm)**

The final total sample size (1,078) was increased by 10 % to **1,186** participants to cater for a non-response insurance factor of 10% (Magnani, 1999). The final calculated sample size was 1,186 adolescent girls.

The actual sample size realized during the study was 1,182 out of the required 1,186 girls representing 99.7% enrollment of the participants in the study. Only participants who met the eligibility criteria and formally consented were included in the study.

### Number of clusters

The minimum number of units to be able to achieve a 5% level of significance was four per arm assuming normality for the cluster level responses and the use of non-parametric test, Mann–Whitney *U*-test (Campbell *et al.*, 2007; Hayes & Moulton, 2009). Campbell (2007) further states that with three units per arm, it is within the bounds of chance that the outcomes in the three treatment arms are all greater than the outcomes in the three control arms, but with four per arm, this is unlikely to happen by chance more than 1 in 20 times. Therefore, the minimum number of clusters is four per arm (eight in total) for an unmatched design or six matched pairs for a matched design.

### To determine number of clusters needed (n\_cluster)

$$n_{\text{cluster}} = \text{Total number of participants in the two groups} / \text{fixed cluster size}$$

$$= (n_{\text{Cluster\_Binary}} \times 2) / m$$

$$= 1,186 / 60$$

$$= 19.8$$

**~20 clusters**

In order to have the same number of clusters per arm, the number of clusters is increased to the nearest upper even number which is 20 in this study. Therefore, the study had a total of 20 clusters, 10 clusters were randomized to the intervention and 10 clusters were randomized to control group as shown in *Table 3*.

*Table 3: The names and study codes of the selected school clusters*

No	School code	Name of Secondary School (SS)	Study arm of school	Eligible/ accessible girls 15-19 years	Eligible sampled participants who consented to participate in the study
1	IPE	St Peter's High SS	Intervention	110	100
2	IBW	Bwikya SS	Intervention	110	72
3	IDU	Duhaga SS	Intervention	70	20
4	IMA	Mandela Annex SS	Intervention	190	60
5	IKI	Kitara SS	Intervention	135	76
6	IDA	Day Star SS	Intervention	180	52
7	IJA	St. James SS	Intervention	190	100
8	IPR	Primier SS	Intervention	180	78
9	IMD	Mandela SS	Intervention	190	114
10	IBH	Buhanika Seed SS	Intervention	70	51
11	CAN	St. Andrews Kitoba SS	Control	80	33
12	CCB	St Cyprian's Butema SS	Control	60	54
13	CGA	Bugambe SS	Control	75	54
14	CKH	Kings High SS	Control	82	55
15	CSL	Bwikya Islamic SS	Control	55	45
16	CST	Strive SS	Control	70	61
17	CBU	Buhimba SS	Control	73	23
18	CDE	Destiny SS	Control	85	62
19	CBS	Buseruka SS	Control	47	36
20	CMS	Morning Star Christian SS	Control	50	36
	<b>TOTAL</b>			<b>1992</b>	<b>1182</b>

*Data source: Primary data, 2018*

The total number of participants who were sampled to take part in the study was 1,992; however, only 1,182 participants assented and or consented to participate in the study in the 20 schools. Therefore, 1,182 participants represent 99.7% enrolment against the actual calculated sample size of 1,186 participants. The average cluster size was 60 participants; this was greatly influenced by the number of eligible participants in the cluster and the willingness of the participants to take part in the study.

### **Sample size determination for qualitative data**

The sample size was determined using the theoretical saturation method (Creswell, 1998; Glaser, 1965; Morse, 1994; Fugard, & Potts, 2015) which states that saturation occurs when adding more participants to the study does not result in additional perspective or information.

Creswell (1998) recommends sample size of 5-25 participants which was used by health workers (Doctors and nurses). Glaser and Strauss (1967) recommend the concept of saturation for achieving an

appropriate sample size in qualitative studies. Several studies reported saturation after as few as 6 interviews (Isman *et al.*, 2013) while another study recommended 12 interviews (Guest *et al.*, 2006). In this study, sampling continued until when the point of saturation occurred, that is when participants did not mention any new subjects or facts and repeated information was received. The point of saturation for this study occurred at 16 participants, additional participants did not mention any new facts to inform the study.

## **2.8. SAMPLING PROCEDURE**

This section illustrates the techniques used to select the participants for quantitative and qualitative data collection.

### **2.8.1. Sampling of participants for quantitative data collection**

The study used multi-stage sampling technique to select the study population. At the time of study, the District had 36 registered secondary schools in four counties. The cluster was the unit of randomization in this study so as to ensure that any baseline differences in group characteristics are purely as a result of chance rather than systematic bias.

#### **Selection of schools (clusters)**

Clusters of adolescent girls attending secondary school who are representing the target population were identified and included in the sample (Jackson, 2011). This was used to increase the level of efficiency of sampling and each cluster was considered as a sampling unit.

In this study, the clusters were secondary schools registered and operational in Hoima District at the time of the study. The list of all the 36 clusters (schools) was generated from the District Education Office and the selection of schools was done in two steps namely;

#### **Step one**

The screening for eligibility of the schools to participate in the study was determined based on two parameters below;

- a) The school must have an enrolment of girls 15-19 years at 10 girls or more
- b) The school should have a senior woman teacher to provide SRH education

Out of 36 registered schools in Hoima District, seven (7) representing 19% (7/36) did not meet the step one eligibility screening to participate in the study (*Table 04*), therefore the ineligible schools were excluded from the study.

Table 4: Number of schools that were eligible to participate in the study

Name of Sub county	No. of registered schools	<10 girls enrolment	No senior woman teacher	Total ineligible schools	Total eligible schools
Kyabigambire	4	1	1	2	2
Kitoba	1	0	0	0	1
Hoima Municipality	19	1	3	4	15
Buhanika	1	0	0	0	1
Buseruka	1	0	0	0	1
Mparo	4	0	0	0	4
Kahoora	6	1	0	1	5
<b>Total</b>	<b>36</b>	<b>2</b>	<b>2</b>	<b>7</b>	<b>29</b>

Data source: Primary data, 2019

Out of the 36 secondary school in Hoima District, 20 schools were eligible and provided formal approval for the study to be conducted in the schools while 16 schools were not included in the study (whereby 7- ineligible and 9- declined to provide formal permission).

### Step two:

Out of the 29 schools that were eligible to participate in the study, permission was sought from all of them using the census method to determine the willingness of the school leadership to participate in the study by providing formal permission or approval. However, only 20 schools provided formal consent in form of approval to participate in the study (Table 05).

Table 5: Number of schools that provided formal approval to participate in the study

Name of Sub county	Eligible Schools where permission was sought	Schools that Declined					Schools that accepted
		Lack of authority	Fear of implications of SRH services in school	Fear to interrupt school activities	Religious affiliation	Total	
Kyabigambire	2	1	1	0	0	2	0
Kitoba	1	0	0	0	0	0	1
Hoima Municipality	15	2	1	1	1	5	10
Buhanika	1	0	0	0	0	0	1
Buseruka	1	0	0	0	0	0	1
Mparo	4	0	0	0	0	0	4
Kahoora	5	1	1	0	0	2	3
<b>Total</b>	<b>29</b>	<b>4</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>9</b>	<b>20</b>
<b>%</b>		<b>44</b>	<b>33</b>	<b>11</b>	<b>11</b>		

Data source: primary data, 2018

Out of the nine (9) schools that declined to provided permission to conduct the study in the schools,

- a) 44% (4/9) lacked managerial authority by the school head teacher to provide permission for the study to be conducted in the school. Head teachers confirmed that the proprietor or the school board of directors undertakes such decisions.
- b) 33% (3/9) feared the negative implications of having SRH services provided at the school premises, this was coupled by a common lack of understanding of SRH package in Uganda for the adolescents
- c) 11% (1/9) declined because of religious affiliation to the catholic faith.
- d) 11% (1/9) feared that the study activities were likely to disrupt the regular school programs

### **Allocation of clusters: simple random sampling**

The allocation of schools (clusters) to either the intervention and control groups was randomly conducted. After selection of the 20 schools, 10 schools were randomly allocated to the intervention group and the other 10 were allocated to the control group.

The names of all the 20 schools were written on small pieces of paper and placed in a container, then 10 schools were randomly picked from the container and allocated to the control group and the rest allocated to intervention group.

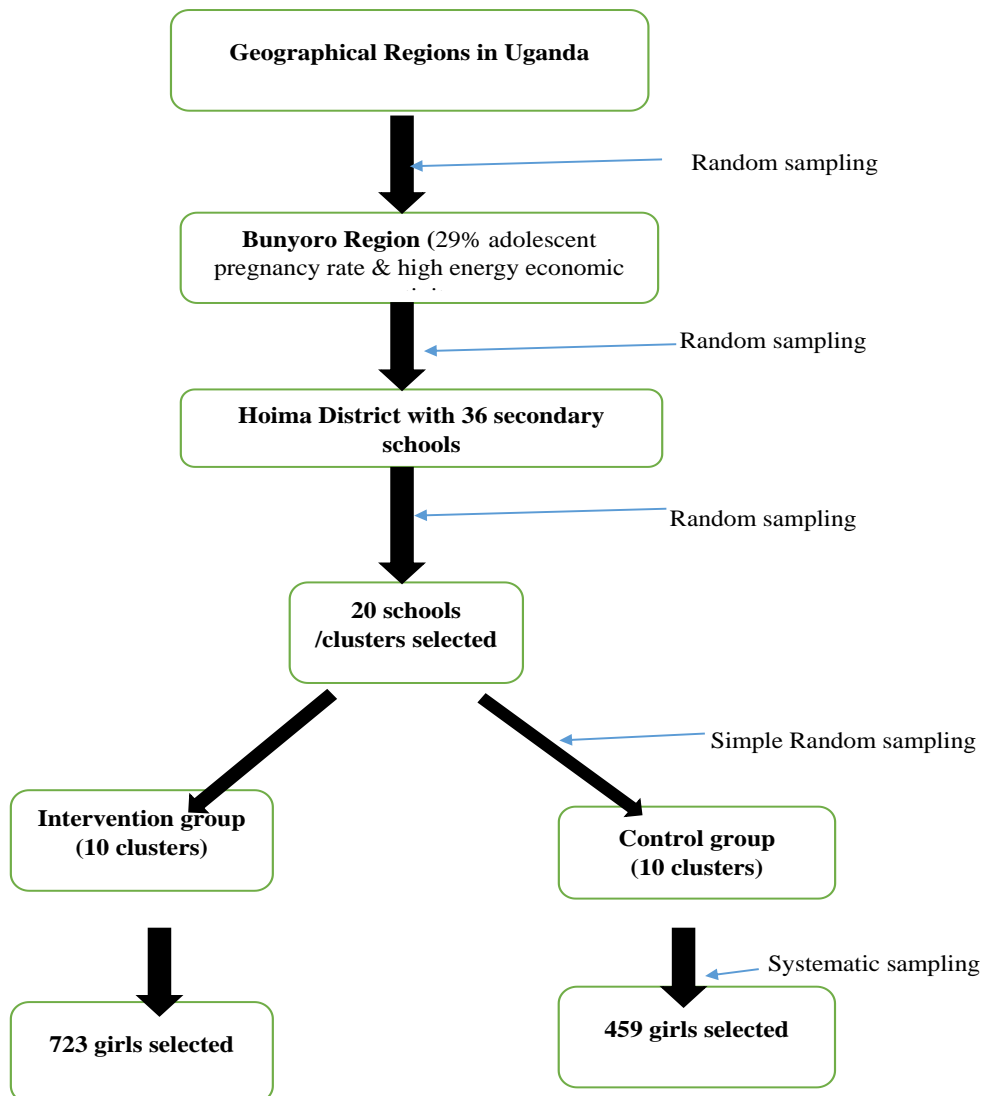
### **Cluster characteristics**

The study had a total of 20 clusters which were randomly allocated to intervention and control arms. 100% cluster schools were mixed sex schools admitting both girls and boys; 95% (19/20) cluster schools had both day and boarding sections for both sexes and majority of the respondents were in the boarding section. Out of the total 1,182 participants, 61% (723/1182) were from the intervention clusters while 39% (459/1182) were from the control clusters.

### **Selection of participants**

According to the approved protocol, selection of the individuals in each of the clusters was done by systematic sampling in accordance to the recommendations by Crossman (2017) and Aparasu (2011) which state that when using this probability sampling method, sample members from a larger population are selected according to a random starting point and a fixed periodic interval. Upon commencement of the study, 1, 992 eligible girls were systematically selected to participate in the study, of these 1,182 provided consent or had their parents provide consent to participate in the study. The sampling framework in *Figure 05* shows the actual selection of the study participants.

Figure 5: Sampling framework used during the study.



Data Source : Primary data, 2018

The study was conducted in the 20 selected secondary schools as clusters; each school was assigned to either intervention study group or the control study group by systematic random sampling. Each school cluster was independent and defined as a natural cluster for the purpose of the trial.

### 2.8.2. Sampling of participants for qualitative data collection

The participants for qualitative data collection were selected purposively based (Morshe, 1994; Creswell, 1998) on the role played in regard to adolescent pregnancy among the girls in secondary schools in Hoima District. Purposive sampling was used because only individuals that play a role in adolescent health care were considered relevant for this study; therefore, one by one purposive sampling was used to select individuals with specific niche demographics which enabled the researcher to obtain specific data points about adolescent pregnancy.

The individuals who met the criteria below were selected;

- a) Played a key role in the community on the health and care of adolescents in school
- b) Knowledgeable about policies, programs and other interventions on adolescents
- c) Hands-on experience – adolescent girl who is pregnant or had had a child prior to the study
- d) Key stakeholder – adolescent boys in secondary school.
- e) Willingness to participate in the study
- f) Ability to communicate in English or Runyakitara clearly
- g) Unbiased about adolescent sexual and reproductive health
- h) Parents of adolescent girls

The respondents to the key informant interviews, in-depth interviews and focus group discussion are shown in *Table 6*.

*Table 6: Qualitative Rule of Thumb based on data collection method*

Data collection method	Data collection instrument	Rule of Thumb	Category of respondents	Number of respondents (N=22)	%
Key informant interview	Key informant interview Guide	Interview approximately 5-25 people	Parent of an adolescent girl in school	1	5%
			Dean of students	1	5%
			District MCH/ adolescent focal person	1	5%
			Police officer in-charge of women affairs	1	5%
			Axillary school staff	3	14%
			Teacher	1	5%
			Religious leader	1	5%
			Local council leader	1	5%
In-depth interview	In-depth interview Guide	Interview approximately 5-25 people	School dropout due to pregnancy	1	5%
			School nurse	1	5%
			Head teacher / Deputy HM	2	9%
			Matron	2	9%
Focus Group Discussion	Focus Group Discussion Guide	Create 1 group of average 5-10 people	Adolescent boys in secondary schools	6	27%

*Source: Primary data, 2019*

The adolescent girl who dropped out of school due to pregnancy related reasons was selected to provide in-depth information based on her personal lived experiences on how to prevent adolescent pregnancy among school girls.

The school head teacher, deputy head teacher, dean of students, teacher, school nurse, school matron and school axillary staff (cooks and security guards) were selected to provide on-ground information on key factors influencing the occurrence of sexuality and adolescent pregnancy among school girls.

In addition, the cooks and security guards were selected to represent the axillary staff who work within the school premises and have pertinent information regarding the sexual habits and practices among the students and teachers which may result into adolescent pregnancy

The District adolescent focal person and police officer in charge of women affairs were selected to provide general information of the adolescent sexuality and adolescent pregnancy prevention measures in place within the District.

Adolescent boys were chosen to represent the boys who are key players with the potential to impregnate the girls and also to prevent the occurrence of adolescent pregnancy through practicing safe sex and providing the necessary support to the girls.

Parent of an adolescent girl was selected to represent the parents of adolescents who play a key role in shaping the sexuality life of the adolescent girls and boys.

The religious leader and local council chairperson were selected as key stakeholders for psychosocial support and enforcement respectively as well as their critical role in shaping behaviour within the society.

## **2.9. DESCRIPTION OF THE INTERVENTION**

The intervention for the experimental group was a three tier adolescent tailored SRH service package provided at school for ten months.

### **Tier 1: In-school ASRH education session**

The health education sessions provided information and create awareness on HIV, pregnancy, safer sex, Gender Based Violence, HIV, pregnancy, sexually transmitted infections (STIs), gender norms, effective communication and safe sex practices, sexuality and self-assertion. The National sexuality education framework by MOH and MOES (2018) was used as a guiding document during the sessions to cater particularly for age appropriate sexuality information. One educative session was conducted by the skilled health worker every week during the ten months of the study. *Table 7* shows the topics that were discussed during the health education sessions.

*Table 7: List of health education session topics*

S/N	Sessions and topics
1	Let's communicate
2	How we act
3	Sex and love
4	Gender-based violence
5	HIV prevention
6	Safer sex practices
7	Conception and contraception
8	Let's assert ourselves
9	Let's support ourselves
10	Self-reflection

*Adopted from the Stepping stones curriculum and National ASRH guidelines (2016)*

Small group discussions lasting approximately 45 minutes were conducted each week targeting the study participants and then general sessions lasting about 45 minutes were conducted for the entire school students involving all interested students both male and female within the school. The researcher, research assistants, SRH nurse and senior woman teacher in-charge of SRH were involved during the education sessions.

#### **Tier two: In-school adolescent sexual and reproductive health (ASRH) services**

ASRH services were provided by a skilled health worker at the intervention school (on-site) in an allocated room/school clinic. The services were made available and accessible to all students regardless of whether they are participating in the study or not. Key services included information, sensitive counseling, STI screening and treatment, HIV testing, referral and general medical care. The services were provided immediately after the educative sessions once every week per school. The SBHCs were operational both during the school terms and school holidays for students who required them. Over 3000 students received SRH services over the 10 months of implementation.

#### **Tier three: Referrals to off-site public health facilities**

The students identified in need of advanced ASRH care such as post abortion care, antenatal care and HIV treatment were referred to primary or tertiary public health facilities for further management. Details of the reasons for referral were recorded and MOH referral form filled and given to the student. The health workers at the public health facilities nearest to the school were sensitized about the study and possible referrals to be made, a mechanism of management of the referred cases was developed to prevent delays and stigma associated with adolescent SRH care.

**Follow up:** Follow up data collection was done for 10 months. Data was collected at the start of the study and at the end of the study after 10 months.

**CONTROL GROUP:** The clusters in this arm only received the regular sexuality education as stipulated in the school curriculum and provided by the senior woman teachers. No additional service was provided during the 10 months of the study period.

**After the study:** The health workers near the control schools were oriented in the provision of ASRH services and linked to the senior women teachers at eh schools to facilitate the complete referral process. This was intended to ensure that the girls within the control group received the services almost similar to those received by the girls in the intervention group.

## **2.10. DATA COLLECTION METHODS AND INSTRUMENTS**

### **2.10.1. Community mobilization and consultation**

Prior to the commencement of the study, several consultative meetings were held with the MNCH and adolescent focal persons, DHO, CAO, DEO, School heads and parent representatives to have a buy-in before commencement of the study. Information concerning this research was shared through presentation and each person received a two pager handout on the research. Community threats,

expectations from each party and potential negative concern were discussed and consensus reached. The meetings helped to build mutual respect and ensure community ownership of the study.

### 2.10.2. Data collection methods

**Survey method:** Quantitative data was collected using the survey method two times that is at the start of the study (0 months) and at the end of the study (after 10 months); a self-administered questionnaire was used to collect quantitative data from the 1,182 respondents.

**Interviews:** Ten face to face key informant interviews and six in-depth interviews were conducted to collect social insights and perceptions of the respondents on occurrence, factors influencing and suggested strategies to prevent adolescent pregnancy. This provided subjective and relevant information to enrich the quantitative data on adolescent pregnancy in Hoima District.

**Focus group discussions:** An open discussion involving six adolescent boys in school was conducted to solicit insights, attitude, experience and perceptions on the drivers and prevention of adolescent pregnancy among girls in school.

The interviews and discussion sessions were facilitated by the moderator and two research assistants who ensured that all information is correctly written, recorded and transcribed within limited time as indicated in *Table 8*.

*Table 8: Guidance on length of each data collection method*

Number of interviews/discussion	Length of the interview/ discussion
10 Key informant interview	30 to 45 minutes
6 In-depth interview	45 – 180 minutes
1 Focus Group discussion consisting of 6 respondents	60 to 120 minutes
1,182 Self-administered interview using structured questionnaires	30 – 60 minutes

*Source: Primary data, 2019*

The moderator was knowledgeable and had skills in conducting key informant and in-depth interviews as well as in leading FGD. The moderator also had the ability to ask open ended questions and follow up with relevant leading additional questions.

Socio-demographic characteristics of the participants, their understanding of adolescent pregnancy, factors influencing occurrence of adolescent pregnancy and interventions deemed necessary to prevent adolescent pregnancy were discussed and probed for by the respondents.

### 2.10.3. Data collection tools

The study employed both quantitative and qualitative methods of data collection. Quantitative data was collected using a self-administered questionnaire while qualitative data was collected using the Key Informant Interview (KII) guide, in-depth interview guide and focus group discussion (FGD) guide.

#### Questionnaire

A structured questionnaire was used to collect data on occurrence of pregnancy and associated sexual behaviour and practices among the participants. The valid questionnaires were characterized by simplicity, viability, reliability and high precision in the words. The questionnaire was adequate for the

problem intended to measure, reflected the underlying theory and with ability to show variation in behavioural change.

The structured questionnaire was adapted from the Uganda Demographic and Health Survey (UBOS & ICF International, 2017) and Adolescent Sexual and Reproductive Health toolkit (UNFPA, 2007). Information was collected from adolescent school girls aged 15 to 19 years who were in form one, two, three and five at the time of baseline data collection. Students in candidate classes (form four and six) were excluded because they did not meet the eligibility criteria and would not be available for the follow on data collection since they were completing school at the various levels.

The following information was collected:

- a) Background characteristics: age, level of education, tribe and religion;
- b) Parental characteristics: type of family, marriage status and occupation;
- c) Reproduction: reported pregnancy status and history such as past pregnancies, number of pregnancies, children ever born, children ever born alive, type of delivery, knowledge and use of contraception, sources of contraceptive methods, and information on family planning, intention to use family planning and pregnancy outcomes (abortion, delivered, miscarried);
- d) Sexual activity and behaviour: age at first sexual intercourse, recent sexual activity, number and type of sexual partners and use of condoms; and
- e) Access to ASRH services: availability, proximity, skilled health worker and access.

### **Key Informant and In-Depth Interview Guides**

Qualitative data was collected using the Key Informant Interview (KII) guide and the In-depth interview guide; the data provided subjective information which enriched the quantitative information. Qualitative data was collected using open-ended questions in both English and Runyakitara to ensure that respondents understood and responded to the questions appropriately

### **Focus Group Discussion Guide**

The guide consisted of 10 open-ended questions aimed at providing direction of the discussion. The guide was in both English and Runyakitara language to ensure that the discussion was well understood and answered appropriately by all participants.

### **2.10.4. Validation and Reliability of Questionnaire**

#### **Validation procedure**

Validity is the degree to which an assessment measures what it is supposed to measure (Kazi & Wardah, 2012). The questionnaire used to collect data in this study was measured for validity of the theoretical constructs using Face and content validity methods. The validation procedures ensured that the questionnaire accurately measured what it aimed to do, regardless of the responder. In addition, this ensured that the data collected was of high quality with high comparability hence increasing the credibility of data. In order to ensure validity of the instruments, the following procedures were done;

**Face validity.** This is a form of content validity; it informally and subjectively considers how suitable the content of the questionnaire seems to be on the surface (Yusoff, 2019; Larsson, 2015)

- a) The questionnaire that was used to collect data in this study was evaluated by the two study supervisors who are the experts in the subject area. The experts reviewed and explored the theoretical constructs of the questionnaire, evaluated the degree to which the questions in the questionnaire effectively captured information on SRH and adolescent pregnancy. All comments and common errors such as double-barreled, confusing, and leading questions were identified and rectified; and the revised questionnaire was developed and the experts after review concluded that the revised questionnaire measured the characteristics of interest.
- b) **Content Validity index** was used to evaluate the relevance of all the questions that are included in the questionnaire. This is the degree to which the questionnaire would have an appropriate sample of items for the construct being measured. The content valid instrument was rationally analyzed by a set of health experts/raters in adolescent health services. The raters reviewed all of the questionnaire items for readability, clarity and comprehensiveness and agreed on the items that were included in the final questionnaire.

Item rating was used to determine the validity of the questionnaire using the dichotomous rating where 'favorable' was rated as '1' and unfavorable was rated as '0'.

### **Formula**

Item rated Content Validity Index (I-CVI) =  $K/N$

K=Number of relevant /suitable items

N= Number of items in the instrument

(Yusoff, 2019; Larsson, 2015)

The questionnaire had a total of 50 items, out of which 43 were rated as favorable resulting in an I-CVI of 86%. This score is above 75% which is considered as the minimal level for considering a tool valid. Therefore, based on the face validity and content validity measures, the questionnaire used for this study was considered to be valid.

### **Reliability of Questionnaire**

The reliability of the questionnaire is the extent to which a questionnaire produces the same result on repeated trials, hence the stability or consistency of scores over time (Bolarinwa, 2015). The reliability of the questionnaire was ensured by training of research assistants prior to the study, pretesting the questionnaire and calculation of the Cronbach's alpha/or coefficient alpha ( $\alpha$ ) which was developed by Lee Cronbach in 1952 to measure reliability or how well a test measures what it should. Coefficient alpha as described by Aparasu (2011) was also used because the questionnaire responses are in form of multiple choices and short answers.

### **Pretesting of questionnaire and Cronbach alpha test**

In order to determine the Cronbach alpha, the questionnaire was pretested through a pilot study conducted in two secondary schools which were not part of the study sample namely Grace High School and St. Mark Secondary School all in Wakiso District. Wakiso District is found in Central region of Uganda which is neighboring Bunyoro region; therefore, the population is likely to have similar characteristics to those of the intended study participants.

A total of 242 girls aged 15-19 years took part in the pilot study. The data collected from the pilot study/test was entered in SPSS version 20 and analyzed for reliability using the Cronbach alpha test, SPSS Version 20.0. Analysis of data from the 242 students showed 242 valid cases, 0 excluded and Cronbach alpha was 0.807. A reliability coefficient (alpha) of 0.7 range is considered acceptable and those above 0.8 range are considered good (Campbell & Walters, 2014), therefore the questionnaire had good reliability.

### **Training of research assistants**

The study used five research assistants were young people aged 18-30 years, holders of diploma or degree qualifications from a recognized institute of higher learning and with ability to understand and speak both English and Runyakitara languages properly. The research assistants had competence in computer applications which ensured timely data entry into SPSS for analysis.

Research assistants were trained for two days in data collection, the training focused on interviewing techniques, field procedures, questionnaire content, documentation, completeness and administration of the questionnaires among others.

### **Trustworthiness and reliability of qualitative data**

Credibility refers to how congruent the study findings are with reality. To ensure credibility, the study adopted appropriate, well organized research methods and considered early familiarity with the culture in Hoima District. Each participant approached was given opportunity to participate in the study to ensure that data was collected from the respondents that were willing and free to take part in the study.

Transferability refers to ensuring the study findings can be applied to other situations and populations. The researcher provided sufficient contextual information about the study site and detailed description of adolescent pregnancy to enable the respondents to make comparisons

Reliability refers to obtaining similar results in case the study was repeated in the same context, with the same participants. In order to achieve reliability of the qualitative results triangulation of findings was done using both the interviews and discussion to collect data. The processes within the study were reported in detail thereby enabling the future researchers to repeat the work, if not necessarily to gain the same results.

Conformability refers to the researcher taking steps to help ensure that as far as possible, the study findings are the result of the experiences and ideas of the respondents rather than own characteristics and preferences. Triangulation of results was done to reduce the effect of investigator bias, admitting beliefs, assumptions and recognizing the shortcomings in the study's methods and potential effects.

In addition, an audit trail was kept by the researcher, which enabled any observer to trace the course of the research step by step via the decisions made and the procedures described.

## 2.11. DATA MANAGEMENT AND ANALYSIS

This section details the participant flow, dropout rates, data processing and analysis done in this study.

### 2.11.1. Participant flow

Figure 6 shows the flow diagram of progress of clusters and individuals through phases of the randomized trial including recruitment to analysis as recommended by Campbell (2012) in the 2010 CONSORT guidelines and statement.

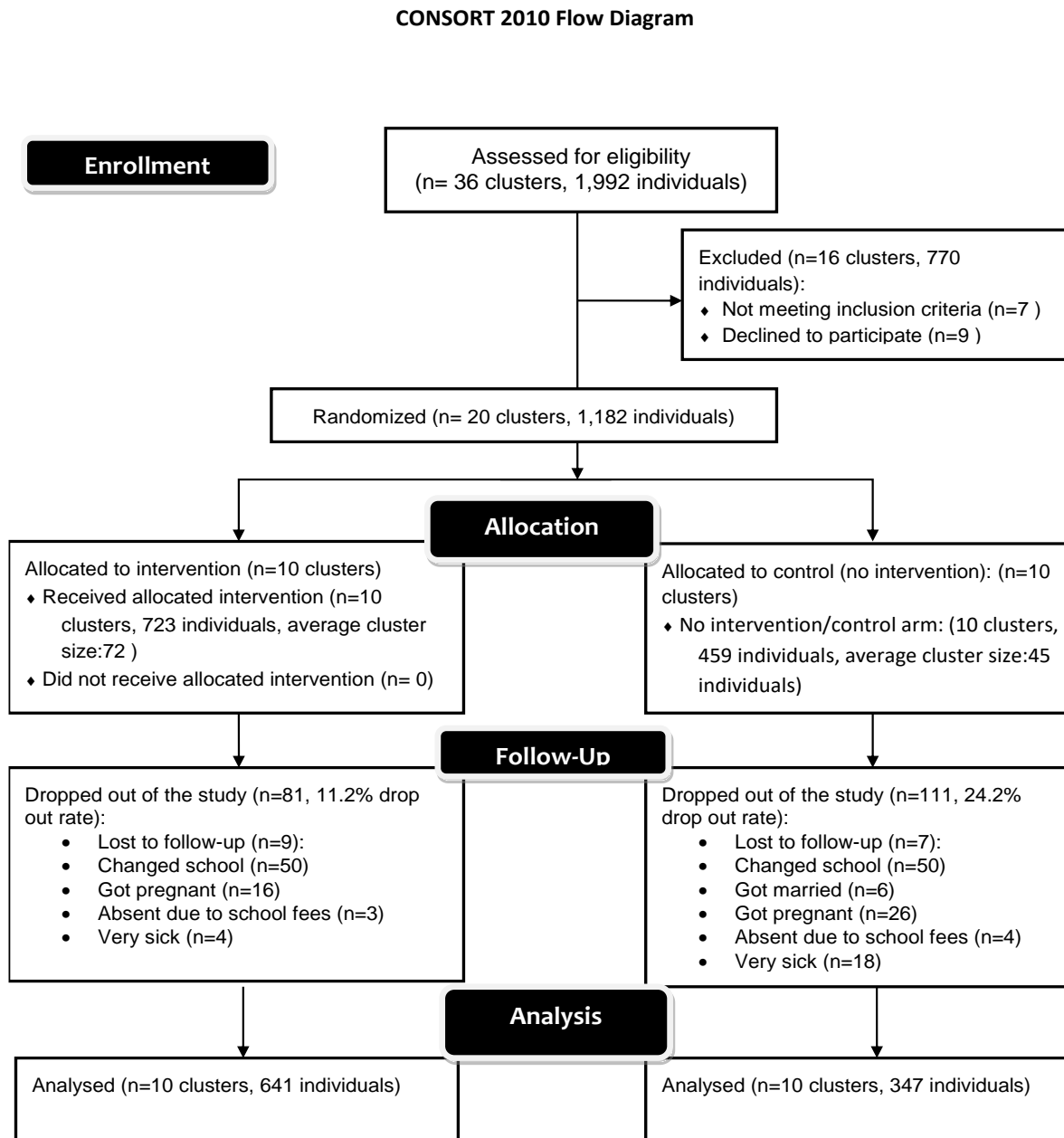


Figure 6: CONSORT 2010 cluster and individual flow diagram

Data source: Primary data, 2019

A total of 1,182 participants were enrolled in the study and baseline data collected from them, however, a 16.4% drop out rate was realized leaving only 988 participants by the end of the study.

There was no cluster drop out in the study, only drop out of 194 participants occurred representing a 16.4% drop out rate of participants from the study. The control arm had a higher dropout rate of 24.4% (112/ 459) compared to 11.3% (82/723) among participants in the intervention arm. The reasons for the individual drop out are indicated in *Table 9*.

*Table 9: Reason for participant drop out by cluster and study arm*

SCHOOL	Dropped out of school completely					Absent from school at time of data collection			TOTAL
	Changed school	Got pregnant	married	unknown reasons	Died	School fees	sick off	unknown reasons	
Intervention group									
IPR	3	2	0	0	0	0	0	0	5
IDU	2	0	0	0	0	0	0	0	2
IMA	3	0	0	0	0	0	0	0	3
IBH	2	2	0	1	0	0	0	0	5
IKI	10	4	0	0	0	0	1	2	17
IBW	3	0	0	2	0	0	0	0	5
IMD	10	3	0	0	0	0	1	0	14
IPE	0	1	0	0	0	0	0	0	1
IDA	2	0	0	0	0	3	2	1	8
IJA	15	4	0	3	0	0	0	0	22
Subtotal	50	16	0	6	0	3	4	3	82
Control group									
CSL	6	2	0	0	0	0	0	0	8
CDE	17	1	2	1	0	1	12	1	35
CST	6	10	1	2	0	2	1	0	22
CBU	2	0	0	0	0	0	1	0	3
CGA	2	3	0	0	0	0	1	0	6
CBS	4	3	2	0	1	0	0	0	10
CCB	6	3	1	2	0	1	2	1	16
CAN	5	4	0	0	0	0	1	0	10
CKH	2	0	0	0	0	0	0	0	2
CMS	0	0	0	0	0	0	0	0	0
Sub total	50	26	6	5	1	4	18	2	112
TOTAL	100	42	6	11	1	7	22	5	194
	52%	22%	3%	6%	1%	4%	11%	3%	100%

*Data source: Primary data, 2019*

One hundred ninety-four participants dropped out of the study and the major reasons for drop out included change of school (52%), got pregnancy (22%), absent due to sickness (11%), got married (3%), died (1%), absent due to lack of school fees (4%) and unknown reasons (9%). Based on the above, the number of participants that contributed to the analysis was 1,182 for baseline and 988 in consideration of the final analysis.

### **2.11.2. Data Processing**

Quantitative data was entered directly to into Statistical Package for Social Sciences (SPSS) version 20.0 for statistical analysis. Data cleaning was conducted after entry and analysis done thereafter. Qualitative data collected during the key informant interviews was transcribed and typed into a Microsoft Word 2015 computer program. These notes were transcribed verbatim to ensure complete capturing of the responses of the study participants.

### **2.11.3. Unit of analysis**

The study had two levels of inference that is the cluster level and the individual level.

Cluster level: 20 clusters were analyzed as intervention (10 clusters) and control group (10 clusters).

Individual level: at baseline, a total of 1,182 individuals (723 interventions and 459 control) while at the end of the study, the study analyzed a total of 988 individuals (641 interventions and 347 control).

### **2.11.4. Quantitative data Analysis**

Campbell and Walters (2014) states that there are four basic methods to analyzing CRCT which are (1) aggregate cluster-level analysis, (2) regression analysis using individual patient data with robust standard errors, (3) random-effects (Res) models using individual patient data and (4) population averaged models using individual patient data with regression coefficients estimated using generalized estimating equations (GEEs). In this study, data exploration was done to visualize the general feature of the data then the key analysis was done using SPSS version 20.0.

The intent to treat analysis was used to analyze participants according to their random treatment assignment which was the intended treatment, not the treatment actually received.

Cluster level: The summary measure for each cluster (mean or proportion) were calculated because each cluster provided only one data point and the data was considered to be independent while allowing standard statistical tests. Multiple regressions were used for the data summarized at the cluster level.

Individual level: During the two stage data analysis process, individual level covariates were incorporated into the cluster analysis while accounting for the intra-cluster correlation, thus increasing the statistical power of the analysis.

Both descriptive and inferential statistics were analyzed allowing for the association between SBSRH service, moderating factors and adolescent pregnancy. Descriptive summary statistics of the clusters and individuals such as frequencies, mean, medians and standard deviations were used to describe the characteristics of the study population on sex, age, socio-economic, education level, pregnancy status and sexual behaviour among others. Summary statistics for categorical data was displayed in form of mean, proportion, frequencies and percentages depending on the nature of the data.

To determine the association between the dependent and independent variables, a general logistic regression model was employed and two steps were followed. First, each variable was entered into a binary logistic regression model. Second, variables which were found to be significant at p-value of 0.05 were fitted into multiple logistic regression model to identify independent factors of influencing occurrence of adolescent pregnancy. Variables that remained significant at p-value of 0.05 were further analyzed using multivariate logistic regression model and variables were identified as independent factors influencing incidence of pregnancy and behavioural change.

Based on the above logistical regressions, inferential statistics- chi square test was used to determine the similarity in the two groups using their baseline data (baseline comparison) and to determine relationships as well as associations between variables. A chi square test was used to test relationships between categorical variables.

### 2.11.5. Qualitative participants and data analysis

Twenty-two respondents from Hoima District took part in provision of qualitative data as indicated in *Table 10*. The 22 participants were selected from the entire District at the Police office, District education office, District Health office, religious institution, community and schools. Therefore, the results do not apply to only the 20 schools used in the trial; rather the findings represent a general overview of the aspects of adolescent pregnancy within the key stakeholders in Hoima District.

*Table 10: Number of respondents who participated in qualitative data collection*

Category of respondents		Number of respondents (N=22)	%
Sex	Male	7	32%
	Female	9	41%
Respondent for key informant and in-depth interviews	Head teacher / Deputy HM	2	9%
	Dean of students	1	5%
	District FP/MCH/adolescent focal person	1	5%
	Matron	2	9%
	Axillary staff (cook, security guard)	3	14%
	Teacher	1	5%
	Religious leader	1	5%
	Local council leader	1	5%
	Police officer in-charge of women affairs	1	5%
	School dropout due to pregnancy	1	5%
	School nurse	1	5%
	Parent of adolescent girl	1	5%
Respondent for FGD	Adolescent boys in secondary schools	6	27%

*Data source: Primary data, 2019*

Thematic analysis was used to analyze qualitative data from 10 key informant interviews, 6 in-depth interviews and focus group discussion manually. Colaizi's phenomenological method was employed to analyze data.

Scripts and recordings were revised repeatedly and statements related to adolescent pregnancy were developed into expanded notes to understand the feelings of participants. Codes were organized in categories from the respondents. Sub-themes and themes relevant to the objectives of the study were then identified to enable development of qualitative coding and code definitions. Codes were grouped into categories and then themes (Graneheim & Lundman, 2004). Meanings were formulated from the significant statements, sorted out into categories, sub themes and then themes as per study objectives. The findings of the study were integrated into an exhaustive description of the phenomenon under the study and then the fundamental structure of the adolescent pregnancy was described. Quotes illustrating meaning or key messages from the analysis were selected based on the code count.

#### **2.11.6. Structural Equation Modelling (SEM)**

SEM using AMOS and SPSS was used to determine the statistical significance of the SBSRH model in the prevention of adolescent pregnancy. The constructs of the SBSRH model were specified based on the theories that informed the research and the findings. Data of the identified constructs was entered into the SEM software package. Matrices of correlations and means were used and relationships expressed as restrictions on the total set of possible relationships. The results featured overall indexes of model fit as well as parameter estimates, standard errors, and test statistics for each free parameter in the model.

### **2.12. LIMITATIONS OF THE STUDY**

#### **a) Reduction in the duration of the implementation of the intervention**

The period of implementation of the intervention was reduced from 12 months to 10 months due to unforeseen circumstances. Baseline data was collected in October 2018 and implementation of the intervention started immediately in November 2018, the intervention was available at school during the school term and holidays so as to avoid any interruptions in service access as much as possible. The intervention was implemented for 10 months from November 2018 to September 2019 instead of 12 months as earlier planned.

The months of implementation were reduced from 12 to 10 to enable the participants who were in form four and form six to extensively prepare for the final national examinations conducted by the Uganda National Examination Board examination. All the schools requested for the adjustments and declined to accept the affected students to participate in any research related activities after September 2019. Final follow up data collection was conducted in September 2019 from all the schools. This limitation was mitigated by increasing the number of school SRH clinics from one clinic to two clinics per week per school; this helped to increase access to the services.

#### **b) Participant drop out**

Similar to RCTs that require a long trial run time, this study required a trial run time of 10 months which resulted in a 16.4% loss of participants. A total of 1,182 participants were enrolled in the study and 988 participants were present for the follow on data collection, 194 participants were lost to follow up. In order to minimize the loss of participants, the school leadership and participants were notified of the data collection schedules at least one month prior to data collection so as to ensure that all the participants are available during the data collection process.

### **c) Use of multiple sites for validity and reliability testing**

Validity and reliability tests for the instruments used in RCT require multiple sites which is difficult to manage. In this study two sites (Grace High School and St Mark's High School - Namagooma) within Wakiso District were used to pretest the study tools hence ensuring quality of the results.

### **d) Self-reporting on sexual practices**

The pregnancy status and sexual behaviour of the participants was based on self-reports which may have been a possible source of bias. In order to mitigate bias, multiple check questions were included in the questionnaire to ensure correctness of information. Secondly, the use of codes as opposed to participant names helped to build confidentiality due to anonymous nature of data collection tools. The data collection tools were only accessible to the research team hence increasing the likelihood of participants providing correct information.

### **e) Restrictions on the type of SRH service provided at school**

SRH services include a variety of reproductive health services including HIV testing, education, counselling, contraceptives, referral and STI treatment among others. The provision of contraceptives to individuals aged 15-19 years is legally acceptable within the protocols governing ASRH services in Uganda although the policy guidelines do not provide clear guidance on SRH service provision within the school premises. Due to this lack of clarity, the provision of contraceptives at the school premises was strongly condemned and not permitted by all schools which may have affected utilization of contraceptives by the eligible participants.

In order to mitigate this challenge, complete referrals of the participants that required contraceptives to the appropriate health centers was done by the health workers who were conducting the SRH clinics at the schools. In addition, contact details of an adolescent friendly health worker were provided to the school leadership and students for further service provision beyond the research period.

## **2.13. ETHICAL CONSIDERATIONS**

**Approvals and clearance:** The authority to conduct this research was granted by (1) School of Postgraduate Studies at Nkumba University on 2<sup>nd</sup> August 2018, (2) Clarke International University Research and Ethics Committee, No.UG-REC-015 on 26<sup>th</sup> September 2018, protocol number IHSU-REC/0103 and (3) Uganda National Council for Science and Technology (UNCST) on 30<sup>th</sup> November 2018, protocol number HS247ES. The trial was registered globally by the Pan African Clinical Trial Registry (PACTR201810882140200) Registered on 16<sup>th</sup> October 2018.

The clearance at the District level was granted by the Chief Administrative Officer (C.A.O), District Education Officer (DEO) and the District Health Officer (DHO) of Hoima District in October 2018.

**Informed consent:** Informed consent was sought at the cluster level from the school administration and at the individual level from the parent/guardian of the 1154 eligible participants who were 17-18 years and from 28 participants themselves who were 19 years. Consent was by either thumbprint or signature on the written consent /assent form.

**Confidentiality:** The privacy and confidentiality of the participants was ensured by strictly observing anonymity during data collection, no participant name was written on the data collection tools, only the participant code was written on the questionnaire and study records are only be accessed by the research team. All data collected during the research was and is used only for the purpose of this research, no participant or cluster names are to be revealed during presentation of the findings. All efforts are made to ensure that the views and findings are disseminated without revealing the identity of the specific participants and clusters. All data collection tools shall be kept for 10 years under lock and key and only accessible to the research team. All publications of this work shall conceal participant personal identification information.

**Voluntary participation / Withdrawal:** Participation in this study was completely voluntary and the participants were free to withdraw from the study at any time prior to and or during the time of the research without any penalty, loss of benefits, legal implications or negative consequences implied.

**Language:** The parent consent form, KII and FGD guides were translated to Runyakitara language to ensure that all respondents understood and responded appropriately. Runyakitara was used instead of Runyoro because Runyakitara as a standardized form of closely related languages of western Uganda ie Runyoro, Rukiga, Runyakole and Rutooro (Bernsten, 1998). Therefore, Runyakitara was preferred because Hoima has residents who speak Runyoro, Rukiga, Runyakole and Rutooro. The questionnaire however remained in only English language since only secondary students were required to respond and all the participants understood English language clearly.

**Expected benefits:** There were no direct benefits, however, the findings from this study are to be used to design adolescent's pregnancy prevention programs in Uganda and other developing countries hence indirectly benefit adolescent girls including the participants of the study.

**Risks:** There were no health risks for the participant because no invasive methods of data collection were used. All activities were conducted in accordance with Ministry of Health guidelines and were within the laws of the land.

**Compensation of participants:** There was no direct form of compensation provided to the participants of the study. All activities of the study were conducted outside school class periods, that is, during the morning breaks, lunch break and evening after class. There were no interruptions with school activities at all. Qualitative data was also collected within areas and time of convenience of the respondent hence no compensation was provided too. The respondents for qualitative study were provided refreshments (drink and snack) in kind during the discussion/interview.

## 2.14. DISSEMINATION

**Report submission:** A copy of the thesis will be submitted to Nkumba University, CIUREC, UNCST, and Chief Administrative Officer in Hoima District, Ministry of Education and Ministry of Health to provide insight in the prevention of adolescent pregnancy among secondary school girls.

The results of the research were to be disseminated to the public through the mandatory Viva Voce defense/public defense session at Nkumba University with face to face and online (zoom) participation. Four publications and one poster presentation of the study findings were accepted in a medical peer reviewed journal and an international scientific conference in 2019 respectively as indicated in *Table 11*.

*Table 11: Details of the scientific publication and poster presentation of the study findings*

Name of conference / journal	Dates of publication	Details of publication
JSM Sexual Medicine journal	23 June 2020	<b>Kirungi, GK</b> , Kiyingi,FP., Musoke, M., Kasozi, J. (2020). Effectiveness of School Based Reproductive Health Services on prevention of adolescent pregnancy among School Girls Aged 15-19 Years in Uganda: Cluster Randomized Trial. JSM Sexual Med 4 (4):1042
Journal of Clinical and Medical Case Reports	30 May 2020	<b>Kasozi Kirungi, G.</b> , Pio Kiyingi,F., Musoke, M., Kasozi, J. (2020). Effectiveness of School Based Health Clinics on Utilization of Sexual and Reproductive Health Services among School Girls Aged 15-19 Years in Uganda: Cluster Randomized Trial. Journal of Clinical and Medical Case Reports doi:10.31487/j.JCMCR.2020.02.02. Volume 1(2): 2-6. <a href="http://dx.doi.org/10.31487/j.JCMCR.2020.02.02">http://dx.doi.org/10.31487/j.JCMCR.2020.02.02</a>
Journal of Women's Health and Development	01 July 2020	<b>Gloria Kasozi Kirungi</b> , Frank Pio Kiyingi, Musoke, Miph., Kasozi, Julius. (2020). Predictors of adolescent pregnancy among school girls aged 15-19 years attending secondary school in Hoima District, Uganda. Journal of Women's Health and Development 3 (2020): 174-184
Methods Protocol journal.	21 <sup>st</sup> February 2019	<b>Kirungi Kasozi, G.</b> ; Kasozi, J.; Pio Kiyingi, F.; Musoke, M. School-Based Sexual and Reproductive Health Services for Prevention of Adolescent Pregnancy in the Hoima District, Uganda: Cluster Randomized Controlled Trial. Methods Protoc. 2019, 2, 21
International Conference of AIDS and STIs in Africa (ICASA),	2 <sup>nd</sup> -7 <sup>th</sup> December 2019. Kigali, Rwanda	<b>Gloria Kirungi Kasozi</b> & Erasmus Tanga, 2019. 'Sexual practices among adolescent girls in secondary schools in Uganda, Abstract no. A-1099-0102-04107. Reference no. WEPEC125. Accepted and presented as a poster presentation at the 2019 ICASA

*Data source: Primary data, 2019*

## **SECTION THREE: EFFECT OF SCHOOL BASED SRH SERVICES PROVISION ON OCCURRENCE OF ADOLESCENT PREGNANCY AMONG SCHOOL GIRLS AGED 15-19 YEARS**

### **3.1. INTRODUCTION**

In this chapter, the study results in relation to an investigation on the effect of providing School Based SRH services on occurrence of adolescent pregnancy among school girls aged 15-19 years in Hoima District, Uganda are presented, analyzed, interpreted and discussed. Socio-demographic characteristics of the study participants in relation to provision of school based SRH services and occurrence of pregnancy are also presented and interpreted.

### **3.2. SOCIO DEMOGRAPHIC CHARACTERISTICS OF STUDY PARTICIPANTS**

The entire study had a total of 1,182 participants with 724 girls in the intervention arm while 458 girls were in the control arm. Of these, 57.2% (676) were aged 15-16 years, 39.5% (466) aged 17-18 years and 3.4% (40) were aged 19 years and above. Majority 91.4% (1,080) of the participants were Christians, 98.7% (1,167) of the participants were Ugandans while 71.1% (840) were in the boarding section of the school. Most of the participants were in senior three (55.7%) and senior two (32.3%) classes. A total of 1,101 (93.2%) participants were in schools which had both day and boarding sections. Overall, the findings of the study can be generalized to Ugandan, Christian girls in secondary school aged 15-19 years in secondary schools as shown in *Table 12*.

**Age of participants:** Most study participants in Hoima District were aged 15 to 16 years 58.7% (425) in the intervention group compared to 54.8% (251) in the control group and the variations were not statistically different ( $\chi^2 = 2.04$ ,  $p = 0.359$ ).

**Religion of the participants:** Majority of the study participants were Christians by religion in both the intervention and control groups (92.4% vs 89.7%) with insignificant variations ( $\chi^2 = 2.528$ ,  $p = 0.112$ ).

**Parent's employment status:** Most of the participants reported to have mothers who are businessmen in both the intervention and control groups (40.6% vs 43.4%) with insignificant variations ( $\chi^2 = 1.256$ ,  $p = 0.869$ ). On the contrary, majority of the participants in the control group (32.3%) reported to have fathers who were farmers compared to the participants in the intervention group (28.2%). The participants in the intervention had most of their fathers engaged in business (33.0%), however, there was no statistically significant variation in the occupation of the fathers ( $\chi^2 = 4.850$ ,  $p = 0.303$ ).

**Class distribution of participants:** Most of the participants were in senior three in both the intervention and control group (58.4% vs 51.3%) followed by the participants in senior two (30.5% intervention and 34.9% control groups). However, there was no significant variations in the class distribution of participants in both the intervention and control groups ( $\chi^2 = 6.494$ ,  $p = 0.090$ ).

Table 12: Summary statistics of key socio demographic characteristics of the participants at baseline

Demographics		Intervention N (%)	Control N (%)	$\chi^2$	P-Value <sup>a</sup>
<b>Age in years</b>	15-16	425 (58.7)	251 (54.8)	2.047	0.359
	17-18	277 (38.3)	189 (41.3)		
	19+	22 (3.0)	18 (3.9)		
<b>Religion</b>	Christian	669 (92.4)	411 (89.7)	2.528	0.112
	Non-Christian	55 (7.6)	47 (10.3)		
<b>Father Occupation</b>	Employed	162 (22.4)	92 (20.1)	4.850	0.303
	Business	239 (33.0)	137 (29.9)		
	Farmer	204 (28.2)	148 (32.3)		
	Not Employed	16 (2.2)	16 (3.5)		
	Not Applicable	103 (14.2)	65 (14.2)		
<b>Mother Occupation</b>	Employed	86 (11.9)	50 (10.9)	1.256	0.869
	Business	294 (40.6)	199 (43.4)		
	Farmer	249 (34.4)	154 (33.6)		
	Not Employed	36 (5.0)	19 (4.1)		
	Not Applicable	59 (8.1)	36 (7.9)		
<b>Class</b>	S.1	75 (10.4)	57 (12.4)	6.494	0.090
	S.2	221 (30.5)	160 (34.9)		
	S.3	423 (58.4)	235 (51.3)		
	S.5	5 (0.7)	6 (1.3)		
<b>School Type</b>	Day Only	42 (5.8)	36 (7.9)	3.341	0.164
	Boarding Only	3 (0.4)	0 (0.0)		
	Day and Boarding	679 (93.8)	422 (92.1)		
<b>Participant-Day Scholar Vs Boarding</b>	Day Scholar	214 (29.6)	128 (27.9)	0.354	0.552
	Boarding	510 (70.4)	330 (72.1)		
<b>Parent Marital Status</b>	Married	389 (53.7)	232 (50.7)	4.160	0.245
	cohabiting	106 (14.6)	87 (19.0)		
	Separated	175 (24.2)	103 (22.5)		
	widowed	54 (7.5)	36 (7.9)		

<sup>a</sup> Comparison between Intervention and comparison groups

**\*\*Significant at 5% level. Data source: Primary data, 2019**

**School type:** Majority of the schools (clusters) had both day and boarding sections in both the intervention and control groups (93.8% vs 92.1%) with insignificant variations ( $\chi^2 = 3.341$ ,  $p = 0.164$ ).

**School section /type of participant:** Most of the participants reported to be attending the boarding section of the school in both the intervention and control groups (70.4% vs 72.1%) with insignificant variations ( $\chi^2 = 0.354$ ,  $p = 0.552$ ).

**Parent's marital status:** Most of the participants reported to have parents who are married in both the intervention and control groups (53.7% vs 50.7%) with insignificant variations ( $\chi^2 = 1.256$ ,  $p = 0.869$ ). However, it is important to note that a sizeable number of participants reported to have parents who separated in the intervention group (24.2%) and control group (22.5%).

### **Interpretation and discussion of demographic characteristics**

The study results in *Table 13* show that there was no statistical difference in the demographic characteristics of the participants in the intervention group compared to the participants in the control group. The results there indicate that the demographics of all participants were generally the same in both study groups which means that the randomization of the clusters was properly conducted. The baseline demographic findings agree with Roberts & Torgerson (1999) who stated that when there is no observed imbalance in the baseline variables in both the intervention group and the control group, it is assumed that the outcome of the study was due to the intervention. The baseline characteristics also agree with the CONSORT 2010 guidelines (Campbell *et al.*, 2012) that emphasize the need to for proper participant selection so as to avoid baseline differences which allows for comparison and data utilization. The findings therefore agree with Campbell *et al.* (2012) and Roberts & Torgerson (1999) to conclude that the study participants came from the same population in Hoima District which implies that the results of this study reported to have occurred in the intervention group did not occur by chance but are attributed to the intervention program provided in the clusters.

### **3.3. PROVISION OF SCHOOL BASED SRH SERVICES AMONG SCHOOL GIRLS AGED 15-19 YEARS IN HOIMA DISTRICT**

The School Based SRH services that were provided in this study at the intervention schools included (1) Education on SRH; (2) Referral; (3) Counselling of SRH; (4) Family planning services; (5) STI treatment and counseling; (6) Pregnancy care and delivery; (7) Mental health and psychosocial support and (8) Miscarriage/Post-abortion care services. All the services were provided and accessible to all students within the intervention schools including the study participants. Provision of comprehensive School Based SRH services was measured by the reported receipt of the various services by the individual school girls and this was considered as follows;

- (1) Receipt of few services: School girls who did not receive any service or received three services or less were considered to have received few or inadequate SRH services
- (2) Receipt of comprehensive services: School girls who received more than three SRH services were considered to have received comprehensive SRH services

*Table 13* shows the uptake of various SRH services provided among school girls aged 15-19 years per study arm. Based on the socio-demographic characteristics of the participants, there was no significant variation in uptake of SRH services and socio-demographic characteristics; therefore, it was assumed that the SRH received by the girls in the intervention group was entirely attributed to the school based service package provided by the researcher. On the other hand, since no school based SRH services were provided to the girls in the control arm, the services received by the girls in the control arm are entirely attributed to the services provided within the public health care system.

Table 13: Provision of School Based SRH services among school girls aged 15-19 years

School Based SRH services	Intervention N (%)	Control N (%)	$\chi^2_{(df)}$	P-Value <sup>a</sup>
<b>Baseline</b>				
<b>SRH services received T1</b>				
0-3 services	291 (63.8)	165 (36.2)	2.056	0.159
More than 3 services	433 (59.6)	293 (40.4)		
<b>End-line</b>				
<b>SRH services received T2</b>				
0-3 services	14 (46.7)	16 (53.3)	4.503	0.039**
More than 3 services	627 (65.4)	331 (34.6)		

<sup>a</sup> **Comparison between Intervention and comparison groups**

\*\*Significant at 5% level. Data source: Primary data, 2019. T1 (Baseline) and T2 (End of study)

**Baseline:** Findings in Table 13 show that 61.4% (726/1,182) of the school girls reported to have received more than three SRH services during the six-month period prior to the study. Most study participants received more than 3 services in both the intervention and the control groups (59.6% vs 40.4%). The proportion of school girls that reported receiving more than 3 services did not however statistically vary at baseline ( $\chi^2 = 2.056$ ,  $p = 0.159$ ). This means that there was no variation in the type of services provided and access by the school girls hence resulting in similar levels of utilization of SRH services for the girls in both the intervention and control groups. Therefore, the variations observed among the school girls in the intervention group at the end of the intervention are strongly attributed to the intervention (school based SRH services) provided during the study.

**End of intervention:** At the end of the intervention, 97% (958/988) reported to have received more than three services within the period of the study. However, the proportion of school girls in the intervention arm who reported receiving more than three services had increased from 59.6% at baseline to 65.4% by the end of the intervention but respectively lowered from 40.4% to 34.6% in the control group. Table 13 results shows a significant variation in the proportion of school girls who reported receiving more than three services between the two groups ( $\chi^2 = 4.503$ ,  $p < 0.001$ ).

The findings indicate that the receipt of services was higher (65.4%) among the girls who had access to School Based SRH services compared 34.6% among the girls who had access to services within the public/government health facilities. Findings differ slightly with a study by Ntulume (2018) which indicated that the overall access and utilization of SRH services among school adolescents was 73.3% with abstinence drive (41%) as the most utilized services. However, it is important to note that in Ntulume's study, abstinence education was the most utilized service, yet utilization of services in this study is mainly focused on individuals who received more than three SRH services hence being considered as having received comprehensive SRH services.

The findings of this study do not agree with two cross sectional studies conducted in Nigeria (Tlaye *et al.*, 2018) and Ethiopia (Binu *et al.*, 2018) among school adolescents, the level of utilization was found to be only 33.8% and 21.2% respectively among adolescents who reported to have utilized at least one

of reproductive health services. The results of the Nigeria and Ethiopian studies are lower than the findings in this study that show that the school girls who received only three or less services were 46.7% and 53.3% among the girls within the intervention group and control group respectively. This study did not focus on just receipt of one service but rather on how comprehensive the services were for the participant and indeed found that the proportion of girls who received three or less services was higher (46.7% in intervention group and 53.3% in control group) than the proportion (33.8% in Nigeria and 21.2% in Ethiopia) stated by Tlaye *et al.* (2018) and Binu *et al.* (2018). This may be attributed to methodology used in conducting the research as well as the geographical access and availability of services within the free public health facilities in Uganda.

### **3.4. OCCURRENCE OF ADOLESCENT PREGNANCY AMONG SCHOOL GIRLS**

At baseline and end of the intervention, the occurrence of adolescent pregnancy was considered to have happened when a school girl reported (1) to be currently pregnant at the time of data collection and (2) to have aborted within 10 months prior to the time of data collection.

#### **Overall prevalence of adolescent pregnancy among adolescent school girls aged 15-19 years**

**Baseline** The percentage of girls who were currently pregnant or had aborted within 10 months prior to the study was 1.8% (21/1,182). Out of the 21 girls who were pregnant or had aborted within 10 months prior to the study, 14 were in the intervention group while 7 were in the control group representing 67% (14/21) and 33% (7/21) respectively and a pregnancy prevalence of 1.9% (14/ 724) and 1.5% (7/ 458) in the intervention and control group respectively.

**End of the intervention:** The overall pooled percentage of girls who were currently pregnant or had aborted within 10 months prior to the study was 2.8% (28/988). Out of the 28 girls who were pregnant or had aborted within 10 months prior to the study, 9 were in the intervention group while 19 were in the control group representing 32% (9/28) and 68% (19/28) respectively and a pregnancy prevalence of 1.4% (9/647) and 5.4% (19/351) in the intervention and control group respectively. There was a reduction in the prevalence of pregnancy from 1.9% to 1.4% in the intervention group while the prevalence of pregnancy increased from 1.5% to 5.4% among the girls in the control group.

*Table 14* shows the socio-demographic characteristics of the school girls who were pregnant and or had had an abortion with ten months prior to data collection at baseline and at the end of the study.

Table 14: Socio-demographic characteristics of school girls aged 15-19 years in school who reported to be pregnant or had abortion at baseline (N=21) and end of the study (N=28)

Variables	Baseline N (%)	End line N (%)
<b>Class of study</b>		
S1	2 (9.5%)	1 (3.6%)
S2	4 (19%)	5 (17.9%)
<b>S3</b>	<b>15 (71.4%)</b>	<b>21 (75%)</b>
S5	0 (0%)	1 (3.6%)
<b>Age group of girls (years)</b>		
15-16	7 (33.3%)	11 (39.3%)
<b>17-18</b>	<b>10 (47.6%)</b>	<b>16 (57.1%)</b>
19	4 (19%)	1 (3.6%)
<b>Religion</b>		
<b>Anglican</b>	<b>8 (38.1%)</b>	<b>9 (32.1%)</b>
Catholic	6 (28.6%)	6 (21.4%)
Moslem	2 (9.5%)	6 (21.4%)
Pentecostal	3 (14.3%)	2 (7.1%)
SDA	1 (4.8%)	5 (17.9%)
Other	1 (4.8%)	0 (0%)
<b>School type</b>		
Day only	1 (4.8%)	0 (0%)
Boarding only	0 (0%)	0 (0%)
<b>Day &amp; Boarding</b>	<b>20 (95.2%)</b>	<b>28(100%)</b>
<b>Student type</b>		
Day scholar	<b>11 (52.4%)</b>	3 (10.7%)
Boarding section	10 (47.6%)	<b>25 (89.3%)</b>
<b>Parent marital status</b>		
<b>Married</b>	<b>11 (52.4%)</b>	<b>17 (60.7%)</b>
Cohabiting	2 (9.5%)	4 (14.3%)
Separated	6 (28.6%)	4 (14.3%)
Widowed	2 (9.5%)	3 (10.7%)
<b>Person who stays with the girl</b>		
Both parents	7 (33.3%)	13 (46.4%)
<b>One of the parent</b>	<b>11 (52.4%)</b>	<b>15 (53.6%)</b>
Relative	2 (5.6%)	0 (0%)
Sexual partner	1 (4.8%)	0 (0%)
<b>Fathers occupation</b>		
Formal employment	0 (0%)	3 (10.7%)
<b>Informal business</b>	<b>10 (47.6%)</b>	<b>13 (46.4%)</b>
Farmer	6 (28.6%)	6 (21.4%)
Not employed	1 (4.8%)	0 (0%)
Didn't know	0 (0%)	6 (21.4%)
<b>Mothers' occupation</b>		
Formal employment	4 (19%)	3 (10.7%)
<b>Informal business</b>	<b>8 (38.1%)</b>	<b>10 (35.7%)</b>
Farmer	6 (28.6%)	10 (35.7%)
Not employed	<b>0 (0%)</b>	<b>1 (3.6%)</b>
Didn't know	3 (14.3%)	4 (14.3%)
<b>Girl had ever used Family Planning methods</b>		
Yes	<b>16 (76.2%)</b>	8 (28.6%)
No	5 (23.8%)	<b>20 (71.4%)</b>

Data source, Primary data, 2019

The school girls in Senior Three (S3) had the highest prevalence of pregnancy at baseline (71.4%) and end line (75%), similarly the girl aged 17-18 years had the highest prevalence of pregnancy at baseline (47.6%) and end line (57.1%).

Majority of the girls who were pregnant at baseline (38.1%) and end line (32.1%) were Anglican. 95.2% of all the girls who were pregnant were in schools that had both day and boarding sections both at baseline (95,2%) and end line (100%). Interestingly, there was no (0%) case of pregnancy reported in schools which had only the boarding section.

However, despite the fact that no pregnancy occurred in schools with boarding sections only, the situation was different for schools with both day and boarding sections, at baseline, 52.4% pregnancy occurred among day scholars while at end line, 89.3% of all the pregnancy cases occurred among the girls in the boarding section of the school.

There was a reduction in the prevalence of pregnancy among school girls who reported to using family planning methods from 76.2% at baseline to 28.6% at end line while the prevalence of pregnancy increased among girls who reported to not using family planning methods from 23.8% at baseline to 71.4% at end line.

The girls who reported to staying with one of the parents had the highest prevalence of pregnancy of 52.4% and 53.6% at baseline and end line respectively. However, the girls whose mothers were unemployed reported very low prevalence of pregnancy at 0% and 1.3% at baseline and end line respectively.

## SUMMARY OF POOLED PREGNANCY OCCURRENCE DURING THE STUDY

### Prevalence of Pregnancy among school girls 15-19 years

Indicators	Baseline		During the study		End line		Total			
	Control	Intervention	Control	Intervention	Control	Intervention	Control	Intervention	Total	% (out of 1182)
Currently Pregnant	7	14	26	16	12	2	45	32	77	7%
Not currently pregnant but had an abortion	1	12	5	1	7	7	8	19	27	2%
<b>Total pregnancies</b>	<b>8</b>	<b>26</b>	<b>31</b>	<b>17</b>	<b>19</b>	<b>9</b>	<b>53</b>	<b>51</b>	<b>104</b>	<b>9%</b>

*7.7% in Ethiopia (Mathewos& Mekuria, 2018); 5.7% in Nigeria ( Aderibigbe et al, 2011)*

However, qualitative responses indicate that the abortion rates could be more than meets the eye as seen in the statement below

*During the last one year, 12 pregnancy cases were identified through the routine checkups, but the pregnancy cases could be more than this since children in this era indulge in early sex and abortion. (KI 2, 2019)*

Similarly, all respondents for the qualitative data confirmed the high adolescent pregnancy cases that occur among adolescent girls within school many are not reported hence not reported to the school leadership as stated below: -

*About 60 girls became pregnant during the last 2 years  
(IDI 3, 2019)*

*Pregnancy cases are common here, last term, 8 girls got pregnant  
(KI 5, 2019)*

*About 20 girls got pregnant in the same term when I also got pregnant,  
but the school never got to know many of them (IDI 6, 2019)*

*Our prevalence of adolescent pregnancy is too high to an extent that  
we stopped counting, just last term, we had over 10 cases and 2 abortions  
(KI 7, 2019)*

### **Discussion on the occurrence of adolescent pregnancy**

In the entire study, the pooled prevalence of adolescent pregnancy among the school girls was 2.8% (1.4% in the intervention group and 5.4% in the control group). The findings agree to some extent with the high percentage of 7.7% adolescent pregnancy among school girls of Arba Minch Town in Ethiopia (Mathewos & Mekuria, 2018). From this study, it is clear that the girls in the control group who did not receive any form of intervention had a high prevalence of 5.4% which is comparable to the 7.7% reported in a cross sectional study by Mathewos & Mekuria (2018).

The prevalence of pregnancy among the school girls in the control group (no intervention provided) was 5.4% which is similar and comparable to 5.7% in Nigeria (Aderibigbe *et al.*, 2011) among school girls. However, the findings of this study do not agree with the results by Kassa *et al.* (2018) that shows that the pooled prevalence of adolescent pregnancy in Africa was 18.8% (95% CI: 16.7, 20.9) and 19.3% (95% CI, 16.9, 21.6) in the Sub-Saharan African region with the highest prevalence found in East Africa (21.5%) and lowest in Northern Africa (9.2%). Important to note is that Kassa *et al.* did not focus specifically on adolescent school girls but rather focused on all adolescents in school and out of school therefore these findings cannot be comparable. However, these studies did not focus on adolescent girls in school only like it is the case with this study.

The 2016 Uganda Demographic Health survey indicates that the prevalence of adolescent pregnancy in the general population (including girls in and out of school) is 25% (UBOS & ICF International, 2017) but further state that the prevalence of pregnancy among girls who had attained secondary education was 3.5% which is higher than the pooled prevalence of adolescent pregnancy of the study (2.8%) but 3.5% reported in the UDHS 2016 is much lower than 5.4% found among school girls who

received no intervention but depended solely on the SRH services provided within the general public health facilities. The findings in this study therefore are consistent with a low prevalence of 3.5% reported among girls with secondary education in the 2016 UDHS. Similarly, the findings of this study also concur with Akanbi *et al.* (2016) who identified educational level as a significant factor influencing the occurrence of adolescent pregnancy, this is similar to the findings that girls who were older and were in upper class (S5) had the lowest prevalence of adolescent pregnancy. Similarly, Dawan (2008) mentions that adolescent pregnancies are associated with social issues including low education levels. Generally, adolescent pregnancy increases with increasing age and reducing literacy levels in Uganda and Africa at large.

There was an increment in the overall number of school girls that were pregnant from 1.8% at baseline to 2.8% at the end of the intervention with majority of the cases occurring within the control group (69%). This may be attributed to the improved access and availability of SRH services for the girls within the intervention group because the services were provided to the girls within the school premises, hence the lower pregnancy prevalence (1.4%) among the school girls in the intervention group compared to 5.4% among the control group. The findings however agree with Kassa *et al.* (2018) who found that the girls who had reproductive health (SRH) issues (OR: 2.88) had higher odds of getting pregnant.

There was a reduction in the percentage of pregnant girls who reported to use family planning methods from 76.2% at baseline to 28.6% at end line while the prevalence of pregnancy increased among girls who reported to never using family planning methods from 23.8% at baseline to 71.4% at end line. These findings presumably indicate the accurate use and access of FP consistently by the sexually active girls. This shows that there could have been inconsistent use and or inaccurate use of FP methods by these girls. The findings agree with results from a randomized controlled trial study conducted among youths living in home care groups in California by Oman *et al.* (2018) where participants in the intervention group had significantly lower odds of having recent sexual intercourse without using birth control (AOR = 0.72; 95% CI = 0.52, 0.98) which provides insights on the findings in this study. This means therefore that majority of the girls who were sexually active started using family planning methods accurately for pregnancy prevention thus reducing the occurrence of pregnancy compared to the school girls who reported never using family planning methods. Similarly, the findings of this study also agree with Cindy Bond-Zielinski (2010), who reveals that a sexually active teen who does not use contraceptives has a 90% chance of becoming pregnant within a year which is similar to the increment in the number of pregnancies that occurred among girl who never used contraceptives in this study.

The girls who reported to staying with one of the parents had the highest prevalence of pregnancy of 52.4% and 53.6% at baseline and end line respectively. However, girls whose fathers were formally employed and unemployed reported no pregnancy case at baseline and end line respectively. Similarly, the girls whose mothers were unemployed reported very low pregnancy prevalence at 0% and 1.3% at baseline and end line respectively. Stammers (2002) conducted a study on the influence of family structure on teenage pregnancies found out that young people aged 14-17 who live in a two parent

family are less likely to have ever had sexual intercourse than young people living in any other family arrangement, even after adjusting for potentially confounding factors such as race, age, and socioeconomic deprivation. The findings in this study showed that the prevalence of pregnancy was low (46.4%) among girls who lived with both parents and higher (52.4%) among those who lived with one of the parent hence agree with Stammers (2002).

It is important to note that the intervention group had a very low prevalence of pregnancy at 1.4% compared to the control group (5.4%) which clearly indicates that provision of school based SRH services lowers the likelihood of adolescent pregnancy. It is therefore paramount to design interventions targeting adolescent girls in school given the evidence that there is a relatively high prevalence of pregnancy among this population.

### 3.5. EFFECT OF SCHOOL BASED SRH SERVICE PROVISION ON OCCURRENCE OF ADOLESCENT PREGNANCY

This section shows the statistical values in relation to hypothesis one.

**H<sub>0</sub>:** School Based SRH services provision does not affect occurrence of pregnancy among school girls aged 15-19 years.

**H<sub>1</sub>:** School Based SRH services provision affects occurrence of pregnancy among school girls aged 15-19 years.

*Table 15: Logistic Regression results for the effect School Based SRH service provision on occurrence of adolescent pregnancy*

	Occurrence of adolescent pregnancy		OR (95%CI)	P-Value
	Yes N (%)	No N (%)		
SRH services received 10 months T2				
Control				
0-3 services	5(31.2)	12(68.8)	10.292 (3.147-33.66)	0.001
More than 3 services	14(4.2)	317(95.8)		
Intervention				
0-3 services	7(50.0)	7(50.0)	312.5 (54.90-1778.80)	0.000
More than 3 services	2(0.3)	625(99.7)		
Overall				
0-3 services	12(40.0)	18(60.0)	39.250 (16.250-94.805)	0.000**
More than 3 services	16(1.7)	942(98.3)		

**\*\*Significant at 5% level. Data source: Primary data, 2019**

#### Control group

Findings in *Table 15* shows that the odds of becoming pregnant are 10.3 times among school girls that received less SRH service (0-3 services) compared to those that received more than 3 services in the control group. This mean that a girl who received less than 3 SRH services had a higher risk of

becoming pregnant that a girl who had received more than three services. Findings also show that 4.2% of the girls who reported to have received more than 3 services got pregnant compared to 31.2% of those who received 0-3 services. The provision of SRH services from the public health facilities (OR= 10.292; 95% CI 3.147-33.66;  $p < 0.001$ ) had a statistically significant effect on the occurrence of adolescent pregnancy among school girls in the control group.

### **Intervention group**

Table 15 shows that the provision of School Based SRH services (OR= 312; 95% CI 54.90-1778.8;  $p < 0.001$ ) had a statistically significant effect on the occurrence of adolescent pregnancy among school girls in the intervention group. 0.3% of the girls who reported to have received more than 3 services got pregnant compared to 50% of those who received 0-3 services. Results specifically show that the odds of becoming pregnant are 312 times among school girls that received less School Based SRH service (0-3 services) compared to those that received more School Based SRH services (More than 3 services) in the intervention group.

**Overall:** Results indicated in Table 15 show that on the receipt of SRH services (OR= 39.25; 95% CI 16.25-94.81;  $p < 0.001$ ) had a statistically significant effect on the occurrence of adolescent pregnancy among school girls in both the groups. Results specifically show that the odds of becoming pregnant 39.25 times among study participants that received less SRH service (0-3 services) compared to those that received more than three services. In addition, 4.2% of the girls who received more than three services conceived in the control group compared to 0.3% in the intervention group while overall, the prevalence of pregnancy among girls who had received 0-3 services was higher at 40% compared to 1.7% among girls who had received more than three services.

Qualitative findings further supported the need for the use of multiple interventions including the provision of SRH services at school, as indicated in the statement below;

*We know that counselling and guidance has failed to prevent pregnancy  
'(KI 12)*

*SRH services including FP should be provided in schools and other areas  
frequented by the adolescents (KI 15)*

It was clear that majority of the respondents acknowledged the ineffectiveness of education only programs for the prevention of adolescent pregnancy and supported use of multiple interventions although cultural and religious perceptions often barred them from promoting their views as seen below:

*'Hoima has a big number of girls getting pregnant, I even fear to bring my  
girl to the schools in Hoima. Unfortunately, many of us are afraid of  
suggesting other methods of preventing pregnancy because of our cultural  
and religious affiliations' (KI 14, 2019)*

### **Hypothesis rejection/acceptance**

**H<sub>0</sub>:** School Based SRH services provision does not affect occurrence of pregnancy among school girls aged 15-19 years

**H<sub>1</sub>:** School Based SRH services provision affects occurrence of pregnancy among school girls aged 15-19 years

Based on the results above results, school based SRH services provision has a statistical significance on occurrence of adolescent pregnancy among school girls aged 15-19 years in Hoima District. This is further evident in the higher percentage of pregnancy within the control group (4.2%) compared to that in the intervention group (0.3%) among girls who received more than 3 services. The girls who received fewer services had a 312 chance of conceiving compared to those who received more than three services. Therefore, the findings of this study confirm that there is a significant effect of provision of school based services on the occurrence of adolescent pregnancy among school girls aged 15-19 years.

Based on the above, the study rejected the null hypothesis and accepted the alternative hypothesis which states that '*School Based SRH services provision significantly affects occurrence of pregnancy among school girls aged 15-19 years*'.

**Discussion on the effect of SRH services on occurrence of adolescent pregnancy:** In this study, the prevalence of pregnancy among girls who had received 0-3 services was higher at 40% compared to 1.7% among girls who had received more than three services. The findings agree with Oringanje (2016) who stated that a combination of educational and contraceptive-promoting interventions appear to reduce unintended pregnancy among adolescents. This study ensured that education and other SRH services are provided at school and through the referral system as per the national guidelines. Similarly, two randomized trial studies (858 participants) by Herceg-Brown (1986) and Philliber (2002) showed that the risk of unintended pregnancy was lower among participants that received multiple interventions (43/397) compared with the control group (69/461) and the difference approached statistical significance (RR 0.72, 95% CI 0.51 to 1.03). Philliber further stated that female participants in the intervention group had significantly lower odds than controls of having experienced a pregnancy (0.3) during the time of the study in New York. Despite the fact that the findings of this study agree with Herceg-Brown (1986) and Philliber (2002), it should be noted that all the two studies were conducted in developed countries, no published study was found in Africa so comparison was not possible among developing countries.

In an abstinence-centered sex education program in adolescent pregnancy prevention, the TeenSTAR Program was applied in a high school in Santiago, Chile (Cabezón, 2005), the prevalence of pregnancy for the intervention and control groups in were 3.3% and 18.9%, respectively (RR: 0.176, CI: 0.076-0.408) in the 1997 cohort compared to 4.4% and 22.6%, respectively (RR 0.195, CI: 0.099-0.384) in the 1998 cohort. The finding from this study agrees with Cabezón (2005) who showed the low effectiveness of the abstinence only program (which is comparable to control group which did not receive any intervention but depended on the already existing sexuality education within the curricula).

Important to note is that the prevalence of pregnancy was lower among girls in the intervention (0.3%) and control (4.2%) groups among girls who received more than three services.

However, the findings of this study differ and hence do not agree from those of LaChausse (2016) who found that there was no impact of the Positive Prevention PLUS program (education only) on getting pregnant at 6-month follow-up ( $b = -0.01$ ;  $t = -1.87$ ;  $P = .07$ ) in a cluster randomized trial conducted in 21 suburban public high schools in California.

### **Summary of key findings**

1. There was no significant variation and observed imbalances in the baseline variables in both the intervention and the control groups which is an indication that the randomization of the clusters was properly conducted; and that the study participants come from the same population in Hoima District. It was therefore assumed that the outcome of this study was due to the intervention.
2. There was a significant variation in the proportion of school girls who reported receiving more than 3 services between the two groups: the proportion of school girls in the intervention arm who reported receiving more than 3 services increased from 59.6% at baseline to 65.4% by the end of the intervention but respectively lowered from 40.4% to 34.6% in the control group
3. There was an increment in the pooled prevalence of pregnancy from 1.8% (1.9% intervention group: 1.5% control group) at baseline to 2.8% (1.4% intervention group: 5.4% control group) within the ten months of the study. This variation was statistically significant.
4. The odds of becoming pregnant among school girls that received less SRH service (0-3 services) are 10.3 times and 312 times in the control and intervention group respectively compared to those that received more than three services.
5. The prevalence of pregnancy among girls who had received 0-3 services was higher at 40% (31.2% control: 50%) compared to 1.7% among girls who had received more than 3 services (4.2% control: 0.3% intervention) Hence there was a statistically significant effect of provision of School Based SRH services and use on the occurrence of adolescent pregnancy among school girls

In conclusion, provision of comprehensive school based SRH services has a significant effect on the prevention of adolescent pregnancy among school girls aged 15-19 years.

## SECTION FOUR: EFFECT OF SCHOOL BASED SRH SERVICES PROVISION ON SEXUAL BEHAVIOUR AMONG SCHOOL GIRLS AGED 15- 19 YEARS IN HOIMA DISTRICT, UGANDA

### 4.1. SEXUAL BEHAVIOUR OF THE SCHOOL GIRLS

In this study, sexual behaviour was considered to be either safe or risky overall. School girls who reported (1) not to have had sexual intercourse or (2) used condom at last sexual encounter ten months prior to the time of data collection were considered to have ‘safe’ sexual behaviour. On the other hand, school girls who reported (1) to have had sexual intercourse or (2) never used a condom at last sexual encounter ten months prior to the time of data collection were considered to have ‘risky’ sexual behaviour.

**Baseline:** Descriptive analysis shows that 22.8% (270/1182) of all the school girls reported to have had at least one sexual encounter in their life prior to the data collection at baseline. *Table 16* shows the details about the sexual encounter and reasons for its occurrence.

*Table 16: Sexual behaviour related characteristics among school girls (N=270) who reported to ever having sex in their life at baseline*

Variables	Frequency N (%)
<b>Age at first sexual encounter (years)</b>	
Below 5	6 (2.2)
6-10	20 (7.4)
11-14	35 (13)
<b>15-18</b>	<b>164 (60.7)</b>
19	5 (1.9)
Don't remember	40 (14.8)
<b>Age of the first sexual partner (years)</b>	
Below 10	11 (4.1)
11-14	25 (9.3)
<b>15-18</b>	<b>116 (43)</b>
19 and above	72 (26.7)
Don't remember	46 (17)
<b>Reason for first sexual encounter</b>	
<b>Willing</b>	<b>166 (61.5)</b>
Persuaded	55 (20.4)
Forced/raped	21 (7.8)
Tricked/coerced	28 (10.4)
<b>Number of sexual partners</b>	
<b>1-2</b>	<b>231 (85.6)</b>
3 and more	37 (13.7)
Not sure	2 (0.7)

*Data source: Primary source, 2019*

Majority (60.7%) of the school girls who had ever had a sexual encounter reported to have had their first sexual encounter at the age of 15-18 years and this is also similar to the recalled age (15-18 years) of their first sexual partner at 15-18 years. 85.6% of the girls also reported to have 1-2 sexual partners at the time of data collection. Interestingly, 61.5% of the girls reported to have been willing to have the first sexual encounter mainly for exploration and for experience purposes only.

## Sexual behaviour at the end of the study

*Table 17: Sexual behaviour among school girls aged 15-19 years in Hoima District at end line*

Sexual behaviour	Intervention N (%)	Control N (%)	$\chi^2(df)$	P-Value <sup>a</sup>
Sex intercourse T2				
No	564(88.1)	297(85.6)	1.157	0.282
Yes	77(11.9)	50(14.4)		
Use condom at last sex T2				
No	30(4.7)	40(11.5)	27.500	<b>0.000**</b>
Yes	47(7.3)	10(2.9)		
Not applicable	564(88.0)	297(85.6)		
Overall Sexual behaviour				
Safe	611(66.6)	307(33.4)	48.562	<b>0.000**</b>
Risky	30(42.9)	40(57.1)		

<sup>a</sup> Comparison between Intervention and comparison groups

Data source: Primary data, 2019

Study findings in *Table 17* show that a higher proportion of school girls had not had sexual encounter within ten months prior to end-line data collection within the intervention group (88%) compared to a lower proportion of the school girls who reported not to have had sexual encounter in the control group (85.6%). The variation in sexual encounter in the two groups was not statistically significant ( $\chi^2 = 1.157, p = 0.282$ ). Generally, the study found out that 12.9% (127/988) girls reported to have had sexual encounter within the ten months of the study with more girls having sex within the control group (14.4%) than the intervention group (11.9%).

Results however show that there was a higher proportion of school girls who reported to have used a condom at the last sexual encounter ten months prior to end line data collection within the intervention group (7.3%) compared to a lower proportion in the control group (2.9%), the difference was significant ( $\chi^2 = 27.500, p < 0.001$ ).

Therefore, the overall the proportion of school girls who had 'safe' sexual behaviour was 66.6% in the intervention group compared to 33.4% in the control group and the variation was statistically significant ( $\chi^2 = 48.562, p < 0.001$ ). This means that there was a great difference in the proportion of girls who practices safe sexual practices with the girls in the intervention group practicing more safe sex than those in the control group.

## Discussion on sexual behaviour

Findings of this study shows that 22.8% of all the school girls reported to have had at least one sexual encounter in their life. The findings agree with results from a study conducted in Nigeria by Aderibigbe *et al.* (2011) among adolescent which found out that 28.2% of school adolescents (boys and girls) were sexually active. Despite the fact that Aderibigbe *et al.* (2011) study looked at both girls and boys in school, the sexual activity level was comparable to 22.8% in this findings.

Similarly, a study conducted in Uganda by MoES (2016), reported that 28% adolescent girls in school are sexually active. The sexual activity in Nigeria and Uganda seem to be almost the same hence a major reproductive health burden across the continent (CDC, 2016) since the practices increases the risk for not only unintended pregnancy but also HIV infection among other problems.

According to this study, majority (60.7%) of the school girls who had ever had a sexual encounter reported to have had their first sexual encounter at the age of 15-18 years and this is also similar to the recalled age (15-18 years) of their first sexual partner at 15-18 years. 85.6% of the girls also reported to have 1-2 sexual partners at the time of data collection. Interestingly, 61.5% of the girls reported to have been willing to have the first sexual encounter mainly for exploration and for experience purposes only. This clearly shows that most of the girls are actually having sex with boys within the same age bracket and it correlates to the fact that most of the girls who were pregnant at the end of the study were in the boarding section where there is little access to SRH services but also closer proximity between the girls and the boys.

Whereas 15% of the sexually active adolescents could not recall the age of the first encounter, 22.6% of all the girls (15-19 years) who had had at least one encounter were below the age of 15 years, this prevalence is much higher than the findings in the 2016 UDHS report (UBOS & ICF International, 2017) which indicated that only 12.2% of adolescents aged 15-19 years had had sex by the age of 15 years. Clearly, the sexuality rate among the girls is higher than what the country knows and this calls for urgent and effective measures to curb the problem.

## 4.2. THE EFFECT SCHOOL BASED SRH SERVICE PROVISION ON SEXUAL BEHAVIOUR AMONG SCHOOL GIRLS AGED 15-19 YEARS

*Table 18: Logistic Regression Results for the effect School Based SRH service provision on Sexual behaviour among school girls aged 15-19 years*

	Sexual Behaviour		OR(95%CI)	P-Value
	Safe N (%)	Risky N (%)		
SRH services received at T2				
Control				
0-3 services	14(87.5)	2(12.5)	0.88(0.19-4.03)	0.870
More than 3 services	294(88.8)	37(11.2)		
Intervention				
0-3 services	10(71.4)	4(28.6)	0.11(0.03-0.38)	0.000**
More than 3 services	600(95.7)	27(4.3)		
Overall				
0-3 services	24(80.0)	6(20.0)	0.29(0.11-0.73)	0.008**
More than 3 services	894(93.3)	64(6.7)		

\*Significant at 5% level. Data source: Primary data, 2019

### Control group

Findings in *Table 18* shows that the odds of a school girl having safe sexual behaviour are 0.88 times among school girls that received less School Based SRH service (0-3 services) compared to those that

received more SRH services from public facility (More than 3 services) in the control group. The service utilization (OR= 0.88; 95% CI 0.19-4.03; p = 0.870) had a statistically insignificant effect on the sexual behaviour among school girls in the control group.

### **Intervention group**

Table 18 shows that the provision of School Based SRH services led to high uptake of services and this had a statistically significant effect (OR= 0.11; 95% CI 0.03-0.38; p < 0.001) on sexual behaviour among school girls in the intervention group. Results specifically show that the odds of having 'safe' sexual behaviour are 0.11 times among school girls that received less School Based SRH service (0-3 services) compared to those that received more School Based SRH services (More than 3 services) in the intervention group.

### **Rejection or acceptance of the hypothesis**

#### **Hypothesis two**

**Ho:** School Based SRH services provision has no effect on adolescent sexual behavioural among school girls aged 15-19 years.

**H1:** School Based SRH services provision has an effect on adolescent sexual behavioural among school girls aged 15-19 years.

Based on the results above, provision of school based SRH services in the intervention group had a statistical significance on sexual behaviour among school girls aged 15-19 years in Hoima District.

Therefore, this study will reject the null hypothesis that says that '*School Based SRH services provision has no effect on adolescent sexual behavioural among school girls aged 15-19 years*' and instead accept the alternative hypothesis that says that '*School Based SRH services provision has an effect on adolescent sexual behavioural among school girls aged 15-19 years*'.

### **Discussion on effect of school based SRH services on sexual behaviour**

The overall proportion of school girls who had 'safe' sexual behaviour was significantly higher at 66.6% in the intervention group compared to 33.4% in the control group. This is an indication of the impact of school based SRH services on overall sexual behaviour among girls aged 15-19 years.

The proportion of girls who reported not to have used condoms at the last sexual encounter reduced from 12% to 4.7% (60.8% reduction rate) and 18.6% to 11.5% (38.2% reduction rate) in the intervention group and control group respectively. The findings of this study show that there was a 60.8% reduction rate in the proportion of girls who had not used condoms in the last sexual encounter which strongly agree with results from another RCT study conducted on promotion of safer sexual choices within high schools in California (Coyle *et al.*, 2001) that showed that number of adolescents who had not used a condom at last sexual encounter in the intervention group had reduced slightly more than one-third by the end of the study. This clearly emphasizes the impact of combined interventions in improving sexual practices among adolescents in school. Although there is no RCT study has been conducted in Africa using multiple /combined interventions for prevention of pregnancy and promotion

of safer sexual practices, other studies conducted in other countries outside Africa continue to show significant impact of using multiple interventions on promoting safe sexual behaviour and prevention of adolescent pregnancy.

### **Summary of key findings**

1. The percentage of school girls who reported to have had at least one sexual encounter in their life at baseline was 22.8%, with the first encounter majorly occurring between 15 and 18 years; and with a sexual partner aged the same.
2. Majority (85.6%) of the girls who had had at least one sexual encounter in life also reported to have 1-2 sexual partners at the time of data collection
3. Majority of the school girls (61.5%) who had had at least one sexual encounter in life reported to have been willing to have the first sexual encounter.
4. A total of 127 out of 988 (12.9%) school girls who participated in the study had had sexual encounter within the ten months of the study. The level of sexual activity was higher among the girls in the control group (14.4%) compared to those in the intervention group (11.9%)
5. The school girls within the intervention group reported a significantly higher condom use at last encounter at 7.3% compared 2.9% in the control group during the study.
6. The overall proportion of school girls who had 'safe' sexual behaviour was significantly higher at 66.6% in the intervention group compared to 33.4% in the control group.

In conclusion, provision of school based SRH services in the intervention group had a statistical significance on sexual behaviour among school girl's aged 15-19 yeas in Hoima District.

## SECTION FIVE: ASSOCIATION BETWEEN SEXUAL BEHAVIOUR AND ADOLESCENT PREGNANCY AMONG SCHOOL GIRLS AGED 15-19 YEARS IN HOIMA DISTRICT, UGANDA

### 5.1. SEXUAL BEHAVIOUR AMONG GIRLS

Overall, 66.6% school girls within the intervention group had safe sexual behaviour compared to 33.4% among school girls in the control group. There was a statistically significant variation ( $\chi^2= 48.562$ ,  $p<0.000$ ) between the sexual behaviour among the school girls in the intervention group and those within the control group as shown in *Table 19*.

*Table 19: Sexual behaviour among school girls aged 15-19 years in Hoima District*

Sexual behaviour	Intervention N (%)	Control N (%)	$\chi^2_{(df)}$	P-Value <sup>a</sup>
Sex intercourse T2				
No	564(88.1)	297(85.6)	1.157	0.282
Yes	77(11.9)	50(14.4)		
Use condom at last sex T2				
No	30(4.7)	40(11.5)	27.500	<b>0.000**</b>
Yes	47(7.3)	10(2.9)		
Not applicable	564(88.0)	298(85.6)		
Overall Sexual behaviour				
Safe	611(66.6)	307(33.4)	48.562	<b>0.000**</b>
Risky	30(42.9)	40(57.1)		

<sup>a</sup> Comparison between Intervention and comparison groups

*Data source: Primary data, 2019*

The results show that there was a clear difference in the sexual behaviour between the girls who were in the intervention group and those who were in the control group. The findings are similar to results from an RCT study conducted on promotion of safer sexual choices within high schools in California (Coyle *et al*, 2001) that showed that number of adolescents who had not used a condom at last sexual encounter in the intervention group had reduced slightly more than one-third by the end of the study. The findings are in agreement with Bunnet (2008) that found in abstinence-only programs that reported no significant change in the frequency of intercourse or number of partners. However, Bunnet results are from an abstinence only program yet this study was combined. Bunnet further reports that adolescents receiving combined (abstinence-plus) programs had a significant increase in use of condom use, which is in agreement with the findings in this study that found a higher rate of safe sexual behaviour compared to school girls who did not have access to school based SRH programs.

### 5.2. ASSOCIATION BETWEEN SEXUAL BEHAVIOUR ON ADOLESCENT PREGNANCY AMONG SCHOOL GIRLS AGED 15-19 YEARS

Overall, only 2.3% of all school girls who reported to have safe sexual behaviour actually got pregnant during the study with a higher proportion of pregnancy occurring among the school girls in the control group (5.8%) compared to those in the intervention group (0.5%).

As expected, the girls who with risky sexual behaviour had higher prevalence of pregnancy at 9.9% with the highest prevalence occurring among the girls in the intervention group (19.4%) compared to those in the control group (2.5%) as shown in *Table 20*.

*Table 20: Logistic Regression results for the effect of sexual behaviour on occurrence of adolescent pregnancy among school girls aged 15-19 years*

		Occurrence of adolescent pregnancy		OR (95%CI)	P-Value
		Yes N (%)	No N (%)		
Sexual behaviour at T2					
Control	Safe	18(5.8)	289(94.2)	2.421 (0.314 - 18.639)	0.381
	Risky	1(2.5)	39(97.5)		
Intervention	Safe	3(0.5)	608(99.5)	0.21 (0.05 - 0.87)	0.000**
	Risky	5(19.4)	25(80.6)		
Overall	Safe	21(2.3)	896(97.7)	0.214 (0.088 - 0.521)	0.000**
	Risky	7(9.9)	64(90.1)		

\*Significant at 5% level. Data source: Primary data, 2019

### Control group

Findings in *Table 20* shows that the odds of a school girl getting pregnant are 2.42 times among girls who had safe sexual behaviour compared to those who had risky behaviour in the control group. The sexual behaviour of the school girls (OR= 2.421; 95% CI 0.314 – 18.639; p = 0.381) had a statistically insignificant effect on the occurrence of adolescent pregnancy among school girls in the control group. However, the odds of the school girls with safe sexual behaviour getting pregnant were 242 times compared to those who reported to have risky sexual behaviour. This has implications on the sexual activity as well as correct and consistent condom use among the school girls who reportedly had safe sexual behaviour.

### Intervention group

*Table 20* shows that there was a statistically significant association between sexual behaviour and occurrence of adolescent pregnancy (OR= 0.21; 95% CI 0.05-0.87; p < 0.001). Results specifically show that the odds of getting pregnant are 0.21 times among school girls that had safe sexual behaviour compared to those that had risky sexual behaviour.

Overall, the school girls who reported to have safe sexual behaviour had a lower prevalence of pregnancy (2.3%) compared to school girls who had risky sexual behaviour (9.9%) and the variation was statistically significant (OR= 0.214; 95% CI 0.088 – 0.521; p < 0.001). The odds of getting pregnant with safe sexual behaviour were low at 0.21 times.

## **Rejection or acceptance of the hypothesis**

### **Hypothesis three**

H<sub>0</sub>: There is no associated between sexual behaviour and adolescent pregnancy among school girls aged 15-19 years

H<sub>1</sub>: There is an associated between sexual behaviour and adolescent pregnancy among school girls aged 15-19 years

Based on the results above, there was a strong statistical association between sexual behaviour and occurrence of adolescent pregnancy among school girls aged 15-19 years in Hoima District. Therefore, this study rejected the null hypothesis that says that '*There is no associated between sexual behaviour and adolescent pregnancy among school girls aged 15-19 years*' and instead accepted the alternative hypothesis that says that '*There is an associated between sexual behaviour and adolescent pregnancy among school girls aged 15-19 years*'.

## **Discussion**

The findings of this study indicate that the overall pooled prevalence of pregnancy among school girls with risky sexual behaviour was 9.9% (19.4% intervention group and 2.5% in the control group). This prevalence (9.9%) is lower than and disagree with Jonas *et al.* (2016) who found that the prevalence of pregnancy among girls who had ever had sex increased was to 21.3 % (95 % CI: 0.19–0.23) in 2011 within South African schools. However, Jonas *et al.* (2016) used a cross sectional design which could not evaluate the association between sexual behaviour and adolescent pregnancy.

The findings also disagree with Heena *et al.* (2014) who found that the sexually experienced adolescent girls in urban cities had high prevalence of pregnancy at 53% and 29% in Baltimore and Johannesburg respectively. This prevalence is higher than 9.9% found among the adolescent girls in school with risky sexual behaviour, this could possibly be attributed to the fact that Heena *et al.* (2014) looked at adolescent girls out of school which is different from this study that only looked at adolescent girls in school.

The findings are also in line with Alan Guttmacher Institute (1997) that stated that the proportion of teenagers who engage in behaviours that put them at risk of pregnancy remains too high with nearly. One-fifth of all sexually active females aged 15-19 years becoming pregnant every year. The findings also agree with WHO (2004) who investigated the relation between several kinds of risk behaviour and pregnancy in a large group of adolescents in USA, WHO (2004) found that there was a significant correlation found between pregnancy, previous sexually transmitted disease and increasing numbers of partners which is indicative of risky sexual behaviour. Rome *et al.* (1998) also found out that past history of sexually transmitted disease among adolescents was associated with increased pregnancy risk. The findings of this study agree with WHO (2004) and Rome *et al.* (1998) on increased risk of pregnancy with risky sexual behaviour. There is therefore need to focus adolescent prevention programs on reduction of sexual behaviour among adolescents.

### Summary of key findings

1. There was a statistically significant variation ( $\chi^2= 48.562$ ,  $p<0.000$ ) between sexual behaviour among the school girls in the intervention group (66.6%) and those within the control group (33.4%).
2. 66.6% school girls within the intervention group had safe sexual behaviour compared to 33.4% among school girls in the control group.
3. The school girls who had safe sexual behaviour within the control group had higher odds of getting pregnant (2.41 times) than the girls in the intervention group (0.21 times).
4. Overall, the school girls who reported to have safe sexual behaviour had a lower prevalence of pregnancy (2.3%) compared to school girls who had risky sexual behaviour (9.9%) and the variation was statistically significant (OR= 0.214; 95% CI 0.088 – 0.521;  $p <0.001$ ).

In conclusion, there was a significant association between provision of SRH services and sexual behaviour of the adolescent girls in school. SRH programmes need to focus on interventions that increase access and utilization of SRH services among adolescent girls so as to promote safer sexual practices.

## SECTION SIX: FACTORS ASSOCIATED WITH UTILIZATION OF SCHOOL BASED SRH SERVICES AND ADOLESCENT PREGNANCY AMONG SCHOOL GIRLS

### 6.1. FACTORS ASSOCIATED WITH UTILISATION OF SCHOOL BASED SRH SERVICES

#### 6.1.1. THE LEVEL OF UTILIZATION OF SRH SERVICES

*Table 21: Level of utilization status of SRH services among school girls*

	Intervention N (%)	Control N (%)	$\chi^2_{(df)}$	P-Value <sup>a</sup>
Utilization of SRH services				
Yes	431(67.0)	86(25.0)	159.876	0.000**
No	210(33.0)	261(75.0)		
<sup>a</sup> Comparison between Intervention and comparison groups				

*\*\*Significant at 5% level. Data source: Primary data, 2019*

Study findings in *Table 21* show that there was a high proportion of school girls who utilized SRH services in the intervention group (67.0%) compared to the school girls in the control group (25.0%). The variations were statistically significant ( $\chi^2 = 159.876$ ,  $p < 0.001$ ). The findings of this study show a high proportion of girls (75%) who did not utilize SRH services in the control group compared to only 33% among the girls within the intervention group.

The findings of this study show a higher proportion of girls (67%) who received the school based SRH services compared to only 25% in the control group who received SRH services from public facilities within the District. This essentially means that 75% of the girls in the control group did not utilize or access services within the 10 months of the study.

The findings of this study however disagree with the 2016 UDHS (UBOS & ICF International, 2017) that reported that only 8% of adolescents had inaccessibility to SRH services. The 8% level of inaccessibility shows that many more girls (75%) actually are not able to receive the services. However, it is important to note that 22.8% girls reported to be sexually active while only 25% accessed services in the control group but yet a higher (67%) proportion is observed in the intervention group. This means that the girls in the control group had approximately 42% unmet need for SRH services.

Schools, peers, mass media, health facilities and community based ASRH programs showed positive impact in adolescents' sexual behaviour (Kalembo *et al.* 2013). The findings of this study agree with the results of this study that showed a significant variation in the level of utilization between the school girls in the intervention group and those in the control group.

Other cross sectional studies show that the level of utilization of SRH services was 47% of the school girls received SRH service in South Africa (Frohlich *et al.*, 2014), 30% level of utilization by Ivanova *et al.* (2019) in a study on utilization of SRH services among adolescents and 21.2% school youths reported that they utilized SRH services in Ethiopia (Binu *et al.*, 2018)

The level of utilization among the school girls in the control group was 25% which may be attributed to limited access to services within the public and private health facilities outside school which is similar to the perceptions by the adolescents in Zambia (Nkole *et al.*, 2019) who sighted inadequate information, education, and communication (IEC) materials in the health facilities as a key hindrance to utilization of services because it poses knowledge gaps in terms of where to access the services and the type of services available at the various clinics.

In contrast, Ntulume (2018) found out that the overall level of access and utilization of SRH services at school was 73.3% with abstinence drive (41%) as the most utilized services, this was a cross sectional study that mainly looked at the all services including abstinence education. Majority of schools provide education on abstinence but lack other comprehensive services for the adolescents hence limited data on utilization of SRH services for adolescents in school.

#### **6.1.2. BIVARIATE ANALYSIS RESULTS FOR THE FACTORS INFLUENCING UTILIZATION OF SRH SERVICES**

At bivariate level of analysis, the factors that were not associated with utilization of SRH services were religion, father's occupation, mother's occupation, cost, location and distance of the SRH services as shown in *Table 22*.

**Age of school girls in years:** The analysis in *Table 23* shows that age of the school girls of had a significant ( $\chi^2 = 8.980$ ,  $p < 0.05$ ) relationship with utilization of SRH services. Among the school girls aged 15-16 years, 49.5% utilized SRH services compared to 50.5% who did not utilize the SRH services within the same age bracket. The percentage of school girls utilizing SRH services increased with increasing age from 49.5% among 15-16 years, to 54.1% among 17-18 years to 74.3% among school girls aged 19 years. Similarly, findings from KII show that girls in lower secondary have a high risk of getting pregnant compared to their counterparts in higher education levels

*‘The most vulnerable group are the girls in lower secondary because they are naïve while those in upper classes are too sharp’ deputy head teacher, (KI 1, 2019)*

Table 22: Bivariate Results for the Factors influencing utilization of SRH services among school girls

		SRH Service Utilization		$\chi^2_{(df)}$	P-Value <sup>a</sup>
Socio-demographic factors		Yes N (%)	No N (%)		
<b>Age in years</b>					
	15-16	274(49.5)	279(50.5)	8.980	<b>0.011**</b>
	17-18	218(54.1)	185(45.9)		
	19	26(74.3)	9(25.7)		
<b>Religion</b>					
	Christian	472(52.0)	435(48.0)	0.228	0.633
	Muslim and others	46(54.8)	38(45.2)		
Parental Characteristics					
<b>Father Occupation</b>					
	Employed	126(58.6)	89(41.4)	6.594	0.159
	Business	151(47.5)	167(52.5)		
	Farmer	152(53.0)	135(47.0)		
	Not Employed	15(55.6)	12(44.4)		
	Not Applicable	74(51.4)	70(48.6)		
<b>Mother Occupation</b>					
	Employed	65(58.6)	46(41.4)	4.108	0.392
	Business	209(51.7)	195(48.3)		
	Farmer	171(49.3)	176(50.7)		
	Not Employed	28(58.3)	20(41.7)		
	Not Applicable	45(55.6)	36(44.4)		
<b>Parent Marital Status</b>					
	Married/cohabiting	342(50.1)	340(49.9)	3.954	<b>0.047**</b>
	Separated/widowed	176(57.0)	133(43.0)		
Accessibility of SRH services					
<b>SRH Cost T1</b>					
	None	195(53.6)	169(46.4)	4.095	0.393
	Less than 3700	107(53.0)	95(47.0)		
	Btn 3700-18500	37(54.4)	31(45.6)		
	Above 19000	23(63.9)	13(36.1)		
	I don't know	156(48.6)	165(51.4)		
<b>Location_used_Place_services_T1</b>					
	School	92(54.8)	76(45.2)	1.494	0.222
	Public Facility & others	426(51.8)	397(48.2)		
<b>Distance SRH Clinic near School used T1</b>					
	Within 1 km	349(53.0)	309(47.0)	0.464	0.496
	Greater than 1 km	169(50.8)	164(49.2)		

<sup>a</sup> Comparison between High SRH utilization and Low SRH utilization

**\*\*Significant at 5% level. Data source: Primary data, 2019**

**Parent's marital status:** There was a statistical significance between parent's marital status ( $\chi^2 = 3.954$ ,  $p < 0.05$ ) and utilization of SRH services. The proportion of school girls who utilized SRH services was higher (57%) among those whose parents were separated/widowed compared to 50.1% for school girls whose parents were living together (either legally married or cohabiting). Qualitative feedback also indicates that parents play a critical role in the promotion and or prevention of adolescent pregnancy as voiced out below.

*Last year, we discovered two (2) girls pregnant and when we called their parents, they simply took the girls for abortion and changed the school, I have even met these 2 girls in school uniform trekking to another nearby school (KI 7, 2019)*

*A parent reported to the police station an old man who had defiled and impregnated her daughter aged 13 years twice in a period of*

*just six months. (KI 14, 2019)*

Although the proportion of school girls who utilized SRH services was slightly higher (57%) among those whose parents were separated/windowed compared to 50.1% for school girls whose parents were living together, the findings agree with Tlaye *et al* (2018) who actually found that adolescents who weren't co-resided with both their parents were also about two times more likely to utilize reproductive health service than those who were living together (AOR = 2.570, 95% CI = 1.155–4.820).

The findings of this study agree with results from a study conducted on the effect of adolescent pregnancy on girl-child in Nigeria by Undiyaundeye *et al.* (2015) who noted that poor parenting is one of the major causes of consequences of teenage pregnancy. Similarly, the findings also agree that teenagers from divorced parents were nearly two times more exposed to teenage pregnancy compared to adolescents from married parents (Yohannes *et al.*, 2018). In addition, Yakubu & Salisu (2018) stated that lack of parental guidance, as a key determinant of adolescent pregnancy in Africa. This is due to the existence of low parental control and communication about sexual and reproductive issues among divorced parents compared to married ones. These lead to increased early sexual debut and risky sexual behaviours among adolescents from divorced parents, and all these expose them to teenage pregnancy.

**Parent's occupation:** There was no significant association between father's occupation ( $\chi^2 = 6.594$ ,  $p=0.159$ ) and utilization of SRH services. Similarly, there was no significant association between mother's occupation ( $\chi^2 = 4.108$ ,  $p=0.392$ ) and utilization of SRH services among school girls.

**Cost of SRH services:** There was no significant relationship between the cost of SRH services ( $\chi^2 = 4.095$ ,  $p=0.393$ ) and utilization of SRH services. The findings are contrary to and do not agree with the results by Yakubu & Salisu (2018) who stated that high costs and long waiting time are major hindrances to access for SRH services among adolescents. In addition, adolescents in Tanzania also reported the sometimes they are required to purchase family planning products from private pharmacies and may find they cannot afford them (WHO, 2019). According to Restless development (2012) in Sierra Leone, adolescents identified illegal charges for access to contraception and other SRH/MCH services which hinder adolescents from utilizing the services. However, qualitative data shows that cost actually influences occurrence of pregnancy:.

*If a parent cannot afford to complete school dues on time, then I find it hard to believe that such a parent can offer the girl other basic needs, so girls seek survival from the men. (KI 1, 2019)*

**Location of the SRH services:** Although there was no statistically significant relationship between location ( $\chi^2 = 1.494$ ,  $p=0.222$ ) and utilization of SRH services, findings in *Table 22* show that school based SRH services (54.8%) were utilized more than the services location outside the school premises (51.8%). Further analysis (*Table 23*) on the preferred location of SRH services by the adolescent girls' reveals that 64.1% of the girls preferred to have SRH services provided within the school premises to mitigate the possible barriers to access. The findings agree with Pushpa (2019) who found that utilization of SRH services was strongly influenced by access issues due to travel in Nepal.

The findings also agree with Abraham *et al* (2019) who found that in-school adolescents were 2.39 more likely to utilize Family Planning services than adolescents who were out-of-school in Ethiopia. In addition, 64.1% of the girls who participated in the study preferred to have SRH services located at school for easy access and utilization as shown in *Table 23*.

*Table 23: Preferred location for SRH services by the school girls*

Preferred location of SRH services	No of school girls	% of school girls
<b>School</b>	758	64.1%
<b>Public facility</b>	136	11.5%
<b>VHT</b>	176	14.9%
<b>Home</b>	112	9.5%
<b>Total</b>	1182	100.0%

*Primary data, 2019*

Whereas location of the SRH services was not statistically significant, the adolescent girls expressed need for services to be located within the school premises. The findings concur with the in-school adolescents in Tanzania (WHO, 2019) who reported the SRH clinics only provide services on weekdays and so conflict with school hours hence making the services inaccessible to them. In other words, the student-unfriendly hours make the clinics inaccessible to the majority of in-school adolescents.

**Distance between school and SRH services:** Findings show that SRH services located within 1km (53.0%) were utilized more than those located at a distance more than 1 km (50.8%). However, there was no statistical significance between distance ( $\chi^2 = 0.464$ ,  $p=0.496$ ) and utilization of SRH services.

The findings differ from a survey done in Tanzania among adolescents who confirmed that long distances to health facilities are a key barrier to services, especially among those in rural areas who report incurring transport costs to reach facilities (WHO, 2019). In a study conducted in Sierra Leone (Restless development, 2012), adolescents sighted the distance to health services and the cost as barriers to accessing FP and SRH services. Even travelling short distances is regarded as a barrier, especially when compounded with young people's lack of financial independence and the attitudes of health workers.

### 6.1.3. MULTIVARIATE LOGISTICS RESULTS FOR THE FACTORS INFLUENCING UTILIZATION OF SRH SERVICES AMONG SCHOOL GIRLS AGED 15-19 YEARS IN HOIMA DISTRICT

Table 24: Multivariate Logistics results for the Factors influencing utilization of SRH services among school girls aged 15-19 years in Hoima District

		SRH Service Utilization		AOR(95%CI)	P-Value <sup>a</sup>
		Yes	No		
Socio-demographic factors		N (%)	N (%)		
Age in years					
	15-16	274(49.5)	279(50.5)	0.38(0.19-0.74)	0.005**
	17-18	218(54.1)	185(45.9)	0.49(0.25-0.96)	0.038**
	19	26(74.3)	9(25.7)	1	-
Parental Characteristics					
Parent Marital Status					
	Married/cohabiting	342(50.1)	340(49.9)	0.81(0.63-1.04)	0.094
	Separated/widowed	176(57.0)	133(43.0)		
<sup>a</sup> Comparison between High SRH utilization and Low SRH utilization					

\*\*Significant at 5%. Data source: Primary data, 2019

Results in Table 24 show that age of the school girls was strongly associated with utilization of SRH services. School girls aged 15-16 years (AOR=0.38; 95% CI 0.19-0.74;  $p<0.05$ ) and those aged 17-18 years (AOR=0.49; 95% CI 0.25-0.96;  $p<0.05$ ) had more likelihood of utilizing SRH services compared to those aged 19 years.

**Age of school girls in years:** The findings of this study show that there was a significant relationship between the age of the school girls and utilization of SRH services at bivariate and multivariate level of analysis. Among the school girls aged 15-16 years, 49.5% utilized SRH services compared to 50.5% who did not utilize the SRH services within the same age bracket. The percentage of school girls utilizing SRH services increased with increasing age from 49.5% among 15-16 years, to 54.1% among 17-18 years to 74.3% among school girls aged 19 years. Yet their utilization of SRH services was lower than the girls aged 19 years who subsequently had a lower prevalence of pregnancy. Clearly, it turns out that the higher the level of utilization of services, the lower the prevalence of pregnancy. Contrary to this, majority of the girls who conceived were aged 17 to 18 years.

The findings of this study are similar and agree with those from a study conducted in Ethiopia which found age of the school girls to be statistically significant influential on the occurrence of adolescent pregnancy with (Yohannes *et al.*, 2018). Yohannes *et al.* (2018) further reported that increase in the age of the adolescent by one year increases the odds of being pregnant by 2.1%. As the girl's age increases adolescents will have more exposure to sexual encounters and exploration of their bodies hence increasing the risk of becoming pregnant. Similarly, findings from KII show that girls in lower secondary have a high risk of getting pregnant compared to their counterparts in higher education levels.

Similar findings are also noted in other adolescent studies in Nigeria (Ezegwui *et al.*, 2012; Were, 2007; Nwosu, 2017). This is mainly because as adolescent grow up, they have more exposure to sex and their chance of becoming sexually active increase. In summary, the age of the school girl and parental marital status were found to be significantly associated with utilization of SRH services.

## 6.2. FACTORS INFLUENCING ADOLESCENT PREGNANCY AMONG GIRLS 15-19 YEARS IN HOIMA DISTRICT

### 6.2.1. STATUS OF ADOLESCENT OF PREGNANCY AT THE END OF THE STUDY

Out of all the girls who got pregnant during the study, there was a high proportion of school girls who got pregnant in the control group (67.9%) compared to the school within the intervention group (32.1%). The variations were statistically significant ( $\chi^2 = 13.557$ ,  $p < 0.001$ ) as shown in *Table 25*.

*Table 25: Status of adolescent pregnancy among school girls aged 15-19 years at the end of the study*

	Intervention N (%)	Control N (%)	$\chi^2_{(df)}$	P-Value <sup>a</sup>
Adolescent pregnancy				
Yes	9 (32.1)	19 (67.9)	13.557	0.000**
No	632 (65.8)	328 (34.2)		

<sup>a</sup> Comparison between Intervention and comparison groups

*Primary source, 2019*

Out of the total school girls who did not get pregnant during the study, a higher proportion of girls did not get pregnant in the intervention group (65.8%) compared to 34.2% in the control group. The prevalence of adolescent pregnancy was higher 5.5% among the school girls in the control group compared to 1.4% in the intervention group.

The findings agree with results from two randomized trial studies (858 participants) by Herceg-Brown (1986) and Philliber (2002) showed that the risk of unintended pregnancy was lower among participants that received multiple interventions (43/397) compared with the control group (69/461) and the difference approached statistical significance (RR 0.72, 95% CI 0.51 to 1.03). Philliber further stated that female participants in the intervention group had significantly lower odds than controls of having experienced a pregnancy (0.3) during the time of the study in New York. Similarly, a study in Santiago, Chile (Cabezón, 2005) reported the prevalence of pregnancy for the intervention and control groups to be 3.3% and 18.9%, respectively (RR: 0.176, CI: 0.076-0.408) in the 1997 cohort compared to 4.4% and 22.6%, respectively (RR 0.195, CI: 0.099-0.384) in the 1998 cohort. While the prevalence of pregnancy is higher in both cohorts than the prevalence of pregnancy (2.8%) in this study, the general consensus is that the prevalence of pregnancy is lower among adolescent who received multiple SRH interventions.

The findings in this study show that the school girls in the control group had a higher prevalence of pregnancy (5.5%) than the girls in the intervention group (1.4%), these results agree with those of

LaChausse (2016) who found that there was no impact of the Positive Prevention PLUS program (education only) on getting pregnant at 6-month follow-up ( $b = -0.01$ ;  $t = -1.87$ ;  $P = .07$ ) in a cluster randomized trial conducted in 21 suburban public high schools in California.

## 6.2.2. BIVARIATE ANALYSIS OF FACTORS INFLUENCING ADOLESCENT PREGNANCY AMONG SCHOOL GIRLS AGED 15-19 YEARS IN HOIMA DISTRICT

At bivariate level of analysis, the factors that were not significantly associated with adolescent pregnancy were age of the school girl and the person with whom the girls stays as shown in *Table 26*.

*Table 26: Bivariate results for the Factors associated with adolescent pregnancy among school girls 15-19 years in Hoima District*

Occurrence of adolescent pregnancy					
		Yes N (%)	No N (%)	$\chi^2_{(df)}$	P-Value <sup>a</sup>
Socio-demographic factors					
Age in years	15-16	11(2.0)	542(98.0)	3.332	0.189
	17-18	16(4.0)	387(96.0)		
	19	1(2.9)	34(97.1)		
Religion	Christian	22(2.4)	885(97.6)	6.231	0.013**
	Muslim and others	6(7.1)	78(92.9)		
School section category	Day scholar	3(1.0)	294(99.0)	5.090	0.024**
	Boarding	25(3.6)	669(96.4)		
Parental Characteristics					
Person who stays with girl	Both parents	13(2.6)	484(97.4)	7.324	0.062
	One of the parent	15(4.3)	330(95.7)		
	Relative	0(0)	39(100)		
	others	0(0)	110(100)		
Sexual activity related factors					
Sexual behaviour	Risky	7(9.9)	64(90.1)	13.781	0.000**
	safe	21(2.3)	899(97.7)		
Ever had abortion in life	Yes	4(44.4)	5(55.6)	57.300	0.000**
	No	24(2.4)	958(97.6)		
Ever been pregnant in life before study	Yes	4(26.7)	11(73.3)	31.531	0.000**
	No	24(2.5)	952(97.5)		
Ever used family planning	Yes	8(5.3)	144(94.7)	3.886	0.049**
	No	20(2.4)	819(97.6)		
Accessibility of SRH services					
SRH Cost T2	None	19(2.3)	804(97.7)	9.510	0.050
	Less than 3700	7(8.0)	80(92.0)		
	Btn 3700-18500	1(2.2)	44(97.8)		
	Above 19000	1(2.8)	35(97.2)		
	I don't know	8(2.4)	327(97.6)		

<sup>a</sup> Comparison between High SRH utilization and Low SRH utilization

*Primary source, 2019*

**Age of the school girl:** There was no statistical significance association between age of the school girl ( $\chi^2 = 3.332$ ,  $p=0.189$ ) and adolescent pregnancy. However, it is important to note that the girls aged 17-18 years had the highest prevalence of pregnancy at 4.0% while the young school girls aged 15-16 years had the lowest prevalence of pregnancy of 2.0%. The findings of this study agree with Rome *et al.* (1998) who found that pregnancy occurred commonly among older adolescent girls than younger adolescent girls.

**Person who stays with the girl:** There was no strong statistical association between the person with whom the girl stays with ( $\chi^2 = 7.324$ ,  $p=0.062$ ) and adolescent pregnancy. However, the girls who stayed with one parent had a higher prevalence of pregnancy (4.3%) than the girls who stayed with both parents (2.6%). The findings agree with Heena *et al.* (2014) who also found out that girls who were not raised by both parents had higher odds of becoming pregnant in Johannesburg. Similarly, Manzi *et al.* (2018) also found out that broken marriages are a major determinant for adolescent pregnancy in eastern Uganda. The findings of this study also agree with Imamura *et al.* (2008) who found out that disrupted family structure was a major determinant for adolescent pregnancy European Union countries.

**Cost of SRH services:** There was no statistical significance association between cost of SRH services ( $\chi^2 = 9.510$ ,  $p=0.050$ ) and adolescent pregnancy. However, it is interesting to note that the girls who reported to have spent less than Ushs 3700 to receive SRH services had the highest prevalence of pregnancy of 8.0%. The findings disagree with Yakubu & Salisu (2018) who found out that high cost of SRH services especially contraceptives is a key determinant for adolescent pregnancy in Sub Saharan Africa. This is not the case in this study because girls who actually paid little or no money for SRH services actually had the highest prevalence of pregnancy although the association was not significant.

**Religion of the school girl:** The school girls who were Christians had a lower prevalence of pregnancy (2.4%) compared to 7.1% among the school girls who were from other denominations (Muslims and others). The association between religion was statistically significant ( $\chi^2 = 6.231$ ,  $p<0.05$ ). A study conducted in the USA (Strayhorn & Strayhorn, 2009) found out that increased religiosity was a strong predictor for a higher teen birth rate ( $r = 0.73$ ;  $p < 0.0005$ ), these findings from the US may be an indicator for the assumed strong faith that Christians exhibit especially in terms of the strong campaign against abortions which is exhibited in this study.

**Category of school girl:** There was a statistical association between the category of the school girl ( $\chi^2 = 5.090$ ,  $p<0.05$ ) and adolescent pregnancy. There was a higher proportion of school girls who were in the boarding section (3.6%) of the school who got pregnant compared to girls who were day scholars (1%). Majority of the girls studied were in schools that had both day and boarding sections and the day scholars had higher prevalence of pregnancy, this finding however do not agree with results from a survey report on re-entry of school girls into school after pregnancy in Uganda by FOWODE (2010) that showed that Day scholars are also known to be more at risk of becoming pregnant than those in boarding schools.

**Sexual behaviour of the school girls:** There was a statistical association between the sexual behaviour of the school girl ( $\chi^2 = 13.781$ ,  $p<0.05$ ) and adolescent pregnancy. The proportion of adolescent

pregnancy was higher among school girls with risky sexual behaviour (9.9) compared to school girls with safe sexual behaviour (2.3%). The findings agree with Donatus *et al.* (2018) who found out in a cross sectional study that sexual activity was a key factor associated with adolescent pregnancy among girls in Cameroon.

**Ever had an abortion:** The proportion of adolescent pregnancy was higher among school girls who had ever had an abortion (44.4%) compared to girls who had never had an abortion (2.4%) in their life. The association was statistically significant ( $\chi^2 = 57.300$ ,  $p < 0.05$ ). The findings agree with Bailey *et al.* (2001) who found out that teenage girls who had aborted had experienced more subsequent pregnancies than girls who had carried their pregnancy to term hence given birth after one year of the occurrence of the pregnancy. This is consistent with this study that found that girls who aborted had a higher likelihood of getting pregnant again compared to those who had never aborted in their life.

**Ever been pregnant in life:** The school girls who had ever been pregnant before the study had higher prevalence of pregnancy (26.7%) compared to school girls who had never been pregnant in their life (2.5%). There was statistically significant association between ever being pregnant ( $\chi^2 = 31.531$ ,  $p < 0.05$ ) and adolescent pregnancy. The findings agree with Donatus *et al.* (2018) who also found out that girls who had had a pregnancy at an early age had had a higher likelihood of getting pregnant.

**Ever used family planning in life:** The school girls who had ever used family planning methods before the study had higher prevalence of pregnancy (5.3%) compared to school girls who had never used family planning methods in their life (2.4%). There was statistically significant association between ever using family planning ( $\chi^2 = 3.886$ ,  $p < 0.05$ ) and adolescent pregnancy. However, in this study, majority of the girls reported not to have used family planning methods in their life which is a likely contributory factor to adolescent pregnancy and is in line with Donatus *et al.* (2018) who found out that low contraceptive use was a significant risk factor associated with adolescent pregnancy in Cameroon. The findings disagree with Oronsaye *et al.* (1982) who found that low knowledge and use of contraceptive methods was a key determinant for pregnancy. This disagrees with the findings of this study that state that girls who had actually ever used family planning had a higher prevalence of pregnancy than those who had never used it. However, the study did not evaluate the accuracy and consistence of the family methods used among the girls who reported to have ever used family planning.

### **6.2.3. MULTIVARIATE LOGISTICS RESULTS FOR THE FACTORS ASSOCIATED WITH ADOLESCENT PREGNANCY AMONG SCHOOL GIRLS AGED 15-19 YEARS IN HOIMA DISTRICT**

Table 27: Multivariate Logistics results for the factors influencing adolescent pregnancy among school girls aged 15-19 years in Hoima District

Variable		Occurrence of adolescent pregnancy		Regression Coefficients	AOR(95%CI)	P-Value <sup>a</sup>
		Yes N (%)	No N (%)			
Socio-demographic factors						
Religion	Muslim and others	6(7.1)	78(92.9)	0.952	2.591 (0.912 – 7.362)	0.074
	Christian	22(2.4)	885(97.6)		1	
School section category	Boarding	25(3.6)	669(96.4)	1.409	4.093 (1.156 – 14.497)	0.029**
	Day scholar	3(1.0)	294(99.0)		1	
Sexuality related factors						
Sexual behaviour	Risky	7(9.9)	64(90.1)	1,106	3.021 (1.008 -9.053)	0.048**
	safe	21(2.3)	899(97.7)		1	
Ever had abortion in life	Yes	4(44.4)	5(55.6)	-2.979	0.051 (0.001 – 4.621)	0.195
	No	24(2.4)	958(97.6)		1	
Ever been pregnant in life before study	Yes	4(26.7)	11(73.3)	0.005	1.005 (0.011 – 95.968)	0.998
	No	24(2.5)	952(97.5)		1	
Ever used family planning	Yes	8(5.3)	144(94.7)	0.227	1.255 (0.415 – 3.794)	0.688
	No	20(2.4)	819(97.6)		1	

Reference category is 'No' representing the girls who did not get pregnant.

<sup>a</sup> Comparison between girls who got pregnant and girls who did not get pregnant

\*\*Significant at 5%. Data source: Primary data, 2019

The factors that were strongly associated with adolescent pregnancy at bivariate and multivariate level of analysis (Table 27) were school section category of the school girl (day scholar or boarding section) (AOR= 4.093; 95% CI 1.156 – 14.497;  $p < 0.05$ ) and sexual behaviour of the school girls (AOR= 3.021; 95% CI (1.008 - 9.053;  $p < 0.05$ ). The school girls who were in the boarding section had more likelihood of getting pregnant compared to school girls who were day scholars.

There was a statistical association between the category of the school girl and adolescent pregnancy. There was a higher proportion of school girls who were in the boarding section (3.6%) of the school who got pregnant compared to girls who were day scholars (1%). Majority of the girls studied were in schools that had both day and boarding sections and the girls in the boarding section had higher prevalence of pregnancy compared to the girls who were in the day section of the schools. This finding however do not agree with results from a survey report on re-entry of school girls into school after pregnancy in Uganda by FOWODE (2010) that showed that Day scholars are also known to be more at risk of becoming pregnant than those in boarding schools. In this study girls in the boarding section are actually more at risk of getting pregnant than girls in the day section.

The findings of this study agree with Jonas *et al.* (2016) who found out that pregnancy among girls who ever had sex increased from 17.3 % (95 % CI: 0.16–0.19) in 2002 to 21.3 % (95 % CI: 0.19–0.23) in 2011 in South Africa. Clearly there is a strong association between sexual behaviour and adolescent pregnancy. It is therefore paramount that major efforts are geared towards attaining safe sexual practices among adolescent girls in school

## **Summary of key findings**

### **Factors associated with utilization of SRH services**

1. There was a significantly high proportion of school girls who utilized SRH services in the intervention group at 75% compared to 25.0% in the control group.
2. Parental marital status and age of the school girl were strongly associated with utilization of SRH services by the school girls. The proportion of school girls who utilized SRH services was significantly higher (57%) among those whose parents were separated/windowed compared to 50.1% for school girls whose parents were living together (either legally married or cohabiting).
3. At multivariate analysis, the age of the school girls had a significant association with utilization of SRH services. The level of utilization increased with increasing age from 49.5% among 15-16 years, to 54.1% among 17-18 years to 74.3% among school girls aged 19 years. Consequently, the 19-year-old girls who had the highest level of utilization (74.3%) consequently had the lowest prevalence of pregnancy (19% at baseline and 3.6% at end line).

### **Factors influencing occurrence of adolescent pregnancy**

- a. At bivariate level, the factors that were associated with adolescent pregnancy included; religion, school section category, ever been pregnant, ever had an abortion, sexual behaviour and ever used family planning.
- b. At multivariate level of analysis, school section category and sexual behaviour of the school girl were strongly associated with adolescent pregnancy.

In conclusion, age of the school girl, school section category and sexual behaviour of the school girl were associated with utilization of SRH services and adolescent pregnancy among school girls 15 to 19 years old. There is therefore need to focus interventions targeting SRH needs of the school girls especially those between 17 and 18 years, girls in the boarding section and those with risky sexual behaviour in order to improve service utilization and prevent adolescent pregnancy in Hoima District.

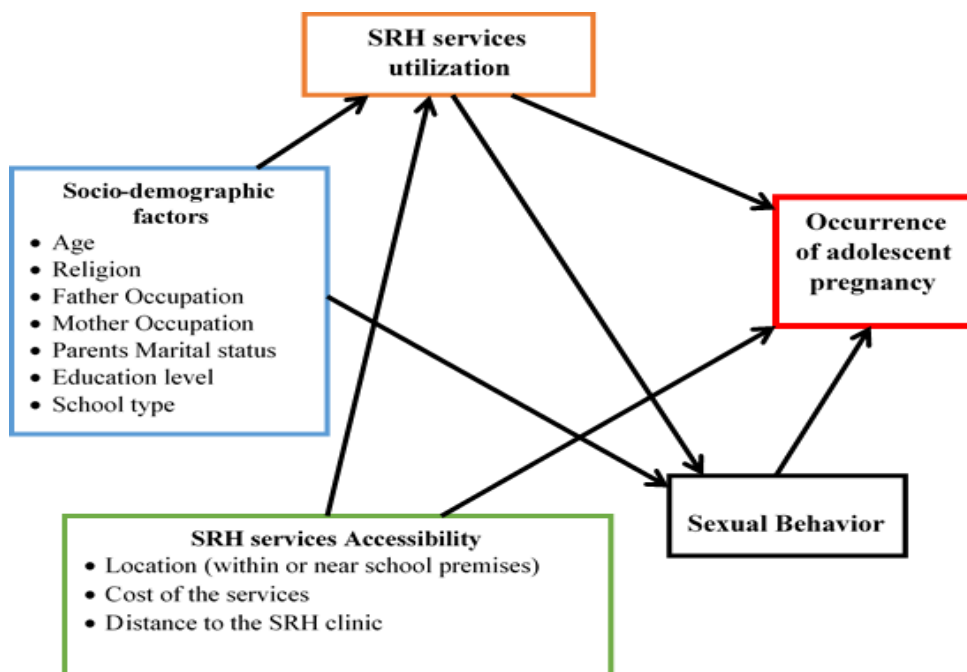
## SECTION SEVEN: CONTRIBUTION TO KNOWLEDGE

### 7. INTRODUCTION

This chapter presents the contribution to the knowledge gap identified through analysis and interpretation of the research findings. The proposed model is hypothesized, explained fully and illustrated. Relevance and practical application of the model is also described. The model is based on the study findings regarding the factors influencing the occurrence of adolescent pregnancy among school girls in Hoima District, Uganda. Through structural equation modeling, the chapter provides findings regarding the direct and indirect factors influencing the occurrence of adolescent pregnancy among school girls.

#### 7.1. THE HYPOTHESIZED SEM MODEL

The findings of this study informed the Structural Equation Modeling (SEM) which yielded the Hypothesized SEM model shown in *Figure 7* on the factors influencing the occurrence of adolescent pregnancy among school girls aged 15-19 years in Hoima District, Uganda



*Figure 7: Hypothesized SEM model on factors influencing occurrence of adolescent pregnancy*

In the Hypothesized SEM model depicted in *Figure 8*, the occurrence of adolescent pregnancy is the dependent variable and the direct factors that were hypothesized as influential were (1) SRH services utilization, (2) Sexual Behaviour and (3) SRH services accessibility. Similar to existing literature, the indirect actors that were hypothesized to indirectly influence the occurrence of adolescent pregnancy through SRH services utilization and Sexual Behaviour included the socio-demographic factors, livelihood factors that are inherent of the study participants particularly age and religion among others.

Demographic factors and SRH services accessibility are considered exogenous factors in the model as opposed to services utilization and Sexual Behaviour which are the endogenous factors.

## **7.2. STRUCTURAL EQUATION MODELING RESULTS FOR FACTORS INFLUENCING THE OCCURRENCE OF ADOLESCENT PREGNANCY AMONG SCHOOL GIRLS**

As depicted in *Table 28* and *Figure 7*, the factors that had a statistically direct significant effect on occurrence of adolescent pregnancy among school girls include utilization of sexual and reproductive health services ( $\beta = -.024, p = 0.018$ ), sexual behaviour ( $\beta = -.072, p = 0.000$ ) and location of SRH services or accessibility ( $\beta = 0.030, p = 0.003$ ). *Table 26* results further show that the marital status of the parents ( $\beta = -.079, p = 0.022$ ) influences occurrence of pregnancy among school girls mediated by SRH Utilization. SRH Utilization ( $\beta = .039, p = 0.014$ ), age ( $\beta = -.044, p = 0.003$ ) and School type ( $\beta = .132, p < 0.001$ ) influences occurrence of adolescent pregnancy among school girls mediated by sexual behaviour.

Table 28: Coefficient and standard error of the final SEM model of factors influencing the occurrence of adolescent pregnancy among school girls

	95% C.I				
Variables	B	S.E.	Sig.	95% Conf. Interval	
Pregnancy occurrence					
SRH Utilization	-.024	.010	<b>0.018</b>	-.045	-.004
Sexual behaviour	-.072	.020	<b>0.000</b>	-.111	-.032
Cost	.008	.007	0.263	-.006	.022
Location	.0409	.014	<b>0.003</b>	.013	.068
School SRH Clinic	.003	.011	0.766	-.019	.0259
Distance	.011	.011	0.317	-.0109	.0338
SRH Utilization					
Cost	.007	.022	0.744	-.036	.051
Location	.030	.043	0.480	-.054	.114
School SRH Clinic	.009	.035	0.777	-.058	.078
Distance	-.023	.035	0.499	-.091	.044
Age	.054	.029	0.067	-.004	.111
Religion	-.015	.057	0.795	-.127	.097
Occupation father	.048	.026	0.067	-.003	.099
Occupation mother	-.002	.032	0.962	-.065	.062
Marital	-.079	.035	<b>0.022</b>	-.147	-.012
Class	.042	.023	0.069	-.003	.088
School type	.108	.066	0.101	-.021	.236
Sexual behaviour					
SRH Utilization	.039	.016	<b>0.014</b>	.008	.072
Age	-.044	.015	<b>0.003</b>	-.074	-.015
Religion	-.013	.029	0.658	-.069	.044
Occupation father	.023	.013	0.084	-.003	.049
Occupation mother	.020	.016	0.223	-.012	.052
Marital	.005	.018	0.772	-.029	.039
Class	-.001	.012	0.945	-.024	.023
School type	.132	.033	<b>0.000</b>	.066	.197

SEM structural equation modeling, SEM model endogenous variables are SRH Services utilization, Sexual Behaviour; exogenous variables are Socio-demographic factors, SRH services Accessibility, CI confidence interval.

Data source: Primary data, 2019

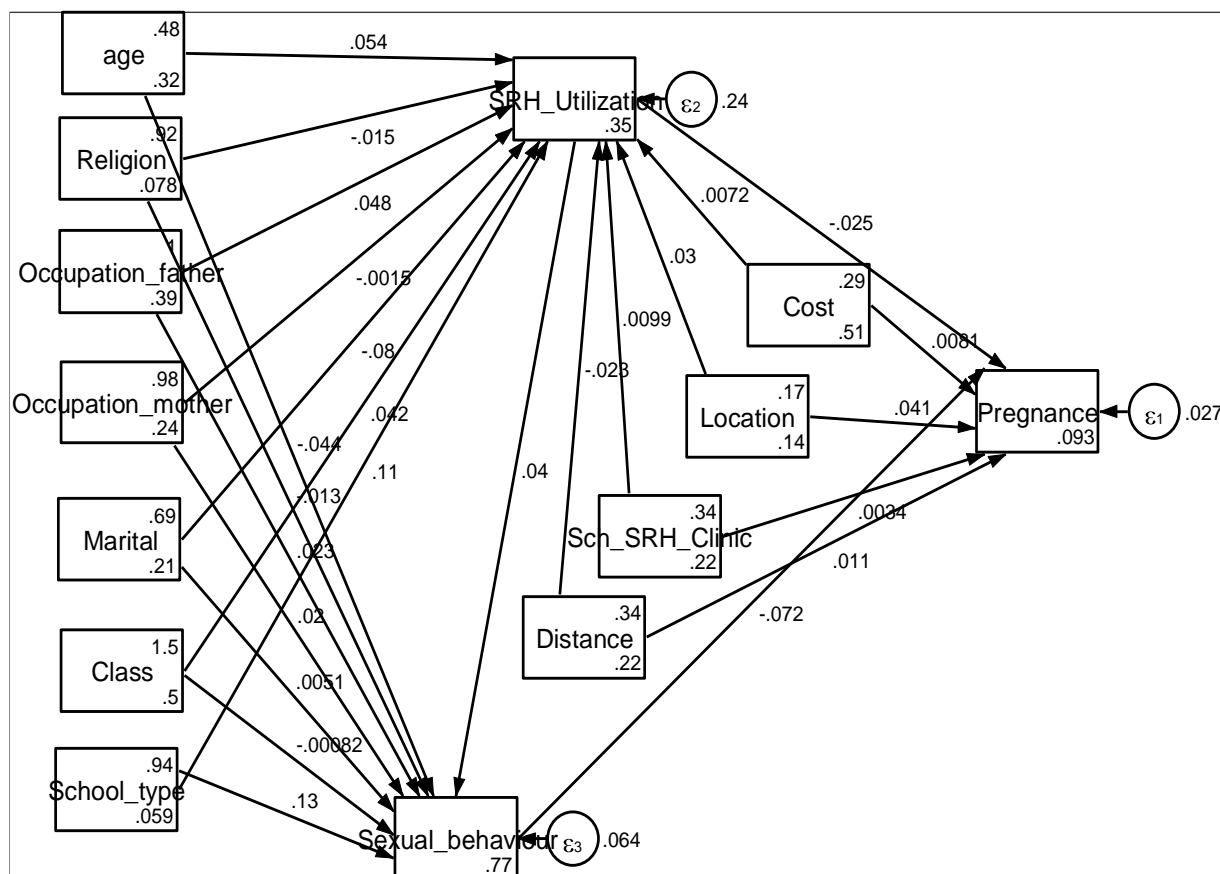
### Goodness of fit statistics

The Goodness of Fit Index (GFI) is a measure of fit between the hypothesized model and the observed covariance matrix. The final SEM model as shown by the standardized path coefficients in *Figure 9* depicted an excellent fit with the goodness-of-fit statistics are shown in *Table 29*.

*Table 29: Goodness-of-fit statistics for the structural equation model*

Goodness-of-fit statistics	Value
Root mean squared error of approximation	0.036, 95% CI (0.018–0.055)
Pclose	0.877, < 0.05
Comparative fit index	0.815
Tucker-Lewis index	0.394
Standardized root mean squared residual	0.015
Coefficient of determination	0.062

*Data source: Primary data, 2019*

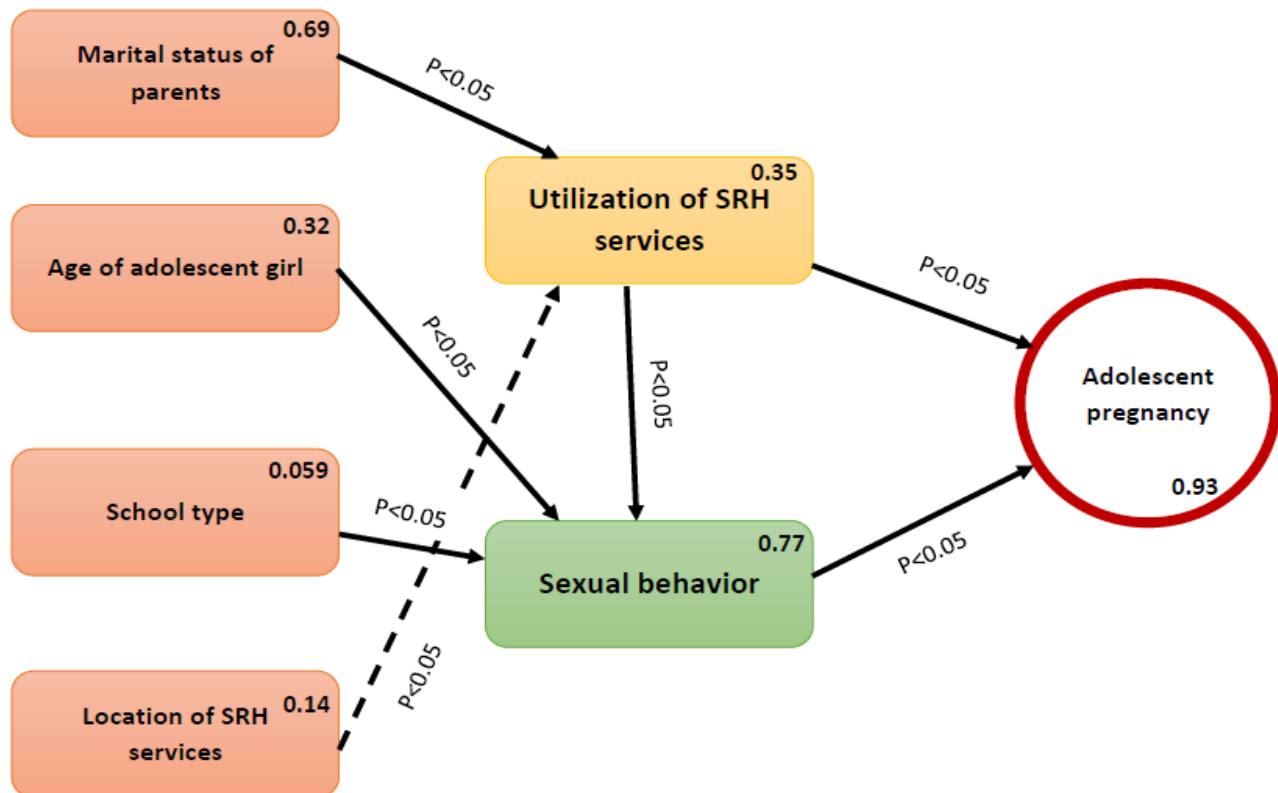


*Figure 8: SEM model of influencing factors for occurrence of adolescent pregnancy.*

*Data source: Primary data, 2019*

Based on the SEM results of the hypothesized model, occurrence of pregnancy is directly influenced by utilization of SRH services and sexual behaviour of the school girls. Furthermore, sexual behaviour is influenced by type of school (day, boarding or both day and boarding) and the age of the school girl. On the other hand, SRH service utilization is influenced by location of the SRH services and marital status of the parents.

**Measuring of the overall contribution of school-based sexual and reproductive health services to prevention of adolescent pregnancy**



*Figure 9: Output Path diagram showing the relationship between school-based sexual and reproductive health services to prevention of adolescent pregnancy,*

*Data source: Primary data, 2019*

Figure 9 shows the output path diagram which illustrates the relationship of the school based SRH services and related factors; and adolescent pregnancy as they already exist based on the SEM results. The diagram shows that Adolescent pregnancy is directly influenced by utilization of SRH services and sexual behaviour of the school girls. Furthermore, sexual behaviour is influenced by type of school (day, boarding or both day and boarding) and the age of the school girl. On the other hand, SRH service utilization is influenced by location of the SRH services and marital status of the parents.

## Path analysis

This was conducted to evaluate the causal model by examining the relationship between the school based SRH services and related factors; and adolescent pregnancy. *Table 30* shows the path analysis of the coefficients of the model.

*Table 30: The Path coefficients*

Paths	Variables	Coefficients
Path one (P1)	Marital status (MS); SRH service utilization (SRHU); Adolescent pregnancy (AP)	MS:0.69, SRHU:0.35, AP:0.93
Path two (P2)	Marital status (MS); SRH service utilization (SRHU); Sexual behaviour (SB); Adolescent pregnancy (AP)	MS:0.69, SRHU:0.35, SB:0.77, AP:0.93
Path three (P3)	Age (AG); Sexual behaviour (SB); Adolescent pregnancy (AP)	AG:0.32, SB:0.77, AP:0.93
Path four (P4)	School type (ST); Sexual behaviour (SB); Adolescent pregnancy (AP)	ST:0.059, SB:0.77, AP:0.93
Path five (P5)	Location (LO); SRH service utilization (SRHU); Adolescent pregnancy (AP)	LO:0.14, SRHU:0.35, AP:0.93

*Data source: Primary data, 2019*

## Computing total casual effect of the School Based SRH services

Basing on the hypothetical model, the path analysis was computed by the multiplication of the endogenous variables which are directional and their variance is considered to be explained in part by other variables. The computations are stated below

### P1: MS-----SRHU----- AP

$$0.69 \times 0.35 \times 0.93 = 0.2246$$

### P2: MS-----SRHU-----SB-----AP

$$0.69 \times 0.35 \times 0.77 \times 0.93 = 0.1729$$

### P3: AG-----SB----- AP

$$0.32 \times 0.77 \times 0.93 = 0.2292$$

### P4: ST-----SB----- AP

$$0.059 \times 0.77 \times 0.93 = 0.0422$$

### P5: LO-----SRHU----- AP

$$0.14 \times 0.35 \times 0.93 = 0.0456$$

According to the above computations, all the path coefficients were positive which meant that increasing the causal variables causes an increase in the occurrence of adolescent pregnancy. Path three (P3) has the strongest the strongest factor load therefore strongest relationship with adolescent pregnancy among school girls aged 15-19 years. This followed by P1, P2, P5 and P4 sequentially.

### 7.3. EVOLUTION OF THE NEW SCHOOL BASED SRH MODEL

In view of the existing norms, models, theories and practices, several gaps were identified that substantiate the need for a new model for the prevention of adolescent pregnancy as the contribution to knowledge. The commonly used models and theories for sexual behavioural change and gaps are described below.

**Knowledge gaps:** There is limited knowledge on the key drivers of sexual activity and adolescent pregnancy for adolescent girls in school.

Description of key characteristics: Undiyaundeye *et al.*, (2015), Akanbi *et al.* (2016) and Dawan (2008) demonstrate factors that promote adolescent pregnancy but there is limited knowledge on the key drivers of sexual activity and adolescent pregnancy in terms of the specific characteristics of the adolescents who are sexually active and those who are pregnant. Often, adolescents within the same geographical area, similar socio-economic levels, and same education level among others tend to vary in the degree of sexual activity and pregnancy. A clear understanding of determinants of adolescent pregnancy for the same group of people within the same geographical and similar socio-demographic characteristics has been established in this study owing to adoption of approaches focusing on the identified drivers.

Inadequate knowledge on SRH: Adolescents often lack confidential source of accurate information on SRH, many base their actions on rumors, peers, media and other unreliable sources for SRH information. The AYA study (200) and Kalembo *et al* (2013) all indicate that there is a serious gap in the availability of skilled professionals to provide accurate information and services within the country's context. It is paramount that clear sources of accurate information are put in place to facilitate information sharing among the adolescents from credible sources. There is therefore a need for reliable, consistent and available source of information for the adolescents as per the study intervention.

Limited range of SRH services: In majority of the schools, the school clinics provide basic first aid and lacked comprehensive SRH services for the students in schools yet the students demonstrate a high level of need for SRH services. UNICEF (2008) and Kamau & Ombinja (2012) do not provide information of the role of service provider to provide actual services and information for adolescents. This is usually undermined yet it is critical in promoting utilization of SRH services among adolescent. Therefore, this study proposes the provision of comprehensive SRH services within reach for the adolescents for instance within the school premises.

#### **Theoretical gaps**

In the Social Learning Theory, Bandura (1977) and McLeod (2016) did not make consideration for the type of desired behaviour, the theory does not specify the kind of behaviour needed to observe behaviour in order to realize positive behavioural change. It is assumed that an individual will only

imitate positive behaviour which is not always true. The character of the presumed positive peers must be considered with care, the accuracy of the information disseminated through the peers also ought to be accurate which in most cases is not.

Secondly, the SLT does not address the provision of accurate information to individuals, actual service availability and utilization as a way of influencing behaviour and hence a measuring change of behaviour that has been learned. Therefore, this study addressed the gaps by provision of actual services which ensured that the information shared by peers was accurate and learned from a reliable and informed source which was the skilled health worker. This was intended to influence sexual behaviour change resulting in prevention of pregnancy among the adolescents.

**Trans-theoretical Model:** Lezin (2017) in the Trans-Theoretical Model does not cater for access to services which contributes to change in behaviour yet sexual behaviour change goes hand in hand with availability and access to health services so as to foster positive behaviour change practices. In addition, the lack of critical consideration of the lack of knowledge as a key factor that delays change behaviour; the need for small support groups to help an individual to change behaviour however, this can only be possible if the peer support is given by a person with the desired character. The gaps were addressed by the provision of information through the school SRH clinics on a regular basis to help the adolescents make informed decisions about their sexual practices; supporting peers with correct information to share with their colleagues; improving access to SRH services through establishment of school SRH clinics; intensifying any contact with the adolescents to create awareness and support the adolescents to change behaviour hence minimizing the period of risky behaviour exposure.

**Health Belief Model:** Becker (1974) in the HBM assumes that everyone would take up actions because of a perceived negative consequence. This may not be the case for especially the adolescent girls who are susceptible to lots of emotional and physiological changes coupled with peer influence. The model does not also cater for reproductive health service availability and access as key drivers to service utilization. Therefore, this study sought to address the gaps by providing reproductive health services to the students at school and providing information of SRH especially the negative consequences of the risky sexual behaviour including pregnancy. This was believed to help the adolescents make informed decisions about their sexual practices.

### **Methodological gaps**

The lack of universally accepted adolescent age globally presents key methodological challenges when conducting key research and designing health programs for adolescents. This mainly stems from the fact that each country defines an adolescent differently which subsequently influences the health services provided to the adolescents. In Uganda, an adolescent is an individual aged 10 to 19 years although access to sexual and reproductive health services especially commodities (such as contraceptives) is majorly focused on the individuals aged 15 years and above. WHO (2014) defines an adolescent as any person between ages 10 and 19 years while United Nations Children's Fund (UNICEF, 2008) on the other hand considers an adolescent as one between the 13 and 19 years, this particularly leaves out the young people between 10 and 12 years.

Limited range of SRH services: The Ugandan policy guideline on adolescent reproductive health (MOH, 2012) excludes provision of key reproductive health services such as family planning and post abortion care which are vital for prevention of adolescent pregnancy and mortality due to pregnancy related complications. This is contrary to WHO (2014) and UNFPA (2013) recommendations for provision of comprehensive sexual and reproductive health services for adolescents.

SRH services: Mason-Jones (2016) and DiCenso (2002) studies clearly show that the ASRH needs go beyond just education and persuasion to actual service delivery. The UNICEF (2008) and DiCenso (2002) studies focus on education and information which is beyond what the adolescents are demanding for, therefore there is need to incorporate service delivery in the health package for adolescents especially those in school with little access to community and clinical based programs. In Uganda, youth-friendly ASRH services have been established at the health facilities and community outreaches, behavioural change communication was also promoted and youth services were incorporated in several in-service curricula for MOH (Tylee *et al.*, 2007). Such services barely target adolescents in school who also have sexual and reproductive health needs just like the largely targeted adolescents out of school. This variation may be contributing to the persistent adolescent pregnancy in the country

Location of SRH services: In majority of the schools, the school clinics provide basic first aid and lack comprehensive SRH services for the students in schools yet the students demonstrate a high level of need for SRH services. Clinic based programs are considered one of the most effective ways of providing adolescents with ASRH services through improved access and availability of care (WHO, 2018). However, WHO does not show significant access to the adolescents in school since the clinic services are often provided when the adolescents in school are attending classes. Tulenko *et al.* (2013) and Atun *et al.* (2010) point out that community interventions can improve access to services although many show less success mainly due to poor integration into the community system.

Arenson *et al.* (2019) notes that School-based health centers (SBHCs) provide comprehensive health care directly in schools where young people spend the majority of their time, maximizing their opportunity to learn and grow. However, in Uganda, school clinics only provide basic first aid to the students and refer the students back home in case of illnesses beyond the minimum care they provide. This means that adolescent SRH services are not in any way part of the school clinics care package which further creates missed opportunities in addressing the sexual reproductive health needs of the adolescents in school.

Research from developed countries shows that adolescent girls with access to SBHCs are more likely to get reproductive preventive care, use hormonal contraception, and to have been screened for an STI than similar girls without an SBHC (School health centers, 2015). However, the concept of SBHC providing comprehensive SRH services is not promoted in developed countries therefore little evidence on their effectiveness is known

This study addressed the knowledge, theoretical and methodological gaps by focusing on the adolescent girls who are still in school and establishing comprehensive SRH services within the school premises, hence improving access by location and at no cost.

**Scientific evidence:** Provision of School Based SRH services (OR= 41.52; 95% CI 17.07-100.99;  $p < 0.001$ ) had a statistically significant effect on the occurrence of adolescent pregnancy among school girls. Provision of School Based SRH services (OR= 0.29; 95% CI 0.11-0.73;  $p < 0.05$ ) had a statistically significant effect on the sexual behaviour among school girls in the intervention group.

At bivariate level, the factors associated with SRH utilization were age of the school girls ( $\chi^2 = 8.980$ ,  $p < 0.05$ ) and parent's marital status ( $\chi^2 = 3.954$ ,  $p < 0.05$ ) while religion ( $\chi^2 = 6.231$ ,  $p < 0.05$ ), school resident category ( $\chi^2 = 5.090$ ,  $p < 0.05$ ), sexual behaviour ( $\chi^2 = 13.781$ ,  $p < 0.05$ ), ever had abortion ( $\chi^2 = 57.300$ ,  $p < 0.05$ ), ever been pregnant ( $\chi^2 = 31.531$ ,  $p < 0.05$ ) and ever using family planning ( $\chi^2 = 3.886$ ,  $p < 0.05$ ) were associated with adolescent pregnancy. Although location of SRH services was not statistically significant, the proportion of girls who utilized SRH services was higher (67%) in the intervention group compared to 25% in the control group. At multivariate level, the factors that were statistically associated with SRH utilization was age of the school girl (AOR=0.38; 95% CI 0.19-0.74;  $p < 0.05$ ) while school section (day scholar or boarding section) category of the school girl (AOR= 4.093; 95% CI (1.156 – 14.497;  $p < 0.05$ ) and sexual behaviour of the school girls (AOR= 3.021; 95% CI (1.008 - 9.053;  $p < 0.05$ ) were associated with adolescent pregnancy.

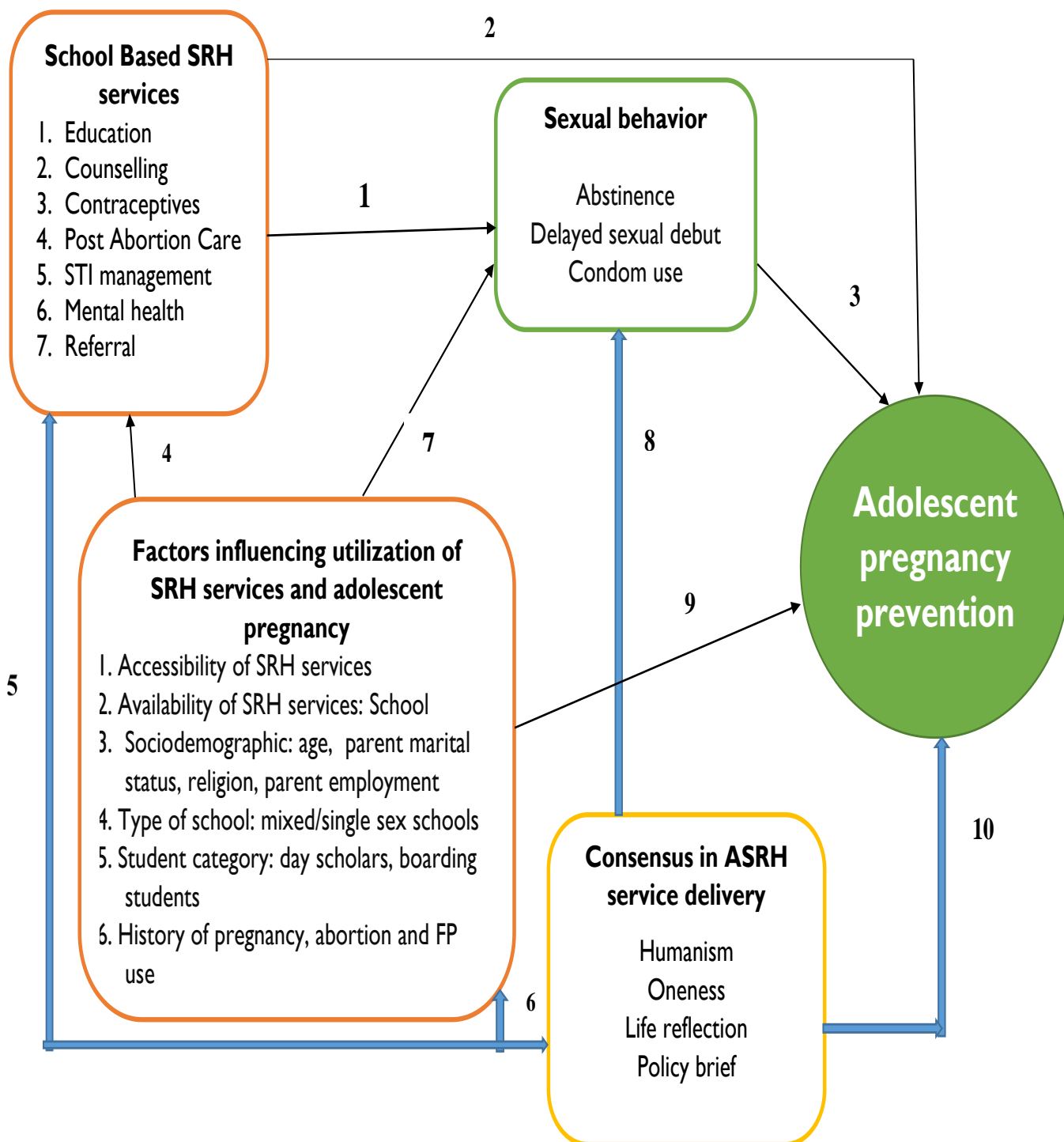
Although Uganda has committed and made significant strides in the development of the relevant laws, guidelines and policies on addressing the SRH needs of adolescents, much remains to be desired in respect to appropriate implementation. In addition, a variety of programs for sexual and reproductive health information and services for young people are available, including media campaigns, peer education and outreach programs, youth development programs and community health facilities. However, despite all the above measures, adolescent pregnancy has remained significantly high for the last 15 years as per the UDHS reports for the various years.

The persistently high adolescent pregnancy clearly illustrates that inappropriateness of the existing interventions. These study findings pose a need for development of a new model for prevention of adolescent pregnancy that addresses key issues of service availability access and personal reflection for the adolescents and key stakeholders.

#### **7.4. THE CONSENSUS ADOLESCENT PREGNANCY PREVENTION (CAPP) MODEL**

The proposed CAPP model is derived from the study conceptual framework, findings of this study; Ubuntu philosophy; Socrates teachings; gaps identified in knowledge, theories and methodology; and existing norms within Uganda and Africa at large.

The Model clearly illustrates the relationship and role played by the different variables on the prevention of adolescent pregnancy namely: sexual behaviour, school based SRH services, and SRH related factors and consensus service delivery. *Figure 10* shows the proposed model for the prevention of adolescent pregnancy using the school based SRH service delivery.



**Figure 10: The CAPP Model.**

Data source: Primary data, 2019

### **Explanation of the CAPP Model**

**Arrow 1 (A  $\Rightarrow$  B):** Indicates that school based Sexual and Reproductive health service provision and utilization influences sexual behaviour of the adolescent girls in school.

**Arrow 2 (A  $\Rightarrow$  C):** Indicates that School Based Sexual and Reproductive health service provision and utilization leads to adolescent pregnancy prevention

**Arrow 3 (B  $\Rightarrow$  C):** Indicates that good sexual behaviour leads to adolescent pregnancy prevention

**Arrow 4 (D  $\Rightarrow$  A):** Indicates that improved accessibility, availability, socio-demographic characteristics (particularly age, school type and marital status of parents) leads to utilization of school based sexual and reproductive health services

**Arrow 5 (E  $\Rightarrow$  A):** Indicates that consensus SRH service delivery which is based on humanism, oneness and policy brief leads to improved utilization of school based SRH services. At the same time, the uptake of SRH services can influence the adoption of the consensus SRH service delivery based on the humanism, oneness, life reflection and the policy brief.

**Arrow 6 (E  $\Rightarrow$  D):** Indicates that consensus SRH service delivery which is based on humanism, oneness and policy brief leads to improved access, availability of services and positively influences the socio-demographic characteristics.

**Arrow 7 (D  $\Rightarrow$  B):** Indicates that improved accessibility, availability, socio-demographic characteristics (particularly age, school type and marital status of parents) leads to sexual behavioural change among adolescents.

**Arrow 8 (E  $\Rightarrow$  B):** Indicates that consensus SRH service delivery which is based on humanism, oneness and policy brief leads to sexual behavioural change among adolescents

**Arrow 9 (D  $\Rightarrow$  C):** Indicates that improved accessibility, availability, socio-demographic characteristics (particularly age, school type and marital status of parents) leads to adolescent pregnancy prevention.

**Arrow 10 (E  $\Rightarrow$  C):** Indicates that consensus SRH service delivery which is based on humanism, oneness and policy brief leads to adolescent pregnancy prevention.

The key solutions to adolescent pregnancy is hinged on the influence of consensus service delivery (information, actual services and referral) based on humanism, oneness and policy brief. This provides sustainable solutions to the problem while involving all the stakeholders including the targeted beneficiaries hence promoting adolescent pregnancy prevention.

Adolescent pregnancy continues to be a public health problem in Uganda and the world at large. Several interventions, approaches, strategies and policies have been developed and implemented in the quest to prevent adolescent pregnancy with little or no gain. Despite all the efforts made so far, adolescent girls continue to get pregnant each day across the country. Several studies have pointed out the lack of access and availability of SRH services for adolescents, peer pressure, and poor sexual behaviour among others as major factors contributing to the occurrence of adolescent pregnancy. This study

sought to remove the barriers to access for adolescent SRH services while evaluating the effect the intervention had on the occurrence of pregnancy among the school girls in secondary school. The proposed model focuses on removal of key barriers to the prevention of adolescent pregnancy.

The Model is hinged on the ‘*Ubuntu*’ philosophy and the teachings of Socrates (469 BC–399 BC). The *Ubuntu* philosophy emphasizes the need to be human beings (Bhengu, 1996) in all dealings of life, its being humane and is a form of humanism which is expressed as in the phrases ‘I am because of who we all are’ (Mugumbate & Nyanguru, 2013). The act of human or humanism is built on the foundation stone of building consensus to do something. This is the gist of the model; the model seeks to promote consensus building among the key stakeholders in regard to adolescent SRH for a common goal. Majority of the stakeholders including policy makers, teachers, parents decline the provision of audience to the adolescents for feedback on the issues that pertain their sexuality, many decline provision of family planning services to sexually active adolescent because it is perceived that this would promote sexual immorality and yet, if an adolescent is sexually active, it calls for rigorous interventions to prevent not only pregnancy but also contraction of STIs among other problems. Below are some sentiments captured during the study on access to family planning services for sexually active adolescents.

*I’m totally against providing family planning to the school girls  
because this will push both the sexually active and those  
that are not into sex. (KI 1, 2019)*

*Family planning methods should not be given at school because this will increase sexual practices in  
schools and increase immorality; (KI 2, 2019)*

With such attitude of stakeholders, the implementation of effective programs for adolescents is quite difficult yet *Ubuntu* strongly promotes positive change for all through consideration of others and respect for diversity (Wichtner-Zoia, 2012). Tutu (2000) clarifies that the quality of ‘*Ubuntu*’ gives human beings resilience in all situations. According to Mugumbate & Nyanguru (2013), *Ubuntu* values have stronger roots and a person with *Ubuntu* would not take part in elicited behaviour like prostitution and high risk sexual behaviour. The traditional African practice of gender inequality; female genital mutilation; and sexual risk behaviours (coerced sex, multiple sexual partners, early sexual debut and non-use of condoms), do not reflect the *Ubuntu* tradition. Ubuntu concept has been widely used in health programs that are aimed at upholding confidentiality, a central requirement in research ethics and the deliverance of health promotion (Tarkang *et al.*, 2018). Tarkang *et al.* (2018) further recommends the adoption of *Ubuntu* concept in addressing the vulnerability of young women and girls to HIV/AIDS; promoting the role of men in HIV/AIDS prevention; promoting sexual reproductive health (SRH) education; discouraging multiple concurrent partnerships (MCP); reducing gender-based violence; addressing intergenerational and transactional sex; promoting life-skills education, self-efficacy and negotiation skills; and fighting stigma and denial of HIV/AIDS. The proposed model therefore draws key lessons from this philosophy in the promotion of oneness, confidentiality; human dignity and preventing the consequences of elicited sexual behaviour. In addition, the philosophy

encourages humanity, togetherness and consensus of all stakeholders in designing policies, programs that address the realities of adolescent life in the prevention of adolescent pregnancy

The proposed model also draws lessons from Socrates (469 BC–399 BC) for his realistic approach to life based on human reasoning. He often acknowledged that ‘*The one thing I know is that I know nothing*’ as an indication of self-awareness and a needed to approach situations with thought, sense, judgment, viable knowledge and prudence (Kendall, 1991). The new model therefore challenges the adolescents, parents/guardians, policy makers, implementers and other stakeholders to uphold the lessons of to examine their own beliefs and challenge the legitimacy of such convictions. This calls for self-reflection as individuals in the quest to prevent adolescent pregnancy. Socrates believed that an unexamined life does not merit living and moral temperance is the main thing that matters’ (Saugat, 2019). Based on the learning from Socrates, the proposed model emphasises the need to improve knowledge and create self-awareness among the adolescents and other stakeholders for prevention of adolescent pregnancy.

In summary, consensus among stakeholders in the provision of school based SRH services and removing barriers would go a long way in promoting good sexual practices among adolescents (abstinence, condom use, delayed sexual debut); remove the barriers to access and availability of SRH services; ensure comprehensive service delivery and in-turn prevent adolescent pregnancy.

## 7.5. APPLICABILITY OF THE CAPP MODEL

In order to prove that the proposed CAPP model has immediate, relevant and practical applicability, among the beneficiaries and other key stakeholders, an operational plan (*Figure 11*) was developed to show how the CAPP model can be put used.

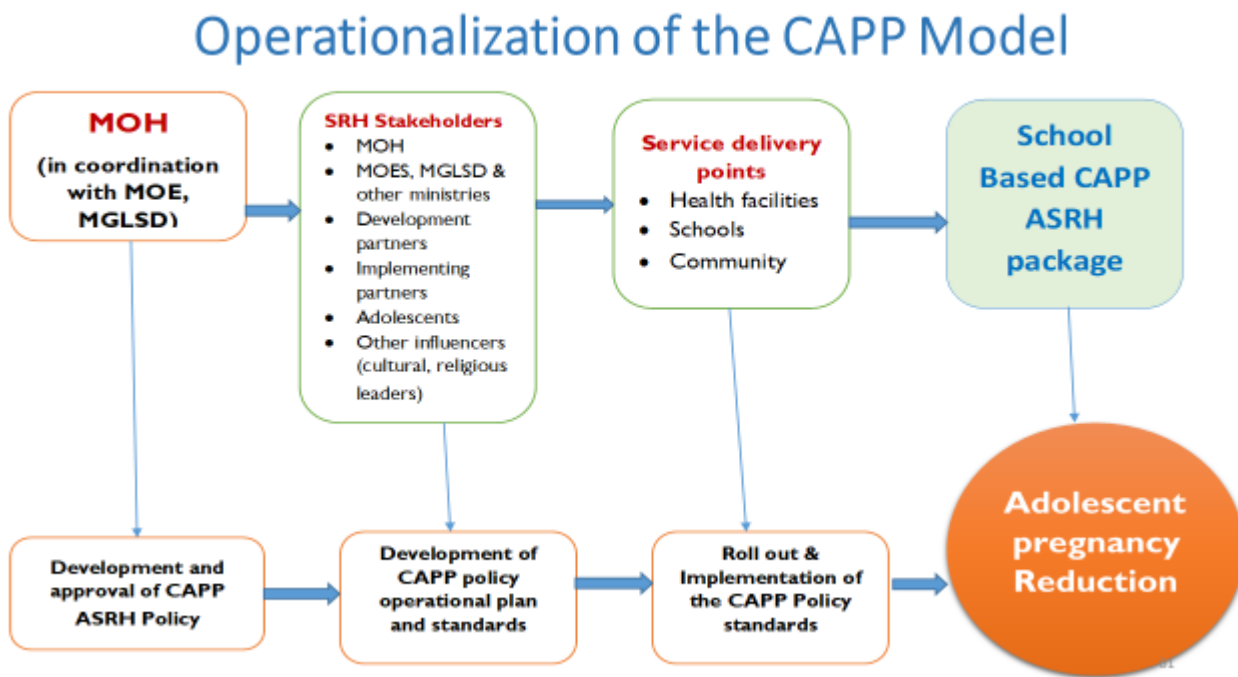


Figure 11: Operational plan of the CAPP Model

### **Explanation of the operational plan**

The operational plan is mainly hinged on the Ministry of Health, which is the main stakeholder in the implementation of reproductive health in Uganda. It is envisioned that

**Step one:** MOH in coordination with MOE and MGLSD will develop and approve the CAPP SRH policy or revise the current National Adolescent Health Policy using the findings of this study.

**Step two:** SRH stakeholders will then develop the CAPP Policy operational plan, guidelines and standards that will ensure the appropriate implementation of the CAPP policy

**Step three:** Using the operational guidelines and standards, stakeholders at the various service delivery points will roll out the implementation of the CAPP SRH package. The package will be customized to suit the needs of the adolescents who are the intended beneficiaries.

Consequently, it is expected that the roll out of the CAPP SRH package will result in the improved uptake of SRH services and reduction of adolescent pregnancy.

### **POLICY BRIEF ON PREVENTION OF ADOLESCENT PREGNANCY**

This study explicitly developed a policy brief on the prevention of adolescent pregnancy. The key recommendations were based on the findings of this study in relation the concepts of the newly developed Consensus Adolescent Pregnancy Prevention (CAPP) model. The policy brief is intended for use by the policy makers, researchers, implementing partners, school leadership, parents, adolescent girls and other relevant stakeholders

#### **The CAPP model Policy recommendations**

The stakeholders should:

1. **Adopt the Consensus Adolescent Pregnancy Prevention (CAPP) model** in designing, implementing and evaluation of adolescent pregnancy prevention programmes
2. **Build consensus** among all stakeholders including adolescents on the issues that affect them, establish consensus on the needs and realities of the adolescents.
3. **Strengthen capacities of institutions, service providers and communities to provide appropriate information and services to adolescents** who require them. This includes:
  - a. **In the health sector:** improving the capacity of the health system to provide adolescent friendly SRH services including a wide range of contraceptive products; strengthen the monitoring and evaluation system to capture and report ASRH indicators including training health workers on data collection and reporting and providing supportive supervision; and supporting law enforcement to deal with rape and other SGBV cases.
  - b. **In the education sector:** Establish school based SRH clinics, advocate for improved access to comprehensive sexuality education and SRH services within the school; support the development and implementation of the return to school guidelines.
  - c. **In the community:** sensitizing parents and the community including Faith-based organizations on Sexual and Reproductive Health and Rights of adolescents; comprehensive SRH services; and training them to disseminate SRH information and refer adolescents for SRHH services appropriately

4. **Increase funding to adolescent SRH from government and development partners.** Both national and county governments should contribute and increase resources for advocacy, coordination of partners, capacity building and monitoring and evaluation.
5. **Strengthen inter-sectorial coordination and networking, partnership and community participation in adolescent SRH** including: developing a coordination mechanism and monitoring and evaluation framework for national, District and county levels; ensuring adolescent participation in key decision making around policy, advocacy, budgeting, planning, research and implementation processes; and strengthening coordination of development partners and collaboration with key departments in the Ministry of Health including those in charge of neonatal, child and adolescent health and HIV.
6. **Promote multi-sectorial and multi-pronged approaches to addressing SRHR issues among adolescents** including: enhancing the linkage between government ministries in charge of education and health (MOES and MOH) and other key agencies responsible for population and development, youth and sports, gender, the judiciary and law enforcement agencies, and community structures and the media.

Uganda has made considerable progress on many fronts to improve adolescent SRH. However, significant challenges remain and threaten the future of adolescents especially the girls if not addressed. The school based SRH study has been conducted to inform stakeholders and contribute to policy change in Uganda in respect to the needs of the adolescents while promoting self-life reflection, humanism and consensus building on the realities facing the adolescents.

## **SECTION EIGHT**

### **OVERALL CONCLUSION AND RECOMMENDATIONS**

#### **8. INTRODUCTION**

This final chapter summarizes the main conclusion in line with the general objective of the study as well as key recommendations to the stakeholders for the prevention of adolescent pregnancy among school girls aged 15-19 years in Uganda.

##### **8.1. RECOMMENDATIONS**

###### **Practice recommendations**

The study recommends the adoption of the CAPP model in adolescent prevention programs in Uganda by MOH in liaison with MOE, health workers and reproductive health implementing partners such as Marie stopes and reproductive health Uganda.

Based on the recommendations stated in the policy brief, MOH, MoES and development partners should revise the existing SRH policy and or develop a policy on improving access and availability comprehensive adolescent SRH services for school going adolescents.

Capacity building through training, mentorship and coaching of service providers and other stakeholders on the roll out and implementation of the CAPP SRH package

Integration of comprehensive SRH services should be prioritized by MoES, MOH, implementing partners, school heads, District SRH focal persons, health workers and other relevant sexual and reproductive health service providers.

The study recommends the government through various Ministries of Education, Health, Gender, Finance and Youths among others should focus on consensus building based on reality of adolescent pregnancy to design evidence based programs.

The adolescent girls who are the primary beneficiaries of adolescent sexual and reproductive health services should be intentionally, constructively and confidentially consulted as well as involved at all stages of programmer design, implementation, monitoring and evaluation because they know the actual sexual and reproductive health issues affecting them.

The study highly recommends to all stakeholders to establish comprehensive school based SRH services as an effective intervention of addressing the SRH needs of the adolescents and consequentially leading to a reduction in adolescent pregnancy.

The Youth rights activists, Ministries, development partners like UNFPA, UNICEF, USAID, parents and adolescents are particularly encouraged to utilize the findings of this study as a cornerstone to advocacy for adolescent sexual and reproductive health rights.

The study recommends that the District leadership, police, local council leaders and other stakeholders should ensure enforcement of the laws on child abuse, marriage and education.

The adolescents are further urged to abstain from sex while those who are sexually active are encouraged to adopt safe sexual behaviour by consistent use of condoms and regular use of contraceptives in order to prevent pregnancy.

### **Further research recommendations**

The use of combined SRH interventions in the prevention of adolescent pregnancy has not yet been widely accepted in Africa hence limited evidence still exists on the effectiveness of combined interventions in the prevention of adolescent pregnancy among school girls. Further research on the use of combined interventions for prevention of adolescent pregnancy in Uganda and other countries is recommended to create a strong evidence base for ASRH policy change.

The use of Telehealth /mhealth in the provision of accurate SRH education and referral for services requires more research given that inconsistent and inaccurate information still exists among the adolescents in school.

There is also need for research to evaluate the implementation and effectiveness of the national sexuality framework in the provision of quality SRH education and information, promotion of safe sexual practices and prevention of adolescent pregnancy among school adolescents in all targeted institutions of learning.

## **8.2. OVERALL CONCLUSION**

The purpose of the study was to evaluate the effect of providing School Based Sexual and Reproductive Health services on occurrence of adolescent pregnancy among school girls aged 15-19 years in Hoima District. The study findings showed a significant effect of school based SRH service provision on occurrence of pregnancy and sexual behaviour among school girls 15-19 years. The provision of SRH services on the school grounds was critical at removing the barriers to access of these services among sexually active adolescents and youths so as to enable timely access to and utilization of SRH services. The factors found to significantly influence the occurrence of adolescent pregnancy mediated by the level of utilization of services were age of the adolescent girl and marital status of the parents.

Based on the findings of the study, the Consensus Adolescent Pregnancy Prevention (CAPP) model was developed as a suitable school based SRH model for use in adolescent pregnancy prevention programs in Uganda and other developing countries.

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## APPENDICES

### APPENDIX 1: DATA ANALYSIS FRAMEWORK ON UNDERSTANDING ADOLESCENT PREGNANCY

*Table 31: Data analysis framework on understanding adolescent pregnancy*

Theme	Sub-theme	Category	Responses
Understanding adolescent pregnancy	Risky SRH behavior	Common occurrence Negative outcome	Drop out of school Many girls Abortion Indulge in early sex Routine
	Vulnerability	Vulnerability Perception about self	Most vulnerable group Too sharp Naivety Lied to
	Psychosocial challenges	Lack of psychosocial support	Identity Alone

## APPENDIX 2: DATA ANALYSIS FRAMEWORK ON FACTORS THAT INFLUENCE THE OCCURRENCE OF ADOLESCENT PREGNANCY

Table 32: Data analysis framework on factors that influence the occurrence of adolescent pregnancy

Theme	Sub-theme	Category	Responses
<b>Factors influencing adolescent pregnancy</b>	Peer influence	Sexual perceptions Attitude of girls Bad companionship Peer advice	Peer influence Attitude of the girls Bad company sexual relationships easily changed Girls dodge school girls are idle Unruly Students do not want to use condoms because it is not nice Girls get boyfriends for their colleagues
	Poverty	Means of survival Looking for cheap options to challenges Failure to meet basic needs admire	Children admire nice stuff Poverty cheaper options girls figure out survival parent fails to pay school dues home living condition parents unable to meet basic needs of the girls
	Parenting challenges	Parents support for early marriage Girls feel neglected Parents are busy Parents provide too much independence to girls	Careless parents parents not talking to the children Girls are sold by their own parents Too freedom offered Neglect Parents not putting enough effort to protect the girls Parents rent houses for their girls instead of school hostels Parents do not have time
	Limited and inaccurate SRH knowledge	Inaccurate SRH information Ignorance of FP methods Myths and misconceptions	Teen age sexuality Pornography girls do not know what to use those who cannot abstain are blank on what to use Virginity viewed as 'bad, fake and local' by society Myths about virginity like cobwebs, cancer if they don't have sex early Girls do not know the safe and unsafe days for timely sex ignorance on various methods to prevent pregnancy
	community challenges	Lack of respect by adolescents Immorality Rape Men as drivers Early marriage	When someone tries to talk to the girls, it is not valued Girls feel they know it all Immorality Children lack respect for their elders girls are easily lied to using small gifts Enticed with money Tricked by men Girls are deceived by men Some girls are raped Early marriage
	Policy related challenges	Prohibited services Not accessible	FP methods prohibited at school FP is not easily accessible

### APPENDIX 3: DATA ANALYSIS FRAMEWORK ON INTERVENTIONS TO PREVENT ADOLESCENT PREGNANCY

Table 33: *Data analysis framework on interventions to prevent adolescent pregnancy*

Theme	Sub-theme	Category	Responses
Interventions to prevent adolescent pregnancy	Information, Education and communication	Education on FP and sexuality Skilled service provider Counselling sensitization	Open Counselling guidance Abstinence Sex education Professional counselling Community Condoms FP sensitization straight talk teachings on outcome of sex FP education
	FP method provision	Free of charge Easily accessible Availability Referral system	Scarcity of HCG strips Free services FP should be costed Service by professional health workers Provide FP methods Frequent and consistent interventions Referral
	Location of SRH services	Services at home Services in school Services in public facilities	Services in homes SRH services schools Promotion of FP at district level Easy access Public places and health facilities
	School interventions	Pregnancy checkups Integration of other stakeholders	Integration of religious activities in school programs Carrying out pregnancy checkups at school Services that conform with the school culture
	Parent focused interventions	Parent relationship with child Sensitization of parents	Parental counselling education Befriending the children Time to talk to children