

## Research Article

# Effectiveness of School Based Reproductive Health Services on Prevention of Adolescent Pregnancy among School Girls Aged 15-19 years in Uganda: Cluster Randomized Trial

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**Abstract**

The prevalence of adolescent pregnancy has remained high (25%) in Uganda for the last 10 years despite the implementation of numerous prevention programs. The limited access and availability of comprehensive reproductive health services by adolescents especially those in school increases vulnerability to risky sexual behaviour and consequently leading to pregnancy. This study aimed at evaluating the effectiveness of providing School Based Reproductive Health services on prevention of adolescent pregnancy in Uganda. Cluster Randomized Controlled Trial (CRCT) design was used and 1,182 school girls aged 15-19 years enrolled within 20 clusters. Results showed that 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 aged 15- 19 years attending secondary school. Therefore provision of School Based reproductive health services is an effective intervention in the prevention of adolescent pregnancy among school girls.

**Trial Registration:** Pan African Clinical Trial Registry (PACTR201810882140200) Registered on 16 October 2018

**ABBREVIATIONS**

SRH: Sexual and Reproductive Health

**INTRODUCTION**

Uganda has had a high prevalence (25%) of adolescent pregnancy among girls 15 to 19 years for the last ten years which is higher than the average prevalence of 19% and 11-16% in the developing and developed countries respectively [1-3]. Although the prevalence reduced from 43% in 1995 to 25% in 2006, further analysis reveals that there has been no significant reduction in the prevalence of adolescent pregnancy from 2006 to 2016 [1,4-7].

Adolescent pregnancy consequently results in premature births, low birth weight of the newborn, high risks for medical complications such as obstructed labor, obstetric fistula, leakage of urine and/or faeces and mortality [8]. The Uganda Demographic Health Survey (UDHS) conducted in 2016 estimated the pregnancy related mortality ratio to be at 368

deaths per 100,000 live births and adolescents 15-19 years contributing 17% of all pregnancy related mortality rate in Uganda. Additionally, 15 out of every 1000 Ugandan women of reproductive age were treated for abortion complications that year [1], high adolescent pregnancy prevalence has often been attributed to early marriage, early initiation of sex and lack of access to reproductive health information and services, age of the adolescent girl, level of education, living arrangement, peer influence, unwanted sexual advances from adult men, lack of parental guidance, early sexual debut, early marriage and poverty in Africa [8-12]. 28% of adolescents in school have been reported to be sexually active yet with limited access and availability of sexual and reproductive health services [13]. Therefore adolescent pregnancy is not always as a result of a deliberate choice; often unintended pregnancy among the adolescent girls is a consequence of little or no access to Adolescent Sexual and Reproductive Health (ASRH) information and services [14].

Traditionally, adolescents are still regarded as children and hence have been exploited in part due to the culture of silence

imposed upon them as they lack a way to express their voice in family and community affairs [15]. Adolescent girls are naturally disadvantaged compared to their male counterparts because of the traditional value attached to the males in Uganda [15]. Therefore female adolescent are less likely to exercise their sexual and reproductive right in such situations.

Uganda introduced several policies, instruments and programs that were ratified by the government of Uganda to protect the girl child, including; (1) The 1995 National constitution that promotes delayed sexual debut by prohibiting the marriage of any person below the age of 18 years; (2) the convention on the rights of the child; (3) the sexuality education framework; (4) National strategy to end child marriage and teenage pregnancy 2014-2020 with an aim of seeing a society free from child marriage and teenage pregnancy; (5) National Adolescent Reproductive Health policy (2004) that advocates for improved access to information and health services. However, these created reproductive health awareness among adolescents but did not address the inaccessibility and unavailability of sexual and reproductive health services among the adolescents especially those in school. This clearly shows that over 15 years ago, Uganda has barely made any strides in reducing teenage pregnancies in the country despite all the sexuality education and awareness campaigns instituted. This static trend therefore provides much food for thought on whether the efforts implemented were evidence based and were focused on reducing this vice in the country, the interventions implemented between 2011 and 2016 have not had a significant impact on prevention of adolescent pregnancy hence calling for more radical measures to curb the problem.

The internationally recommended Adolescents' sexual and reproductive health package includes: (1) Comprehensive sexuality education (CSE) provision; (2) contraception counselling and provision; (3) antenatal, intrapartum and postnatal care; (4) safe abortion care; (5) sexually transmitted infections (STIs) prevention and care; (6) human immunodeficiency virus (HIV) prevention and care; (8) violence against women and girls prevention, support and care; and (9) harmful traditional practices prevention [16,17].

However, the current in-use Uganda Adolescent Health Policy Guidelines and Services [18] Standards include: (1) Clinical Care for Sexual gender-based violence; (2) Prenatal care and maternity care for pregnant adolescents; (3) HPV immunization; (4) HIV counselling and testing; (5) Breast examination and information on cancer cervix; (6) Information and counselling on health especially growth and development; (7) Information on their rights and responsibilities; (8) Referral and follow up. The Ugandan policy guideline is silent on the provision of key reproductive health services which are vital for prevention of adolescent pregnancy and mortality due to pregnancy related complications such as family planning and post abortion care

Clinic based programs are considered one of the most effective ways of providing adolescents with ASRH services through improved access and availability of care [16]. Youth programs should be designed to provide adolescents with adequate knowledge on reproductive and sexual issues including pregnancy prevention [19]. However, clinic based interventions

are not easily accessed by the adolescents in school because both school activities and clinic services are provided during the same working hours therefore this makes it difficult for school going adolescents to access and receive services especially during school days.

The community health system is defined as the 'grey zone' consisting of household-level caregivers, volunteers, community leaders and informal health providers, organizational intermediaries such as non-governmental organizations, religious and sporting groups, as well as other government sectors such as housing, education (schools), and social development [20]. Therefore community-based health interventions are "caught between the formal health system and the community and often in a "grey zone" between public, non-governmental and private health systems" [21]. Community interventions can improve access to services although many show less success mainly due to poor integration into the community system [22]. Exposure to community based SRH services to young people significantly increases the utilization of services and promotes safe sexual and reproductive health behaviors among young people in Uganda [15]. Peer to peer activities were also found to promote uptake of family planning services in Uganda [15]. Findings suggested that a comprehensive, scaled-up, multi-component approach can be effective in improving certain key SRH behavioral outcomes, and that scale up of SRH services is highly recommended to promote safe sexual practices [15]. Community based interventions provide services majorly to the out of school adolescents compared to the in-school adolescents. The community based interventions continue to serve majorly adolescents who are out of school since the interventions are implemented during the working hours when adolescents in school are attending school activities. This therefore increases the vulnerability of the adolescents-in-school to unhealthy sexual practices.

School-based health centers (SBHCs) provide a variety of health care services to youth in a convenient and accessible environment [23]. SBHC model of health care comprises of on-school site health care delivery by an interdisciplinary team of health professionals, which can include primary care and mental health clinicians [23]. Research has demonstrated the SBHCs' impacts on delivering preventive care, such as immunizations; managing chronic illnesses, such as asthma, obesity, and mental health conditions; providing reproductive health services for adolescents; and even improving youths' academic performance. 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 [24]. 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. 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 sought to provide comprehensive sexual and reproductive health services to school girls so as to generate evidence on the effectiveness of combined approach to prevent

the occurrence of adolescent pregnancy among adolescent girls 15-19 years attending secondary school in Uganda. This study used the priori approach and hence was hinged on the Health Belief Model (HBM) and Trans-theoretical Model [22,24].

### School based reproductive health intervention

The key elements of the three tier School based reproductive health package was provided to the adolescents in school twice every week for ten months and included;

- (1) In-school ASRH education session: age appropriate sexuality information was provided by skilled health professional and small group peer led discussions were conducted as stipulated in the National sexuality education framework by MOH and MOES
- (2) In-school adolescent sexual and reproductive health (ASRH) services: services included sensitive counseling, STI screening and treatment, HIV testing and general medical care
- (3) Complete referrals to public health facilities: The students identified in need of advanced ASRH care such as family planning, post abortion care, antenatal care and HIV treatment were referred to primary or tertiary public health facilities for further management.

## MATERIALS AND METHODS

The Cluster Randomized Controlled Trial (CRCT) design was used to conduct this evaluation research and took on the epistemological lens of positivism so as to determine the effect of the school based intervention on adolescent pregnancy objectively [25,26] The study was guided by the Consolidated Standards of Reporting Trials (CONSORT) guidelines and Clinical trial guidelines [27,28].

The study was conducted in Hoima District located in western Uganda, sample size was determined using Campbell and Walters [28] method for comparing differences in rates and or proportions between two groups and determining the number of subjects per group for a two-sided significance level. A total of 1,182 adolescent girls aged 15-19 years who were attending the 20 randomly selected secondary schools in Hoima District were enrolled in the study randomly. 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. Formally consent was sought from girls aged 18 years and above while parent consent and assent was sought from the girls who were below 18 years.

Data was collected using structured questionnaire which had an item rated Content Validity Index of 86% and was also underwent face validity by two experts [29,30]. In addition, the questionnaire had a Cronbach alpha of 0.807 which was considered to be good [28,31]. Double blinding was done by concealing the type of SRH package from participants and data collectors were not aware which intervention arm each cluster belonged to. Participant flow is shown in figure 01 and data was analysed using SPSS Version 20 to generate descriptive and inferential statistics.

## Measures considered

### a) Provision of School Based SRH Services among school girls aged 15-19 years

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 utilized any service or utilized three services or less were considered to have received few or inadequate SRH services
- (2) Receipt of comprehensive services: School girls who utilized more than three SRH services were considered to have received comprehensive SRH services

### b) 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 to (1) be currently pregnant at the time of data collection and (2) have aborted in within 10 months prior to the time of data collection.

## Hypothesis

**Ho:** School Based SRH services provision does not affect occurrence of pregnancy among school girls aged 15-19 years

**H1:** School Based SRH services provision affects occurrence of pregnancy among school girls aged 15-19 years

## RESULTS AND DISCUSSION

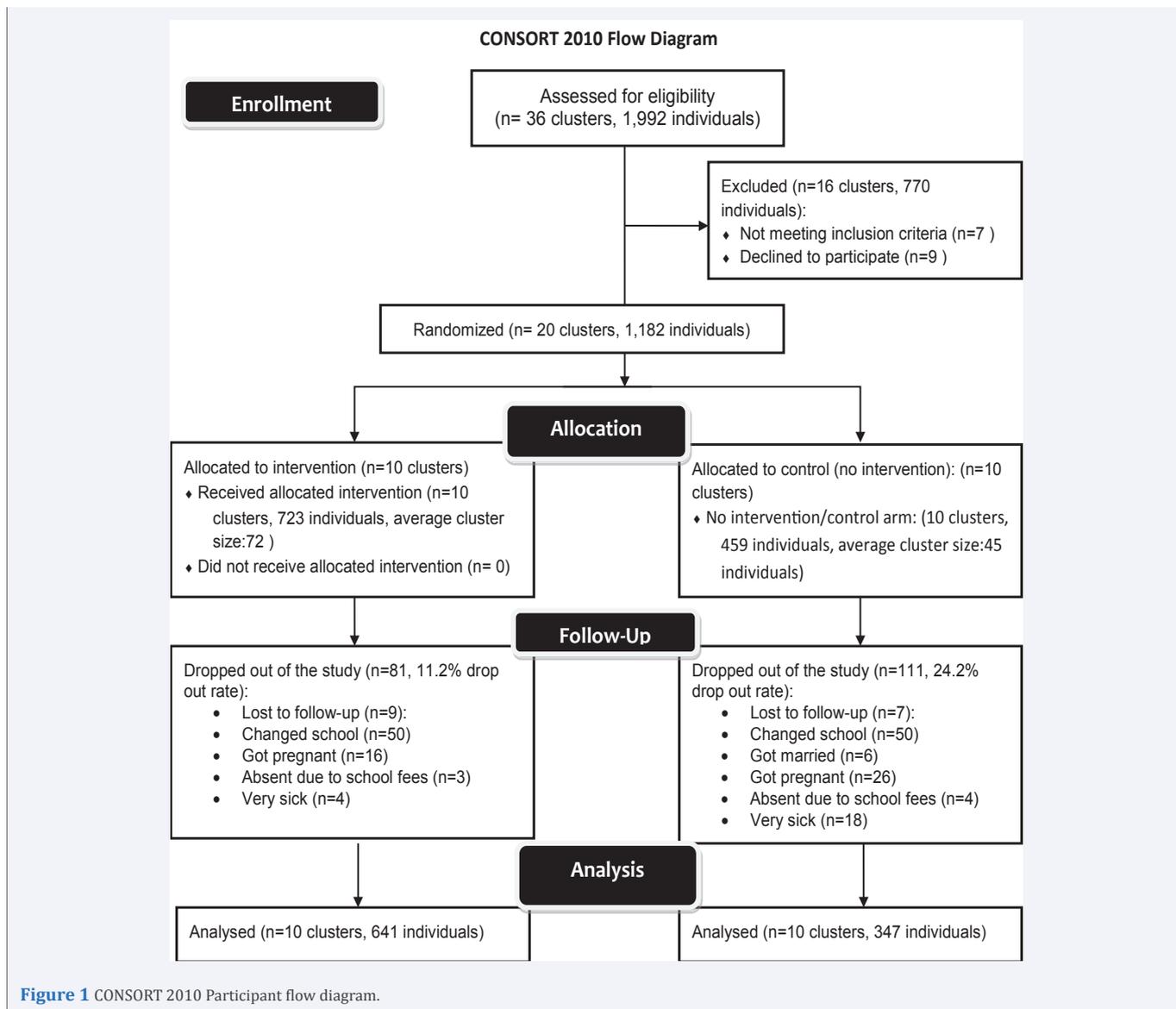
Occurrence of adolescent pregnancy among school girls.

**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 rate 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, 32% (9/28) were in the intervention group while 68% (19/28) were in the control group representing a pregnancy prevalence rate of 1.4% (9/647) and 5.4% (19/351) in the intervention and control group respectively. There was a reduction in the pregnancy rate from 1.9% to 1.4% in the intervention group while the pregnancy rate increased from 1.5% to 5.4% among the girls in the control group.

### Effect of School Based SRH Service on occurrence of adolescent pregnancy

**Control group:** Findings in Table 1,2 show 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



**Table 1:** 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)		
<b><sup>a</sup> Comparison between Intervention and comparison groups</b>					
<b>**Significant at 5% level.</b> Data source: Primary data, 2019					

**Table 2:** 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 (%)			
<b>SRH services utilized at T2</b>					
Control					
	0-3 services	5(31.2)	11(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)		
<b>**Significant at 5% level.</b> Data source: Primary data, 2019					

received more than 3 services. 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. Although there was a high occurrence of pregnancy among participants in the control group, results show that receipt of SRH services had statistically significant effect (OR= 10.292; 95% CI 3.147-33.66;  $p < 0.001$ ) on the occurrence of adolescent pregnancy among school girls in the control group.

Intervention group: Table 2 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 than 3 School Based SRH services in the intervention group.

Overall: Results indicated in Table 2 show that on the provision of School Based 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 3 services. In addition, 4.2% of the girls who received more than 3 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 3 services.

### Hypothesis rejection/acceptance

Ho: School Based SRH services provision does not affect occurrence of pregnancy among school girls aged 15-19 years

H1: School Based SRH services provision affects occurrence of pregnancy among school girls aged 15-19 years

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

### Discussion on the occurrence of adolescent pregnancy

In the entire study, the pooled prevalence of 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 rate among school girls of Arba Minch Town in Ethiopia [32]. From this study, it is clear that the girls in the control group who did not receive any form of intervention had a high rate of 5.4% which is comparable to the 7.7% [32].

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 among school girls [19]. However, the findings of this study do not agree with the results by Kassa et al. [3] 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 rate 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 Uganda Demographic Health survey indicates that the adolescent pregnancy rate in the general population (including girls in and out of school) is 25% [1] but further state that

the pregnancy rate among girls who had attained secondary education was 3.5% which is higher than the pooled pregnancy rate 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 does not agree with the 2016 UDHS findings although agree with Akanbi et al. [11], 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 pregnancy rates. Similarly, a study in India [12] 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 schools 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 prevalence of pregnancy (1.4%) among the school girls in the intervention group compared to 5.4% among the control group. The findings however seem to agree with Kassa et al. [3], who found that the girls who had reproductive health (SRH) issues (OR: 2.88) had higher odds of getting pregnant. This study did not specify the kind of reproductive health issues however; this may be correlated to lack of comprehensive SRH services in this study as shown in the high pregnancy rate among the girls within the control group.

### 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 3 services. The findings agree with Oringanje et al. [33], 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) 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) [34,35]. 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 [35]. However all the two studies [34,35] 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 [36] pregnancy rates 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 agree with Cabezón et al. [36], 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 pregnancy rates are lower among girls in the intervention (0.3%) and control (4.2%) groups among girls who received more than 3 services.

However, the findings of this study differ and hence do not agree from those of LaChausse [37] 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.

## CONCLUSION

Provision of comprehensive school based reproductive health services significantly contributes to a reduction in the occurrence of adolescent pregnancy among school girls aged 15-19 years. Adoption of such evidence based approach would go a long way in reducing the prevalence of adolescent pregnancy among school girls hence keeping the girls in school.

## Ethical approval

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

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