

# Repeat adolescent pregnancies in Southwestern Uganda: A cross-sectional study

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## Abstract

**Background:** Pregnancy in adolescents continues to remain a significant public health challenge, with repeat pregnancies in this age group often receiving insufficient attention. In Uganda, repeat adolescent pregnancy varies between 26.1% and 55.6%. Evidence shows that repeat pregnancy in adolescence is more common in settings of high poverty, low educational attainment and low use of long-acting reversible contraceptives among others.

**Objectives:** The main aim of this study is to determine the underlying risk and protective factors of repeat adolescent pregnancy in Uganda.

**Design:** This was a cross-sectional study among adolescent girls and young women aged between 13 and 22 years with single and repeat pregnancies in four districts in Southwestern Uganda.

**Methods:** The questionnaire was administered on a portable PC to collect information on socio-demographic characteristics, sexual behaviours, sexual and reproductive health (SRH) knowledge, pregnancy outcome, experience of violence and mental health. Descriptive statistics and logistic regression were performed.

**Results:** A total of 115 girls with single and 93 with repeat pregnancies participated in the survey. Of these, 42 (20.2%) were 18 years and younger. The majority (92%) had dropped out of school, having achieved primary-level education (67%). The mean age of sexual debut (15.6 versus 16.4 years) and the mean age at first pregnancy (16.4 versus 17.3 years) were lower among those in repeat-pregnancy group compared to those in single-pregnancy group. The odds of having repeat pregnancy were higher among participants who engaged in risky behaviour (AOR 3; 95% CI (1.28–7.37)) and experienced any form of violence (AOR 4.67; 95% CI (1.5–16.56)). Being single, having the first pregnancy in older age (16 and above) and having a positive first pregnancy outcome (live birth) served as protective factors for repeat pregnancy.

**Conclusions:** Adolescents with repeat pregnancies have significantly more SRH risks compared to those with single pregnancies. These findings underscore the importance of multi-faceted and timely interventions for adolescent girls in this setting, with an emphasis on the mitigation of violence, and enhancing access to comprehensive sexuality education, and SRH services.

## Plain language summary

### Repeat teenage pregnancies in Uganda

Study on factors contributing to repeat pregnancies in Ugandan adolescents.

**Why was the study done?** Teen pregnancy is a major public health issue, and repeat pregnancies in adolescents are often overlooked. In Uganda, 26% to 56% of teen pregnancies are repeat pregnancies. These tend to happen more

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frequently in areas with high poverty, low education levels, and poor access to long-term contraceptives. Understanding the causes and factors that increase or decrease the likelihood of repeat pregnancies can help create more effective prevention strategies.

**What did the researchers do?** We studied 208 adolescent girls and young women, aged 13 to 22, from four districts in Southwestern Uganda. We compared those with single pregnancies to those with repeat pregnancies. Data was collected on their backgrounds, sexual behaviors, knowledge of reproductive health, pregnancy outcomes, and experiences of violence.

**What did the study find?** Out of 208 participants, 115 had a single pregnancy, while 93 had repeat pregnancies. The study found that:

- Most of the girls (92%) had dropped out of school, and 67% had only completed primary education.
- Girls with repeat pregnancies started having sex and got pregnant at younger ages than those with single pregnancies.
- Those who engaged in risky behaviors or experienced violence were more likely to have a repeat pregnancy.
- Protective factors included being single, having the first pregnancy after age 16, and having a positive outcome in the first pregnancy (a live birth).

**What do the findings mean?** This study highlights the need for targeted interventions to reduce repeat pregnancies among Ugandan adolescents. These interventions should focus on preventing violence, improving access to education about sexual and reproductive health, and providing better health services to these young women.

## Keywords

repeat pregnancy, adolescent, Africa, Uganda

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## Introduction

Adolescent pregnancy remains a major public health challenge globally, leading to serious health, social, and economic consequences for individuals, families, and communities.<sup>1</sup> In 2022, 13% of the adolescent population worldwide gave birth before the age of 18.<sup>1</sup> According to The World Health Organization (WHO), 21 million girls aged between 15 and 19 years in developing countries become pregnant, and 12 million give birth every year.<sup>2</sup>

Being subjected to pregnancy at an early age can result in serious health conditions such as preterm delivery, low birth weight and poor survival of infants, obstetric fistula, eclampsia, anaemia and postpartum haemorrhage.<sup>1,3</sup> The United Nations Children's Fund (UNICEF) reports that maternal conditions are the fourth leading contributor to disability-adjusted life years and the second most common cause of mortality among adolescents aged 15–19 years due to complications of induced abortions, pregnancy or delivery.<sup>1</sup> Most pregnant or parenting teenagers drop out of school, leading to an intergenerational cycle of poverty. Additionally, they also face stigma, rejection and violence from their family, peers and partners and are forced to marry early.<sup>1</sup>

Another less-addressed facet of adolescent pregnancy is repeat pregnancy. It is defined as an adolescent woman undergoing an additional pregnancy or a second pregnancy before the age of 20.<sup>4</sup> The existing literature states that there is a high likelihood of an adolescent mother experiencing repeat pregnancy, which in turn has adverse effects on the offspring's health.<sup>4</sup> In the Sub-Saharan African countries, findings from the meta-analysis showed a pooled repeat pregnancy prevalence of 12.84%, with variations between countries.<sup>4</sup> The highest prevalence of repeat pregnancy was recorded in Gabon (20.93%) and the

lowest was in South Africa (4.82%).<sup>4</sup> The correlates of repeat pregnancy for the Sub-Saharan countries were older than 20 years of age, being married or cohabiting with a partner, low educational attainment, acceptance of intimate partner violence, exposure to media and belonging to a lower wealth index.<sup>4</sup>

Variations in the repeat adolescent pregnancy rates in Uganda have also been observed. Some studies have reported a prevalence of 55.6% and others of 26.1%.<sup>5</sup> On the contrary, the prevalence of repeat pregnancy within 24 months has been reported to be as high as 74% among women aged between 15 and 22 years.<sup>6</sup> Additionally, a recent study by Amongin et al.,<sup>7</sup> indicated that following a first birth < 18 years, more than half of the women reported a repeat adolescent birth with no decline observed in 30 years in Uganda.<sup>7</sup> Only a handful of studies have tried to explore various risk factors related to repeat adolescent pregnancy in Uganda, which include being married, low family income, early onset of sexual activity, alcohol consumption, incorrect sexual and reproductive health (SRH) knowledge and early childbearing.<sup>5–7</sup>

This study aims to identify risk and protective factors for repeat pregnancy in adolescents in Southwestern Uganda. Doing so, it will contribute to a body of evidence and help plan an effective context-adapted intervention for the prevention of repeat adolescent pregnancy.

## Methods

### Study design

This cross-sectional study is part of a larger quasi-experimental study (yet to be published) designed to enhance the adoption of post-delivery and post-abortion contraception

after a first teenage pregnancy. This study was conducted to assess the situation and prepare the grounds for intervention. We applied both quantitative (questionnaires) and qualitative methods (in-depth interviews, focus group discussions and consultations). This paper reports the quantitative findings of the study. The article was prepared using the STROBE guidelines<sup>8</sup> for cross-sectional study.

### Study setting

We conducted the study in 2023 in four districts in Southwestern Uganda, which included Mbarara, Rwampara, Isingiro and Ibanda. These districts are within the catchment area of Mbarara Regional Referral Hospital (MRRH) and Mbarara University of Science and Technology (MUST). MRRH is a public and teaching hospital within the vicinity of MUST. It serves as a regional referral centre with a catchment of 4 million people from 6 districts in Southwestern Uganda and neighbouring countries – Rwanda, DR Congo and Tanzania. It provides inpatient, outpatient and outreach services in various medical specialties.

### Study population

The main target group of the study was adolescent girls and young women (who had their first pregnancy before age 20) following delivery or abortion. Adolescent girls and women aged between 13 and 22 years, including pregnant, postpartum and post-abortion, who were willing to provide written consent or through a witness in case of illiteracy, were included in the study. We excluded adolescents with severe medical or psychiatric conditions that might interfere with the ability to give informed consent. Participants were recruited from outpatient service units focusing on maternal and child health care, such as immunization or family planning clinics. Recruitment occurred within maternal and child health outpatient units within health facilities (levels III and IV). Participants were recruited by trained research assistants; meanwhile, community health volunteers provided support in inviting adolescents who met the criteria for enrolment to come to the health facilities to participate in the study. Informed consent was obtained at the health facilities (we obtained a prior exemption for parental consent for those below 18 years; since adolescents who had pregnancy experience were considered emancipated minors and were able to provide consent without the need for parental approval).

### Sample size

Since the study's goal was to determine the risk and protective factors of repeat pregnancy among adolescents, participants were recruited into two groups, namely a single-pregnancy group and a repeat pregnancy group. The sample size was derived using the formula based on the

frequency of the outcome. Poor teenage pregnancy outcome such as maternal death, which was estimated to be 15% in Uganda, was used in the sample size calculation.<sup>9</sup> A similar approach to the selection of outcomes was used in another study that investigated characteristics and birth outcomes between adolescents and older women.<sup>10</sup> An open-source OpenEpi software was used to calculate the sample size. The design effect was assumed to be 1, power to be 80% and confidence interval to be 95%. The non-response rate was fixed at 5%. A sample size of 196 was obtained and with the non-response rate taken into consideration, the sample size was calculated to be 206. Since the participants were enrolled on a consecutive basis, a total of 208 participated in the study.

### Data collection

Data was collected by eight trained research assistants—six females and two males, with backgrounds in social or health sciences and previous experience in interviewing adolescents in this setting. We used a structured questionnaire uploaded on portable PCs via KoboCollect software (KoboToolbox), an open-sourced platform for collecting survey data. Interviews were conducted mainly in the local language, Runyankole, which is a common dialect in the four districts. Interviewers were familiar with the local language and had copies of questionnaires translated from English to the local language to aid the interview. Occasionally, a few adolescents were interviewed in English.

A questionnaire encompassing socio-demographic characteristics, knowledge of SRH, sexual behaviours and experiences, pregnancy and contraception use and violence was used in the study. The questionnaire was an adaptation of a previously conducted study<sup>11</sup> by the authors. Information on age, education, socio-economic status and living situation was covered by the socio-demographic domain in the questionnaire. An asset-based socio-economic questionnaire was used to measure the socio-economic status of the participants. Depending on the type of housing—temporary, semi-permanent or permanent and assets such as radio, television, mobile telephone, etc., owned by the participants, a score was obtained and was compared between the groups. Knowledge of the SRH domain focused on assessing the participant's understanding of menstruation, sexually transmitted infections (STIs), contraceptives and sources of SRH information.

Emotional, sexual and physical violence faced by the participants in the last 12 months were recorded using the 15-item WHO Violence Against Women instrument.<sup>12</sup> The first three questions were about emotional violence, questions 4–11 were about physical violence and the last 12–15 questions were about sexual violence. If a participant answered yes to any of the three violence types, a separate category named “any form of violence” was created during the data analysis phase.<sup>12</sup>

## Quantitative variables

The outcome of the study was to identify various risk and protective factors pertaining to repeat pregnancy among adolescents. Based on the results of the previous studies that were conducted in Uganda and South Africa<sup>4-7</sup> and variables that were significant in the bivariate analysis such as age, marital status, socio-economic status, occupation, living situation, age at first intercourse, age at first pregnancy, outcome of first pregnancy, any form of violence, knowledge about menstrual cycle and pregnancy, and risky behaviour were included in the multivariate analysis. Socio-economic status was classified as low or moderate to high based on the scores obtained from the questionnaire. The mean score was considered as the threshold. If the score was above mean, it was categorized as moderate/high and if it was less than mean, it was categorized as low. The variable "risky behaviour" was defined as those adolescents who were having sex while drunk, receiving gifts in exchange for sex or the number of sexual partners of more than five, and if any one of the variables were true, it was deemed as risky behaviour. The outcome of the first pregnancy was classified as positive if the outcome was live birth and as negative if it was abortion or stillbirth.

## Statistical analysis

Categorical variables were summarized using frequency tables. Continuous numerical variables such as age or age at first pregnancy were reported using mean and standard deviation (SD). Bivariate analysis was performed using Pearson's Chi-square test and Fisher test for those variables with entries less than 5, to find independent variables associated with repeat pregnancies in adolescents. Univariate analysis was done to find potential variables, which were associated with repeat pregnancy. These variables were adjusted in the multivariate analysis. A forward stepwise multivariate analysis was used to identify significant predictors for repeat pregnancy in adolescents. Odds ratio, 95% confidence interval (CI) and the level of significance were reported for the multivariate analysis. R software version 4.2.1 was used to carry out the statistical analysis for the study.

## Results

### Socio-demographic characteristics of the participants

A total of 208 adolescent girls and young women participated in the study. Of them, 115 reported single and 93 repeat pregnancies. The overall mean age of the participants was 19.3 years. The highest level of education attained in both groups was the primary level. The mean socio-economic score was 4.2 and 3.5 in the single and

repeat-pregnancy groups respectively. Table 1 shows detailed information about the socio-demographic characteristics of each group.

### Sexual and reproductive health characteristics of the participants

**SRH knowledge.** Most of the participants in both groups had menarche between the ages of 12–14 years. More than half of the single-pregnancy group (61.7%) use disposable or reusable pads or tampons. At least 37% of participants could not correctly identify the specific period within the menstrual cycle when girls would most likely conceive. While a majority of participants in both groups could identify more than two STIs, over half struggled to list more than three contraceptive methods. The primary source of SRH information in both groups was doctors and nurses, followed by family and relatives. Table 2 illustrates the knowledge of SRH among the participants.

**Sexual practices.** According to Table 3 which focuses on sexual practices among participants, a lower proportion of adolescents with repeat pregnancy reported sexual debut later than 16 years compared to those with single pregnancy (65.2% versus 49.5%). More than half the participants reported their partner's age being 1–5 years older and the majority (more than 80%) had not used a condom during their first sexual intercourse. A total of 110 participants in the single-pregnancy group and 92 in the repeat pregnancy had tested for HIV and a vast majority of participants were HIV-negative.

**Experiences of sexual, emotional and physical violence.** Nearly three-quarters of the participants (73.1%) had experienced any form of violence in the past 12 months. The most common form of violence as shown in Table 4 was emotional violence (62.9%), followed by sexual violence (49%) and physical violence (43.3%). The main perpetrators of violence were boyfriends, regular partners or husbands. 23.5% and 37.6% in the single and repeat-pregnancy group respectively reported the violence to their family members. However, 34.8% from the single-pregnancy group and 33.3% from the repeat-pregnancy group did not report violence to anyone.

**Outcomes of first pregnancy.** At least 24.7% and 6.5% in the repeat-pregnancy group reported poor outcomes of the first pregnancy, abortion and stillbirth respectively. A higher percentage of live births (92.2% versus 67.7%) was recorded in the single-pregnancy group compared to those who had repeat pregnancies. Most of the participants (78.4%) had their delivery at a healthcare facility and had vaginal birth. Antenatal attendance (96.5% versus 82.8%) was more common among the single-pregnancy group than the repeat-pregnancy group. 56.3% of the participants

**Table 1.** Socio-demographic characteristics of the participants in the single and repeat-pregnancy groups.

Socio-demographic variables	Single pregnancy (N=115)	Repeat pregnancy (N=93)	p-Value (Chi-square test/Fisher test)
Age mean (SD)	19.0 years (SD 1.2)	19.7 years (SD 0.9)	0.02*
14–17 years	11 (9.6%)	1 (1.1%)	
18–22 years	104 (90.4%)	92 (98.9%)	
Marital status			0.097
Single	73 (63.5%)	53 (57.0%)	
Married/cohabiting	37 (32.2%)	31 (33.3%)	
Divorced/separated	5 (4.3%)	9 (9.7%)	
Education			0.892
Never attended school	4 (3.5%)	5 (5.4%)	
Primary	77 (67%)	63 (67.7%)	
Secondary	32 (27.8%)	24 (25.8%)	
Tertiary (university, vocational training)	2 (1.7%)	1 (1.1%)	
Occupation			0.104
Unemployed	84 (73.0%)	60 (64.5%)	
Self-employed	18 (15.7%)	27 (29.0%)	
Student	5 (4.3%)	2 (2.2%)	
Employed as waitresses, maids, farmers and craft-maker	8 (7%)	4 (4.3%)	
Religion			0.673
Orthodox	3 (2.6%)	2 (2.15%)	
Catholic	48 (41.7%)	38 (40.9%)	
Protestant	44 (38.3%)	38 (40.9%)	
Muslim	7 (6.1%)	2 (2.15%)	
Jehovah's witness	2 (1.7%)	3 (3.2%)	
Traditional	1 (0.9%)	3 (3.2%)	
Others	10 (8.7%)	7 (7.5%)	
Socio-economic score (mean (SD))	4.2 (SD 1.7)	3.5 (SD 1.6)	0.002*
Low (score 0–2)	15 (13.1%)	26 (28%)	
Moderate (score 3–5)	75 (65.2%)	57 (61.3%)	
High (>5)	25 (21.7%)	10 (10.7%)	
Living situation			0.131
With parents/either mother or father	49 (42.6%)	28 (30.1%)	
With partner/husband/partner or husband's family	36 (31.3%)	31 (33.3%)	
Others	30 (26.1%)	34 (36.6%)	

\*statistically significant p-Values &lt; 0.05.

**Table 2.** Sexual and reproductive health knowledge among the participants in single and repeat-pregnancy groups.

SRH knowledge	Single pregnancy (N=115)	Repeat pregnancy (N=93)	p-Value (Chi-square test/Fishers test)
Age of menarche <sup>1</sup>	12.0 years (SD4.9)	13.0 years (SD 3.6)	0.547
9–11 years	5 (4.4%)	2 (2.2%)	
12–14 years	66 (57.4%)	62 (66.7%)	
15–17 years	29 (25.2%)	23 (24.7%)	
Products used during menstruation			0.03*
Disposable pads or tampons/reusable pads	71 (61.7%)	43 (46.2%)	
Others—cotton cloth, gauze	44 (38.3%)	50 (53.8%)	
When can a girl or a woman get pregnant? <sup>2</sup>			0.03*
Any time of the menstrual cycle	14 (12.2%)	14 (15.1%)	
Within a week of completion of the menstruation	48 (41.7%)	54 (58.1%)	
A week before the next expected date of menstruation	41 (35.7%)	17 (18.3%)	
Do not know	9 (7.8%)	4 (4.3%)	
Knowledge of STIs			0.529
<2 STIs	39 (33.9%)	29 (31.2%)	
≥2 STIs	76 (66.1%)	64 (68.8%)	

(Continued)

**Table 2.** (Continued)

SRH knowledge	Single pregnancy (N = 115)	Repeat pregnancy (N = 93)	p-Value (Chi-square test/Fishers test)
Knowledge of contraceptive methods			
<3 methods	65 (56.5%)	47 (50.5%)	0.471
≥3 methods	50 (43.5%)	46 (49.5%)	
Source of SRH information			
Doctors/nurses	50 (43.5%)	42 (45.2%)	0.232
Family and relatives	31 (27.0%)	15 (16.1%)	
Friends/peers/school	12 (10.4%)	15 (16.1%)	
Media (TV/radio/internet/books)	11 (9.6%)	14 (15.1%)	
Others	11 (9.6%)	7 (7.5%)	

<sup>1</sup>Missing information from 20 participants.

<sup>2</sup>Missing information from 7 participants.

\*statistically significant p-Values < 0.05.

**Table 3.** Sexual practices reported by the study participants in single and repeat-pregnancy groups.

SRH practices	Single pregnancy (N = 115)	Repeat pregnancy (N = 93)	p-Value (Chi-square/Fishers test)
Age at first sexual intercourse <sup>1</sup>	16.4 years (SD 1.6)	15.6 years (SD 1.3)	0.003*
12–15 years	26 (22.6%)	41 (44.1%)	
16–19 years	75 (65.2%)	46 (49.5%)	
Age at first pregnancy	17.3 years (SD 1.3)	16.4 years (SD 1.2)	<0.0001*
12–16 years	27 (23.5%)	48 (51.6%)	
17–21 years	88 (76.5%)	45 (48.4%)	
Partner's age at the time of first sexual intercourse			
Same age	12 (10.4%)	9 (9.7%)	0.77
1–5 years older	60 (52.2%)	50 (53.8%)	
5–10 years older	25 (21.7%)	18 (19.4%)	
Others	18 (15.7%)	16 (17.2%)	
Used condom during first sexual experience			
Yes	18 (15.7%)	8 (8.6%)	0.08
No	94 (81.7%)	85 (91.4%)	
Was the first sexual experience forced?			
Yes	5 (4.3%)	14 (15.1%)	0.015*
No	110 (95.7%)	79 (84.9%)	
Engaged in sex when drunk? <sup>2</sup>			
Yes	5 (4.4%)	9 (9.7%)	0.263
No	53 (46.1%)	42 (45.2%)	
Received gifts in exchange for sex?			
Yes	46 (16%)	46 (49.5%)	0.220
No	69 (60%)	47 (50.5%)	
Number of sexual partners <sup>3</sup>			
1–5	111 (96.5%)	81 (87.1%)	0.005*
More than 5	2 (1.7%)	11 (11.8%)	
HIV status reported by participants			
Positive	5 (4.35%)	6 (6.4%)	0.324
Negative	105 (91.3%)	86 (92.5%)	
Not known/no response	5 (4.35%)	1 (1.1%)	
Labia-pulling/elongation			
Yes	59 (51.3%)	60 (64.5%)	0.076
No	56 (48.7%)	33 (35.5%)	

Missing.

<sup>1</sup>Age at first sexual intercourse: 20 participants did not remember the age at sexual debut.

<sup>2</sup>Engage in sex while drunk: 1 participant responded as do not know.

<sup>3</sup>Number of sexual partners: 2 in the single-pregnancy group and 1 in the repeat-pregnancy group did not respond.

\*statistically significant p-Values < 0.05.

**Table 4.** Violence reported by the participants in single and repeat-pregnancy groups.

Type of violence	Single pregnancy (N=115)	Repeat pregnancy (N=93)	Alpha Cronbach	p-Value (Chi-square test/Fishers test)
Any form of violence (Yes/%)	68 (59.1%)	84 (90.3%)	NA	<0.0001*
Emotional violence (Yes/%)	54 (47%)	78 (83.9%)	0.845	<0.0001*
Sexual violence (Yes/%)	46 (40%)	55 (59.1%)	0.846	0.006*
Physical violence (Yes/%)	37 (32.2%)	53 (57%)	0.923	<0.0001*

\*statistically significant p-Values < 0.05.

**Table 5.** Risk and protective factors for repeat pregnancy.

Variables	Unadjusted odds ratio (95% CI)	p-Value	Adjusted odd ratio (95% CI)	p-Value
Age				
<18	0.21 (0.01–1.34)	0.158	0.04 (0.001–0.63)	0.04*
≥18	1.00		1.00	
Occupation				
Employed	1.00	0.165	1.00	0.285
Unemployed	0.63 (0.32–1.21)		0.64 (0.27–1.46)	
Socio-economic status				
Low	1.5 (0.82–2.74)	0.189	1.22 (0.54–2.75)	0.635
Moderate to high	1.00		1.00	
Marital status				
Single	0.42 (0.11–1.42)	0.177	0.18 (0.03–0.82)	0.033*
Married/living together	0.45 (0.11–1.6)	0.232	1.12 (0.08–16.0)	0.930
Divorced/separated	1.00		1.00	
Age at first intercourse				
≤15 years	1.00		1.00	
>15 years	0.36 (0.19–0.68)	0.0018	0.76 (0.28–2.10)	0.593
Living situation				
With partner	0.98 (0.51–1.85)	0.939	0.29 (0.03–2.98)	0.280
Not with partner	1.00		1.00	
Knowledge about the menstrual cycle and pregnancy				
Right	1.3 (0.23–7.33)	0.752	0.62 (0.06–6.89)	0.683
False	0.48 (0.08–2.77)	0.389	0.33 (0.03–3.87)	0.361
Risky sexual behaviour				
Yes	1.89 (1.04–3.48)	0.390	2.49 (1.12–5.72)	0.03*
No	1.00		1.00	
Any form of violence				
Yes	5.86 (2.64–14.48)	<0.0001	4.15 (1.54–12.60)	0.007*
No	1.00		1.00	
Age at first pregnancy				
≤16 years	1.00		1.00	
>16 years	0.22 (0.11–0.43)	<0.0001	0.26 (0.09–0.68)	0.007*
Outcome of first pregnancy				
Positive	0.02 (0.001–0.12)	0.0003	0.02 (0.003–0.10)	0.0001*
Negative	1.00		1.00	

\*statistically significant p-Values < 0.05.

in both groups visited a healthcare facility for post-natal care within the first 2 months of delivery.

### Analysis of factors associated with repeat pregnancy

In the multivariate analysis in Table 5, the odds of having repeat pregnancies were higher among participants who engaged in risky behaviour (AOR 2.49; 95% CI (1.12–5.72))

and experienced any form of violence (AOR 4.15; 95% CI (1.54–12.60)). Conversely, the likelihood of experiencing repeat pregnancy was significantly lower among those who were single compared to those who were either married/cohabiting or divorced/separated. Adolescents and young women who were below 18 years, and who became pregnant for the first time at an older age (16 years and above) were less likely to experience repeat pregnancy compared to their counterparts. Finally, a positive previous pregnancy outcome

(live birth) was associated with a lower probability of having a repeat pregnancy (AOR 0.02; 95% CI (0.0003–0.10)).

## Discussion

The study aimed to identify both risk and protective factors associated with repeat adolescent pregnancy in Southwestern Uganda. Our findings identified six key factors as independent predictors of repeat pregnancy: experiencing violence and engaging in risky sexual behaviour as risk factors, being young at age, a positive outcome of the first pregnancy, being older age at first pregnancy (above 16 years) and being unmarried as protective factors.

Experience of any form of violence was high in both groups (59.1% with single pregnancy compared to 90.3% with repeat pregnancy). The odds of occurrence of a repeat pregnancy were 4.15 times higher in those participants who experienced any form of violence. This finding was in line with other studies, which also identified gender-based violence as a risk factor associated with repeat pregnancies.<sup>5,13</sup> The United Nations Population Fund (UNFPA) report on gender-based violence and harmful practices in Uganda states that 22.3% of married women face physical violence, and 16.6% face sexual violence by their partners.<sup>14</sup> Additionally, a survey by the Uganda Bureau of Statistics in 2021 found that the lifetime prevalence of sexual or physical or both violence by an intimate partner was 56%.<sup>15</sup> Another study found that the prevalence of physical violence among pregnant teenagers was 5-fold significant compared to their non-pregnant peers.<sup>16</sup>

Violence may lead to the occurrence of teenage pregnancy in the event of rape, or physical and emotional violence that may drive adolescents to seek solace in men which may lead to sexual relationships.<sup>17</sup> Moreover, violence may stem from teenage pregnancy due to societal or cultural beliefs, such as the stigma and social isolation faced by girls who experience pre-marital pregnancy.<sup>18</sup> This stigma arises from the notion that pregnancy brings shame to the family and reduces the girl's prospects for marriage, thereby depriving the family of the benefits associated with a "bride price"—a gift given to the girl's family upon marriage. As such, parents, guardians or the community may be emotionally or physically abusive.<sup>19,20</sup> This abuse seems to increase with recurrence in pregnancy, or from partners who may be forced to marry teenage girls who got pregnant for social acceptance.<sup>21–23</sup>

At least 94 (45.2%) participants reported risky sexual behaviours, which included having multiple partners, having sex under the influence of alcohol, or engaging in transactional sexual relationships for money or gifts (39.1% among those with single pregnancy compared to 52.7% with repeat). Adolescents who engaged in risky sexual behaviour had 2.49 times the odds of occurrence of repeat pregnancy. This finding was consistent with another study that also reported alcohol intake and the number of partners to be associated with repeat pregnancy.<sup>5</sup> A recent meta-analysis study has reported

a strong association between alcohol consumption and risky sexual behaviour such as early sexual initiation, multiple sexual partners and inconsistent contraceptive use in adolescents and young adults.<sup>24</sup>

We also identified several protective factors, including marital status (being single), the outcome of the first pregnancy—a live birth, age at first pregnancy over 16 years and being young (below 18). In our research, being younger than 18 years of age has been found to be a protective factor. This is similar to another study wherein being 18 years and above was found to increase the instances of repeat pregnancy by almost three folds when compared to single-pregnancy group.<sup>5</sup> Studies have shown that being married or in a union was a major risk factor for teenage pregnancy, as well as adolescent repeat pregnancy.<sup>5,6,25–27</sup> The explanation may lie in the absence of familial pressure for unmarried girls to expand their families. Although, existing research has not previously identified being single as a protective factor against repeat pregnancies, thus, this finding is unique to this study. Burke et al.<sup>6</sup> found that there was a higher proportion of repeat pregnancies among women within 24 months who had a history of non-live pregnancy outcomes. Likewise, in the present study, the occurrence of repeat pregnancy was less likely in those participants who had a live birth. While pregnancy outcomes correlate with repeat pregnancies, there may be an underlying factor influencing this association. Cultural norms in African societies often prioritize family expansion, potentially contributing to repeat pregnancies among young adults.<sup>6</sup> Addressing this cultural norm should be a focal point for future interventions aiming to reduce repeat pregnancies among adolescents and young women.

Socio-demographic factors such as marital status, occupation and living with a partner were found to be related to repeat adolescent pregnancy in existing literature.<sup>4,5,28</sup> In this study, the bivariate analysis showed only socio-economic status to be significant, and in the multivariate analysis, none of the socio-demographic variables except age were significant. Concerning SRH characteristics, age at first sexual contact and knowledge about menstrual cycle and pregnancy, were associated with repeat pregnancy only in the bivariate analysis. This could be due to the fact that other variables such as risky behaviour, and any form of violence have a greater impact on the outcome, that is, the likelihood of repeat pregnancy than other variables. In other studies, these variables were also significant at the multivariate analysis level.<sup>4,5,12,28</sup>

The Ugandan government developed various measures to reduce teenage pregnancy and child marriage. One such initiative is the national strategy to end child marriage and teenage pregnancy from 2022/2023 to 2026/2027.<sup>29</sup> It aims to increase the access and uptake of public services such as education and healthcare and focuses on changing the negative social and cultural norms and beliefs that foster child marriage and teenage pregnancy. Most of the strategies emphasize combating teenage pregnancy, but

not repeat pregnancy in adolescents.<sup>29,30</sup> More research as well as holistic interventions are required to reduce the incidence of repeat adolescent pregnancy.

### *Strengths and limitations of the study*

The study has some limitations to consider. Firstly, because the study was a cross-sectional survey, it is difficult to draw conclusions about causation and establish temporal relationships. Secondly, there could be reporting or recall bias, with adolescents either underreporting or overreporting SRH experiences, especially those from the past. There could also be a social desirability bias, particularly among this age group. To address this, research assistants of a similar age administered the questionnaire to ensure participants felt comfortable sharing their experiences without fear of judgement.

The current study stands out by focusing on repeat adolescent pregnancies, unlike previous studies that mostly looked at teenage pregnancy overall. It also sheds light on an underprioritized region in Africa—Southwestern Uganda, where targeted interventions and services are lacking.

### *Implications of the study*

The findings from this study can inform the development of targeted interventions, such as delaying the age of the first pregnancy, which can reduce the likelihood of repeated pregnancies. Additionally, addressing risky behaviours among adolescents is crucial, as these behaviours were found to increase the risk of repeat pregnancies. The study highlights the need for behavioural interventions aimed at changing community mindsets and educating the public about violence faced by adolescents and young women. Moreover, the results from this cross-sectional study were instrumental in designing an intervention to enhance the uptake of contraceptives among adolescents in healthcare settings in Uganda.

## **Conclusion**

The current study explored various risk and protective factors associated with repeat pregnancies among adolescents in Southwestern Uganda. Engaging in risky behaviour and experiencing violence was more common among the repeat-pregnancy group than the single-pregnancy group. The results of the study suggest that there is an urgent need for a holistic and multi-faceted approach towards repeat adolescent pregnancy.

## **Declarations**

### *Ethics approval and consent to participate*

The study was performed following the study protocol, the Declaration of Helsinki and any other applicable national and other regulatory guidelines. Ethical approvals were sought from

the Mbarara University Research Ethics Committee (REF: MUST-2022-656) and the Uganda National Council of Science and Technology (REF: HS2972ES). The study also obtained approval from LMU in Germany (Project N: 23-0617). The Ugandan ethics committees accorded a waiver of parental consent for adolescents less than 18 years, as they were considered emancipated minors who were able to provide informed consent on their own. Written informed consent was obtained from participants after a thorough explanation of the study.

### *Consent for publication*

The informed consent provided by the participants included the use of their anonymous data for study documents and communication of the study results.

### *Author contribution(s)*

**Rupa Ramachandran:** Writing – original draft; Writing – review & editing; Data curation; Formal analysis.

**Shakillah Namatovu:** Project administration; Writing – review & editing.

**Daniel Atwine:** Writing – review & editing; Supervision.

**Jackline Tumuhairwe:** Project administration; Writing – review & editing; Methodology.

**Viola Nilah Nyakato:** Conceptualization; Writing – review & editing; Supervision; Methodology.

**Elizabeth Kemigisha:** Conceptualization; Funding acquisition; Writing – review & editing; Methodology; Formal analysis; Project administration; Data curation; Supervision.

**Olena Ivanova:** Conceptualization; Funding acquisition; Writing – review & editing; Methodology; Project administration; Supervision.

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### *Competing interests*

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### *Availability of data and materials*

The datasets used and analysed during this study are available from the corresponding author on reasonable request.

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## Supplemental material

Supplemental material for this article is available online.

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