



# Attitudes and risky sexual behavior among youth in Kampala, Uganda: Empirical analyses of risk factors by gender

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## ARTICLE INFO

### Keywords:

Gender  
Sexual behavior  
Peer influence  
Parental influence  
Sexual health

## ABSTRACT

**Objective:** This study sought to examine gender differences and the influence of peer and parental perceptions on sexual risk behaviors among an at-risk sample of youth living in Kampala, Uganda.

**Methods:** Using the cross-sectional Kampala Youth Survey (2014) based in Kampala, Uganda (n = 1134), bivariate and multivariable logistic regressions were conducted to determine the odds of sexual risk behaviors based on peer and parental influence variables and gender.

**Results:** The perceptions of peer, adult, and parental opinions on sexual activity were significantly associated with varying levels across all risky sexual behaviors explored. When indexed and adjusted for other variables, females compared to males were at increased odds of participating in 3–4 risky sexual behaviors (OR: 0.63, 95% CI: 0.44, 0.90) and 5–6 risky sexual behaviors (OR: 0.38, 95% CI: 0.21, 0.68) compared to zero risky sexual behaviors.

**Conclusions:** Adolescent sexual risk behaviors are subject to peer and parental influence and vary between genders.

**Innovation:** This study emphasizes the importance of peer influences in adolescent sexual risk behaviors. Many of these youth are orphans, which may explain the lack of association between parental influences and sexual risk behavior. School-based and community-based interventions may be effective at preventing risky sexual behaviors for this vulnerable population.

## 1. Introduction

The bulk of the world's human immunodeficiency virus (HIV) epidemic burden falls on sub-Saharan Africa (sSA), and youth account for 45% of new infections [1]. In much of sSA, females have lower social status than their male counterparts [2], making adolescent females a particularly vulnerable population for HIV acquisition, and they are eight times more likely to be infected than adolescent males [1]. Peers and parents also affect adolescent behavior, including the establishment of their romantic relationships [3]. This information suggests that interventions to decrease HIV risk in one of the most vulnerable populations must focus on how the internalization of adolescent perceptions affects sexual and reproductive health behaviors. Additionally, by focusing on the differences between the genders within the adolescent population, the antecedents to behavior can be identified and inform programmatic design and intervention targeting in sSA.

A survey of Ugandan adults in 2011 found a 7.3% prevalence of HIV, with women having a higher prevalence than men and adolescents having a larger gender gap than their older counterparts [4]. Decreased agency in condom negotiations and control over sexual encounters are associated

with female vulnerability [5]. Gender disparities are ubiquitous throughout sSA, including Uganda [6]. The amendment to Uganda's consent law in 1990 increasing the age of consent for females to 18 was hotly debated as "sexual access" to younger females was pervasively seen as a masculine right [7]. Uganda has a history of culturally sanctioned age-disparate or "sugar-daddy" relationships in which adolescent girls, commonly those in lower economic classes, participate in sex-for-money relationships with older males [7–9]. The age disparities found within these relationships are associated with an increased HIV risk [9,10]. This highlights the gender disparity in HIV risk that may drive the epidemic, and that research on gender-specific behaviors is important for making change [8].

The social networks surrounding teens including the peers and parents are critical as the adolescents identify, model, and perform behaviors and have been identified as stable predictors of sexual behavior [11,12]. Perceived peer sexual behaviors are linked to adolescents intentions to have sex, with less favorable peer views associated with increased abstinence and pro-childbearing attitudes related to early initiation of sex [12]. Conversely, when adolescents perceive that their peers are engaging in sexual behavior, they are more likely to initiate sex early and engage in sexual

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intercourse [5,12]. Despite this logical connection, research focused on the effects of peer exposure on adolescent sexual behaviors in sub-Saharan Africa is extremely limited [13].

Parental relationships are critical in many aspects of adolescent development including the formation of romantic relationships [3]. Parental influence on sexual and reproductive health behaviors varies between genders [14]. Adolescent-parent communication regarding sex is often seen as taboo in Uganda, meaning that older adults and parents can act as a barrier in health-seeking sexual and reproductive health behaviors like other parts of sSA [15,16]. Perhaps as a result of these unsuccessful and awkward conversations, teens receive sexual education and pressure from peers [17].

The prevalence of HIV in Uganda receives extensive public health attention; however there is limited research that examines adolescent behavior through a gender-specific lens [6]. The disparity in disease prevalence between genders calls for an understanding of how behavior and risk are different. Based on the gaps in the literature, we aim to explore how sexual behaviors differ by gender including self-reported HIV and STI rates and the internalization of peer, adult, and parental perceptions. By examining gender differences in behaviors and the internalization of peer and parental influences, we aim to understand the role of gender in the effect of external pressures on sexual behavior in these adolescents. These will be assessed by 1) the determination of how selected sex behaviors vary by gender; 2) the determination of how self-reported HIV and STI history vary by gender; 3) the identification of risk factors associated with selected sex behaviors; and 4) to determine if there is an interaction between gender and the effects of peer and parental influences on sexual risk behaviors. We hypothesize that these risk factors and their correlation to risky sex behaviors will vary by gender. Taken together, this research will elucidate the impact of peer and parental influence on adolescent sex behavior by gender.

## 2. Materials and methods

### 2.1. Setting

In the spring of 2014 a cross-sectional study entitled the Kampala Youth Survey was performed to assess risky behaviors among youth living in the slums of Kampala, Uganda. Adolescent participants aged 12–18 were recruited from Uganda Youth Development Link (UYDEL) drop-in centers, where the youth were receiving services or were recruited via community outreach activities. This study is unique in that the target population was considered hard to reach; therefore, no preliminary sample size determinations were calculated. Other details of this study are documented elsewhere [18–20]. UYDEL is a non-profit organization that provides social services to disadvantaged youth living on the streets or in the slums of Kampala [21].

### 2.2. Data collection

Data was collected over a 14-day period, resulting in a sample size of 1134 (92% participation rate and some surveys lost due to technical errors) [18]. Inclusion criteria included youth ages 12–18 years of age. There were no other exclusion criteria aside from age requirements. Surveys were translated into the local language, Luganda, by a certified translator and back translated to English to ensure accuracy. After participants gave informed consent, in-person interviews lasting 20–30 min were conducted by trained UYDEL staff [18]. Question content primarily derived from previously validated instruments including the 2011 Kampala Youth Survey [22–24], World Health Organization's (WHO) Global School-based Student Health Survey (GSHS) [25], the Uganda AIDS Indicator Survey [26], the Demographic Health Survey [4], Monitoring Alcohol Monitoring in Africa (MAMPA) 2012 Questionnaire, imPPACS [27], Cut-Annoyed-Guilty-Eye (CAGE) Questionnaire [28], and Alcohol Use Disorders Identification Test (AUDIT) Questionnaire [29].

### 2.3. Ethics

Parental consent was waived in the survey's administration because (1) children who cater to their own livelihood are considered emancipated in Uganda at 14 years of age, (2) consent for HIV testing without parental approval can be obtained at 12 years of age, and (3) UYDEL is considered as serving in the children's best interests as many are orphans or otherwise "abandoned" [17]. The protocol was approved by the Institutional Review Board at Georgia State University (H14101) and the Uganda National Council on Science and Technology (SS3338), in accordance with the Declaration of Helsinki.

### 2.4. Measures

All participants were asked about their demographic characteristics to assess gender, age, and education level. Age was stratified into two groups along the early and normal sexual initiation ages divide: 12–14 years old and 15–18 years old [36]. Education was stratified during analysis to those who: a) never attended school; b) attended at least some primary; c) attended at least some secondary; and d) attended at least some tertiary.

Demographic characteristics of sexual behavior were also collected through survey administration. To determine if the adolescent was sexually active, they answered yes or no to the question "Have you ever had sexual intercourse?" Age at sexual initiation was determined through the question "How old were you when you used sexual intercourse for the first time?" and answers were then grouped into the early (12–14 years) and normative (15–18 years) sexual debut age divide (Vu et al., 2017). Teens were also asked to identify condom use at first and last sexual encounter through the question "did you use a condom the first (last) time you had sex?" with a yes or no response. To determine the adolescent's history of sexually transmitted infections (STIs), they were asked to self-report their history via a yes or no response to the question "Have you been told by a doctor/nurse or HIV counselor that you have a sexually transmitted infection such as syphilis, herpes, bola bola or gonorrhoea?" Lastly, HIV status was assessed through a self-reported yes or no to the question "Have you been told by a doctor/nurse or HIV counselor that you have HIV?"

The number of risky sexual behaviors were operationalized as an outcome of interest. The number of risky sexual behaviors was constructed using the following variables: ever had sexual intercourse, early sexual debut, first condom use, last condom use, STIs and HIV. Each variable was operationalized as one risky sexual behavior, and the total number of risky sexual behaviors was added for each participant to get a score from zero risky sexual behaviors to six risky sexual behaviors.

Questions related to perceived peer and parental influence were collected on a scale of "Disagree", "Neither agree nor disagree", and "Agree". Statements asked were "Most of my friends do not plan on having sex until they are older", "Most of my friends think I should not have sexual intercourse", "Most adults discourage people my age from having sex", "My parents would be upset if they found out I am having sex", and "My parents think I should carry a condom if I plan to have sex".

### 2.5. Data analysis

Descriptive analyses were performed to explore demographics, peer and parental influence, and sexual and reproductive health (SRH) actions by gender (Table 1). Both bivariate and multivariable logistic regression analyses were conducted to determine the associations between the variables of interest and SRH and to also identify any potential moderation by gender, adjusting for demographics and peer and parental influence (Tables 2a–2c). Logistic regression was utilized to determine statistically significant predictors with a binary outcome (SRH). A multinomial logistic regression model was used to determine the odds ratios for the number of risky sexual behaviors the teens reported. Multinomial logistic regression analyses were utilized because the outcome is ordinal, and the outcome failed the

**Table 1**  
Demographic characteristics and key variables by gender in the Kampala Youth Survey (N = 1134).

Question content <sup>A</sup> (N, N%)	Female (n = 636) N (%)	Male (n = 497) N (%)	Pr > ChiSq
Education			0.8603
None	36 (60.0)	24 (40.0)	
Attended at least some primary	338 (56.4)	261 (43.6)	
Attended at least some secondary	244 (55.1)	199 (44.9)	
Attended at least some tertiary	11 (64.7)	6 (35.3)	
Missing	7 (50.0)	7 (50.0)	
Age (Median, IQR)	17 (3)	17 (3)	0.9627 <sup>B</sup>
Sexually Active			0.0808
No	286 (53.6)	250 (46.6)	
Yes	349 (58.9)	244 (41.5)	
Missing	1 (25.0)	3 (75.00)	
Age at Sexual Initiation			0.0774
<12–14	152 (61.5)	95 (38.5)	
15–18	198 (57.1)	149 (42.9)	
Missing	286 (53.1)	253 (46.9)	
Has been diagnosed with HIV			0.6859
Yes	68 (58.6)	48 (41.4)	
No	553 (56.0)	434 (44.0)	
Missing	15 (50.0)	15 (50.0)	
Has been diagnosed with an STI			<0.0001
Yes	268 (64.0)	151 (36.0)	
No	368 (51.8)	343 (48.2)	
Missing	0 (0.00)	3 (100.00)	
Did you use a condom the first time you had sex			0.1385
Yes	155 (59.2)	107 (40.8)	
No	195 (58.7)	137 (41.3)	
Missing	286 (53.1)	253 (46.9)	
Did you use a condom the last time you had sex			0.1088
Yes	235 (60.0)	157 (40.0)	
No	115 (56.9)	87 (43.1)	
Missing	286 (53.1)	253 (46.9)	
Peers do not plan to have sex until older			0.0057
Disagree	144 (48.7)	152 (51.4)	
Neither agree nor disagree	155 (60.6)	101 (39.5)	
Agree	336 (58.3)	240 (41.7)	
Missing	1 (20.0)	4 (80.0)	
Most of my friends think I should not have sex			0.0389
Disagree	147 (50.3)	145 (49.7)	
Neither agree nor disagree	142 (61.7)	88 (38.3)	
Agree	345 (57.0)	260 (43.0)	
Missing	2 (33.3)	4 (66.7)	
Adults approve of people my age having sex			0.1012
Disagree	535 (56.7)	409 (43.3)	
Neither agree nor disagree	45 (51.1)	43 (48.9)	
Agree	56 (57.7)	41 (42.3)	
Missing	0 (0.00)	4 (100.00)	
My parents would be upset if they found out I am having sex			0.0009
Disagree	538 (58.4)	384 (41.7)	
Neither agree nor disagree	62 (45.3)	75 (54.7)	
Agree	36 (52.9)	32 (47.1)	
Missing	0 (0.0)	6 (100.0)	
My parents think I should carry a condom if I am going to have sex			0.8779
Disagree	258 (55.7)	205 (44.3)	
Neither agree nor disagree	162 (54.9)	133 (45.1)	
Agree	213 (57.7)	156 (42.5)	
Missing	3 (50.0)	3 (50.0)	
Risky sexual behaviors sum score			0.0390
0 Risky sexual behaviors	214 (51.8)	199 (48.2)	
1–2 Risky sexual behaviors	184 (55.4)	148 (44.6)	
3–4 Risky sexual behaviors	210 (60.5)	137 (39.5)	
5–6 Risky sexual behaviors	28 (68.3)	13 (31.7)	

<sup>A</sup>Row percentages were used; <sup>B</sup>Wilcoxon Two-Sample Test used; Statistically significant associations are bolded

proportional odds assumption. Therefore, we conducted multinomial logistic regression analyses to determine statistically significant predictors with the number of sexual risky behaviors (Range 0–6). Analyses were computed in SAS 9.4 (SAS Institute, Cary, NC, USA).

### 3. Results

Overall, there was no significant difference in the prevalence of risky sexual behaviors for females (n = 636) and males (n = 497) (p = 0.08) or HIV prevalence (p = 0.69). Of the risky sexual behaviors examined, there was only a significant difference between genders for the self-reported STI rate (p < 0.0001, Table 1). Peer (p = 0.0057, p = 0.0389) and parental influence (p = 0.0009) appears to vary significantly by gender (Table 1).

Bivariate and multivariable logistic regressions were then performed to examine associations between the risk factors, including the demographic variables and the perception variables, and the selected sexual behaviors (Tables 2a–2c). In the bivariate associations, males had a lower odds for a self-reported STI history (OR: 0.56, 95% CI 0.43, 0.74) than their female counterparts. When controlling for all other variables, males were at lower odds of being sexually active (OR: 0.64, 95% CI: 0.47, 0.86) and reporting a history of HIV diagnosis (OR: 0.61, 95% CI: 0.47, 0.78) than females. In the bivariate associations, age increased the odds of being sexually active (OR: 1.94, 95% CI: 1.77, 2.12); of having a self-reported history of an STI (OR: 1.32, 95% CI: 1.21, 1.44); of using a condom at first sexual encounter (OR: 1.27, 95% CI: 1.11, 1.46); and using a condom at last sexual encounter (OR: 1.19, 95% CI: 1.04, 1.36). Age was significantly associated with a decreased likelihood of early sexual debut (OR: 0.46, 95% CI: 0.39, 0.54), even when adjusting for other variables (OR: 0.45, 95% CI: 0.37, 0.54). When adjusting for all other variables, age was associated with increased odds of being sexually active (OR: 1.92, 95% CI: 1.73, 2.14); delayed sexual debut (OR: 2.23, 95% CI: 1.85, 2.68); a self-reported history of HIV infection (OR: 1.27, 95% CI: 1.18, 1.36); and condom use at last sexual encounter (OR: 1.19, 95% CI: 1.03, 1.38). Increasing levels of education were generally significantly associated with decreasing odds of early sexual debut in both unadjusted and adjusted models (Table 2a) and decreasing odds of self-reported STI rates in the unadjusted model (Table 2b).

When compared to adolescents who did not perceive abstinence in their peers, adolescents who did perceive abstinence were less likely to be sexually active (OR: 0.19, 95% CI: 0.14, 0.26) and were more likely to use a condom at their last sexual encounter (OR: 1.58, 95% CI: 1.06, 2.23) (Tables 2a–2c). When adjusted, adolescents who perceived peer abstinence had a lower odds of a self-reported HIV infection (OR: 0.58, 95% CI: 0.44, 0.78) and had a lower odds of being sexually active (OR: 0.43, 95% CI: 0.27, 0.68) than their counterparts (Tables 2a, 2b). Adolescents who perceived peer disapproval of sexual activity were at decreased odds of being sexually active (OR: 0.17, 95% CI: 0.12, 0.24) and of a self-reported history of STI diagnosis (OR: 0.59, 95% CI: 0.39, 0.88) compared to adolescents who did not perceive peer disapproval of sexual activity. After adjusting for the other variables, perceived peer disapproval was associated with decreased odds of sexual activity (OR: 0.49, 95% CI: 0.31, 0.76); decreased odds of self-reported history of HIV diagnosis (OR: 0.46, 95% CI: 0.34, 0.61); and increased odds of self-reported history of STI diagnosis (OR: 2.49, 95% CI: 1.24, 5.01). To test the moderating effect of gender on the selected perception variables, the significance of the interaction between gender and all of the perception variables was assessed. Only the interaction between gender and STI diagnosis was significant (p = 0.0051). In males, the perceived peer disapproval of sexual activity decreased the odds of having an STI history (OR: 0.69, 95% CI: 0.52, 0.93).

Perceived adult disapproval of adolescent sex was associated with increased odds of being sexually active (OR: 4.12, 95% CI: 2.48, 6.85) compared to those who did not perceive adult approval. When adjusting for other variables, perceived adult disapproval of adolescent sex was associated with increased odds of a history of HIV diagnosis (OR: 1.84, 95% CI: 1.21, 2.80). When controlling for other variables, teens who perceived parental disapproval of sexual activity had increased odds of being sexually active (OR: 5.98, 95% CI: 2.25, 15.87); having a history of HIV diagnosis (OR: 1.92, 95% CI: 1.17, 3.14); and having a history of STI diagnosis (OR: 4.39, 95% CI: 2.14, 9.01) compared to teens who did not perceive parental disapproval of sex. Lastly, adolescents who thought that their parents

**Table 2a**

Unadjusted and adjusted associations between demographic variables, normative perceptions, and sexual activity or sexual debut in the Kampala Youth Survey.

	Sexually Active		Early sexual debut	
	Unadjusted	Adjusted	Unadjusted	Adjusted
Gender				
Female	Ref	Ref	Ref	Ref
Male	0.80 (0.63,1.01)	<b>0.64 (0.47, 0.86)</b>	0.83 (0.60, 1.16)	0.98 (0.67, 1.44)
Age	<b>1.94 (1.77, 2.12)</b>	<b>1.92 (1.73, 2.14)</b>	<b>0.46 (0.39, 0.54)</b>	<b>0.45 (0.37, 0.54)</b>
Education				
None	Ref	Ref	Ref	Ref
Attended at least some primary	0.59 (0.35, 1.02)	0.73 (0.37, 1.43)	<b>0.38 (0.18, 0.81)</b>	<b>0.29 (0.13, 0.66)</b>
Attended at least some secondary	0.93 (0.54, 1.62)	<b>0.49 (0.25, 0.99)</b>	<b>0.21 (0.10, 0.45)</b>	<b>0.26 (0.11, 0.58)</b>
Attended at least some tertiary	1.60 (0.50, 5.12)	0.45 (0.11, 2.00)	<b>0.22 (0.06, 0.89)</b>	0.27 (0.06, 1.25)
Peers do not plan to have sex until older				
Disagree	Ref	Ref	Ref	Ref
Neither agree nor disagree	<b>0.34 (0.24, 0.49)</b>	<b>0.58 (0.34, 1.00)</b>	1.44 (0.94, 2.21)	0.901 (0.49, 1.66)
Agree	<b>0.19 (0.14, 0.26)</b>	<b>0.43 (0.27, 0.68)</b>	1.08 (0.74, 1.57)	1.17 (0.68, 1.98)
Most of my friends think I should not have sex				
Disagree	Ref	Ref	Ref	Ref
Neither agree nor disagree	<b>0.40 (0.27, 0.58)</b>	0.88 (0.50, 1.54)	<b>1.56 (1.02, 2.41)</b>	1.36 (0.74, 2.49)
Agree	<b>0.17 (0.12, 0.24)</b>	<b>0.49 (0.31, 0.76)</b>	1.24 (0.85, 1.80)	1.08 (0.63, 1.84)
Adults approve of people my age having sex				
Disagree	Ref	Ref	Ref	Ref
Neither agree nor disagree	<b>2.38(1.48, 3.81)</b>	<b>1.97 (1.08, 3.59)</b>	0.72 (0.41, 1.25)	0.81 (0.43, 1.52)
Agree	<b>4.12 (2.48, 6.85)</b>	1.45 (0.79, 2.68)	1.02 (0.63, 1.67)	1.13 (0.63, 2.02)
My parents would be upset if they found out I am having sex				
Disagree	Ref	Ref	Ref	Ref
Neither agree nor disagree	<b>3.34 (2.23, 5.01)</b>	<b>2.87 (1.66, 4.98)</b>	1.27 (0.82, 1.96)	1.38 (0.78, 2.42)
Agree	<b>11.85 (5.08, 27.67)</b>	<b>5.98 (2.25, 15.87)</b>	1.45 (0.67, 1.96)	1.63 (0.85, 3.11)
My parents think I should carry a condom if I am going to have sex				
Disagree	Ref	Ref	Ref	Ref
Neither agree nor disagree	0.75 (0.56, 1.01)	<b>0.65 (0.45,0.96)</b>	1.43 (0.95, 2.16)	1.36 (0.83, 2.23)
Agree	0.88 (0.67, 1.16)	0.73 (0.51, 1.03)	1.19 (0.81, 1.74)	1.27 (0.82, 1.98)

Statistically significant associations are bolded.

**Table 2b**

Unadjusted and adjusted associations between the demographic variables, normative perceptions, and history of self-reported HIV or STI diagnosis in the Kampala Youth Survey.

	HIV		STI	
	Unadjusted	Adjusted	Unadjusted	Adjusted
Gender				
Female	Ref	Ref	Ref	Ref
Male	0.90 (0.61, 1.33)	<b>0.61 (0.47, 0.78)</b>	<b>0.56 (0.43, 0.74)</b>	0.88 (0.58, 1.33)
Age	1.10 (0.98, 1.24)	<b>1.27 (1.18, 1.36)</b>	<b>1.32 (1.21, 1.44)</b>	1.15 (1.00, 1.32)
Education				
None	Ref	Ref	Ref	Ref
Attended at least some primary	0.64 (0.29, 1.42)	<b>0.32 (0.18, 0.56)</b>	<b>0.31 (0.17, 0.56)</b>	0.74 (0.32, 1.70)
Attended at least some secondary	0.76 (0.34, 1.70)	<b>0.31 (0.18, 0.54)</b>	<b>0.20 (0.11, 0.37)</b>	0.78 (0.34, 1.83)
Attended at least some tertiary	2.66 (0.74, 9.58)	0.41 (0.14, 1.22)	<b>0.21 (0.06, 0.67)</b>	2.21 (0.55, 8.90)
Peers do not plan to have sex until older				
Disagree	Ref	Ref	Ref	Ref
Neither agree nor disagree	1.44 (0.84, 2.49)	0.75 (0.53, 1.05)	1.00 (0.62, 1.59)	1.34 (0.66, 2.73)
Agree	1.12 (0.69, 1.81)	<b>0.58 (0.44, 0.78)</b>	1.05 (0.70, 1.57)	0.89 (0.46, 1.71)
Most of my friends think I should not have sex				
Disagree	Ref	Ref	Ref	Ref
Neither agree nor disagree	1.49 (0.89, 2.70)	0.73 (0.52, 1.04)	0.87 (0.54,1.41)	1.43 (0.65, 3.11)
Agree	1.48 (0.903,2.43)	<b>0.46 (0.34, 0.61)</b>	<b>0.59 (0.39, 0.88)</b>	<b>2.49 (1.24, 5.01)</b>
Adults approve of people my age having sex				
Disagree	Ref	Ref	Ref	Ref
Neither agree nor disagree	0.779 (0.35, 1.74)	<b>1.80 (1.16, 2.78)</b>	1.43 (0.87, 2.35)	0.58 (0.24, 1.40)
Agree	1.627 (0.90, 2.94)	<b>1.84 (1.21, 2.80)</b>	1.11 (0.68, 1.80)	1.09 (0.54, 2.18)
My parents would be upset if they found out I am having sex				
Disagree	Ref	Ref	Ref	Ref
Neither agree nor disagree	<b>1.92 (1.14, 3.24)</b>	<b>1.95 (1.36, 2.79)</b>	<b>1.90 (1.22, 2.96)</b>	<b>2.76 (1.47, 5.21)</b>
Agree	<b>3.51 (1.91, 6.48)</b>	<b>1.92 (1.17, 3.14)</b>	1.18 (0.67, 2.08)	<b>4.39 (2.14, 9.01)</b>
My parents think I should carry a condom if I am going to have sex				
Disagree	Ref	Ref	Ref	Ref
Neither agree nor disagree	1.00 (0.63, 1.59)	0.82 (0.60, 1.12)	0.71 (0.50, 1.01)	0.87 (0.52, 1.48)
Agree	0.74 (0.46, 1.19)	<b>1.34 (1.01, 1.77)</b>	<b>1.38 (1.01, 1.88)</b>	0.74 (0.45, 1.24)
Gender*My friends think I should not have sex				
Disagree	---	---	Ref	Ref
Neither agree nor disagree			1.02 (0.70, 1.47)	0.96 (0.62,1.48)
Agree			<b>0.69 (0.52, 0.93)</b>	0.97 (0.64,1.46)

Statistically significant associations are bolded.



**Table 2c**

Unadjusted and adjusted associations between the demographic variables, normative perceptions, and condom use at first sexual encounter or last sexual encounter in the Kampala Youth Survey.

	Condom use at first sexual encounter		Condom use at last sexual encounter	
	Unadjusted	Adjusted	Unadjusted	Adjusted
Gender				
Female	Ref	Ref	Ref	Ref
Male	0.98 (0.71, 1.37)	0.98 (0.69, 1.39)	0.88 (0.63, 1.25)	0.88 (0.61, 1.26)
Age	<b>1.27 (1.11, 1.46)</b>	1.02 (0.72, 1.45)	<b>1.19 (1.04, 1.36)</b>	<b>1.19 (1.03, 1.38)</b>
Education				
None	Ref	Ref	Ref	Ref
Attended at least some primary	1.87 (0.87, 4.03)	1.93 (0.88, 4.24)	1.18 (0.58, 2.40)	1.08 (0.52, 2.24)
Attended at least some secondary	<b>2.54 (1.18, 5.48)</b>	<b>2.27 (1.03, 5.02)</b>	1.33 (0.65, 2.740)	1.11 (0.53, 2.34)
Attended at least some tertiary	0.87 (0.19, 3.87)	0.63 (0.14, 2.91)	1.27 (0.32, 5.03)	1.22 (0.29, 5.06)
Peers do not plan to have sex until older				
Disagree	Ref	Ref	Ref	Ref
Neither agree nor disagree	0.96 (0.63, 1.48)	0.99 (0.56, 1.75)	1.19 (0.77, 1.85)	1.17 (0.65, 2.09)
Agree	1.34 (0.92, 1.94)	1.03 (0.63, 1.67)	<b>1.58 (1.06, 2.33)</b>	1.47 (0.89, 2.45)
Most of my friends think I should not have sex				
Disagree	Ref	Ref	Ref	Ref
Neither agree nor disagree	1.04 (0.68, 1.60)	1.27 (0.72, 2.24)	1.17 (0.75, 1.83)	0.99 (0.56, 1.78)
Agree	1.30 (0.90, 1.87)	1.26 (0.77, 2.06)	1.38 (0.93, 2.03)	1.09 (0.66, 1.81)
Adults approve of people my age having sex				
Disagree	Ref	Ref	Ref	Ref
Neither agree nor disagree	1.04 (0.60, 1.77)	1.29 (0.71, 2.35)	1.59 (0.86, 2.95)	1.65 (0.85, 3.21)
Agree	1.21 (0.74, 1.96)	1.62 (0.93, 2.81)	0.77 (0.47, 1.27)	0.80 (0.46, 1.40)
My parents would be upset if they found out I am having sex				
Disagree	Ref	Ref	Ref	Ref
Neither agree nor disagree	<b>0.60 (0.38, 0.93)</b>	<b>0.46 (0.27, 0.80)</b>	0.95 (0.61, 1.50)	0.92 (0.53, 1.80)
Agree	0.82 (0.48, 1.41)	0.74 (0.41, 1.35)	0.79 (0.46, 1.37)	0.98 (0.53, 1.80)
My parents think I should carry a condom if I am going to have sex				
Disagree	Ref	Ref	Ref	Ref
Neither agree nor disagree	0.91 (0.61, 1.38)	1.09 (0.69, 1.72)	1.09 (0.70, 1.70)	1.19 (0.73, 1.93)
Agree	0.81 (0.56, 1.19)	0.82 (0.55, 1.22)	0.71 (0.48, 1.05)	0.72 (0.480, 1.09)

Statistically significant associations are bolded.

would want them to carry a condom if having sex had increased odds of reporting a history of STI diagnosis (OR: 1.38, 95% CI: 1.01, 1.88) and, when controlling for the other variables, had a higher odds of reporting a HIV diagnosis (OR: 1.34, 95% CI: 1.01, 1.77).

Based on the violation of the proportional odds assumption (Table 3), a multinomial indexing approach was determined to be appropriate for both unadjusted and adjusted models. Being male and having attended at least some secondary school decreased the odds of participating in multiple risky sexual behaviors, while older ages increased the odds (Table 4). Adolescents who participated in 5–6 risky sexual behaviors were less likely to be male than female (OR: 0.46, 95% CI: 0.27, 0.79) compared to adolescents who participated in zero risky sexual behaviors. When adjusting for other factors and with a referent group of zero risky sexual behaviors, male adolescents were less likely to report engaging in 3–4 risky behaviors (OR: 0.63, 95% CI: 0.44, 0.90) or 5–6 risky behaviors (OR: 0.38, 95% CI:

**Table 3**

Proportional Odds Score Test Results for the Number of Risky Sex Behaviors in the Kampala Youth Survey.

	Number of Risky Sex Behaviors (grouped behaviors)	
	Unadjusted (p-values)	Adjusted (p-values)
Gender	0.2863	<0.0001
Age	<0.0001	<0.0001
Education	0.0598	<0.0001
Peers do not plan to have sex until older	<b>0.0018</b>	<0.0001
Most of my friends think I should not have sex	0.0572	<0.0001
Adults approve of people my age having sex	0.0901	<0.0001
My parents would be upset if they found out I am having sex	0.3543	<0.0001
My parents think I should carry a condom if I am going to have sex	<b>0.0256</b>	<0.0001

Bolded values are significant, meaning that the proportional odds assumption is not met.

0.21, 0.68). Teens that perceived their peers as delaying sexual encounters were less likely to participate in more risky sexual behaviors than those who perceive their peers engaging in intercourse. The same is true for teens that perceived peer approval of their sexual intercourse. Compared to teens reporting zero risky sex behaviors, teens that reported perceiving peer disapproval for sexual activity were less likely to participate in 1–2 risk behaviors (OR: 0.36; 95% CI: 0.24, 0.53), 3–4 risk behaviors (OR: 0.15, 95% CI: 0.10, 0.22), and 5–6 risk behaviors (OR: 0.19, 95% CI: 0.10, 0.35). The magnitude of these odds was diminished when adjusted for the other variables in the model. Parental disapproval increased the likelihood of participating in more risky sexual behavior. With a referent group of zero risky sex behaviors reported, adolescents who reported perceiving parental disapproval for their sexual activity were more likely to participate in 1–2 risky sex behaviors (OR: 4.97, 95% CI: 1.83, 13.47), 3–4 risky sex behaviors (OR: 12.72, 95% CI: 4.91, 32.97), and 5–6 risky sex behaviors (OR: 14.48, 95% CI: 4.66, 45.02) compared to zero risky sexual behaviors for those who did not report perceiving parental disapproval. Tables 5 and 6 present p-values for the interaction terms between sex and covariates for the multivariable logistic regression models (Table 5) and the multinomial regression models (Table 6). In the multivariable logistic model, the only interaction term that was statistically significant was for sex and peer approval for STI history. In the multinomial models (Table 6), the same interaction term was statistically significant. Additionally, the interaction term between sex and adult approval was statistically significantly associated with being sexually active.

**4. Discussion**

Sub-Saharan Africa faces a challenge as the region with the greatest burden of the HIV epidemic, with females in the region accounting for the majority of those infections [1]. Gender disparities are prevalent throughout much of sub-Saharan Africa and affect sexual and reproductive health behaviors and subsequently also HIV prevalence. By better understanding the gender-specific sexual behaviors of adolescents, interventions can be

**Table 4**  
Multinomial Regression of Indexed Values for the Number of Risky Sex Behaviors in the Kampala Youth Survey.

	0 OR	Number of Risky Behaviors					
		Unadjusted ORs			Adjusted ORs		
		1-2 OR (95% CI)	3-4 OR (95% CI)	5-6 OR (95%CI)	1-2 OR (95% CI)	3-4 OR (95% CI)	5-6 OR (95% CI)
Gender							
Female							
Male	1	0.84 (0.63, 1.12)	0.79 (0.58,1.06)	<b>0.46 (0.27, 0.79)</b>	0.74 (0.54,1.03)	<b>0.63 (0.44, 0.90)</b>	<b>0.38 (0.21, 0.68)</b>
Age	1	<b>1.62(1.48, 1.78)</b>	<b>1.83 (1.65, 2.03)</b>	<b>1.51 (1.29, 1.77)</b>	<b>1.65 (1.48,1.84)</b>	<b>1.82 (1.61, 2.07)</b>	<b>1.59 (1.32, 1.92)</b>
Education Attendance							
None	-	-	-	-	-	-	-
At least some primary	1	0.53 (0.25,1.14)	<b>0.37 (0.18,0.75)</b>	<b>0.21 (0.08, 0.53)</b>	<b>0.13 (0.05, 0.39)</b>	<b>0.39 (0.17, 0.89)</b>	<b>0.24 (0.09, 0.66)</b>
At least some secondary	1	0.88 (0.41, 1.89)	<b>0.46 (0.22, 0.95)</b>	<b>0.25 (0.10, 0.64)</b>	<b>0.40 (0.17, 0.95)</b>	<b>0.19 (0.08, 0.45)</b>	<b>0.13 (0.05, 0.39)</b>
At least some tertiary	1	2.44 (0.42, 14.16)	2.66 (0.50, 14.25)	-	0.95 (0.15, 6.27)	0.836(0.13, 5.53)	-
Peers do not plan to have sex until older							
Disagree	-	-	-	-	-	-	-
Neither agree nor disagree	1	<b>0.49 (0.31, 0.78)</b>	<b>0.31 (0.20, 0.48)</b>	0.65 (0.33, 1.27)	0.88 (0.47, 1.64)	0.578 (0.31,1.09)	1.21 (0.48, 3.06)
Agree	1	<b>0.46 (0.32, 0.68)</b>	<b>0.16 (0.11, 0.23)</b>	<b>0.24 (0.13, 0.45)</b>	0.85 (0.51, 1.45)	<b>0.40 (0.23, 0.69)</b>	0.58 (0.25, 1.36)
Most of my friends think I should not have sex							
Disagree	-	-	-	-	-	-	0.64 (0.24, 1.65)
Neither agree nor disagree	1	<b>0.48 (0.30, 0.77)</b>	<b>0.37 (0.24, 0.59)</b>	0.51 (0.25, 1.102)	0.83 (0.44, 1.59)	0.84 (0.43, 1.62)	0.45 (0.20, 1.04)
Agree	1	<b>0.36 (0.24, 0.53)</b>	<b>0.15 (0.10, 0.22)</b>	<b>0.19 (0.10, 0.35)</b>	0.62 (0.36, 1.04)	<b>0.51 (0.30, 0.89)</b>	-
Adults approve of people my age having sex							
Disagree	-	-	-	-	-	-	-
Neither agree nor disagree	1	<b>1.98 (1.13, 3.47)</b>	<b>2.09 (1.17, 3.75)</b>	1.50 (0.54, 4.11)	1.83 (0.96, 3.50)	1.31 (0.64, 2.68)	0.98 (0.32, 3.06)
Agree	1	<b>3.41 (1.72, 6.76)</b>	<b>6.17 (3.20, 11.90)</b>	<b>4.93 (1.99, 12.23)</b>	1.77 (0.84, 3.72)	1.94 (0.91, 4.12)	1.63 (0.58, 4.57)
My parents would be upset if they found out I am having sex							
Disagree	-	-	-	-	-	-	-
Neither agree nor disagree	1	<b>2.04 (1.21, 3.45)</b>	<b>4.22 (2.56, 6.94)</b>	<b>4.83 (2.38, 9.80)</b>	<b>2.08 (1.09, 3.96)</b>	<b>3.99 (2.09, 7.61)</b>	<b>4.92 (2.05, 11.82)</b>
Agree	1	<b>4.97 (1.83, 13.47)</b>	<b>12.72 (4.91, 32.97)</b>	<b>14.48 (4.66, 45.02)</b>	2.74 (0.93, 8.07)	<b>4.87 (1.69, 14.03)</b>	<b>8.15 (2.34, 28.37)</b>
My parents think I should carry a condom if I am going to have sex							
Disagree	-	-	-	-	-	-	-
Neither agree nor disagree	1	<b>0.60 (0.42, 0.86)</b>	<b>0.68 (0.46, 1.00)</b>	0.80 (0.43, 1.48)	<b>0.59 (0.39, 0.90)</b>	<b>0.56 (0.35, 0.89)</b>	0.53 (0.26, 1.08)
Agree	1	<b>0.69 (0.49, 0.96)</b>	1.12 (0.79, 1.58)	<b>0.69 (0.49, 0.96)</b>	0.72 (0.49, 1.06)	1.06(0.70, 1.61)	0.72 (0.37, 1.39)

Statistically significant associations are bolded

more targeted and efficacious. Despite the prevalence of risky sexual behaviors among adolescents in sub-Saharan Africa, the literature that aims to understand the mechanisms and patterns of those behaviors remains limited. This study aimed to understand how peer and parental influences are perceived by teens and, in turn, if their behaviors are affected by those perceptions. Through the analysis of the extent of adolescent internalization of interpersonal opinions surrounding risky sexual behaviors, we sought to understand the factors that contribute to the ongoing HIV epidemic in a vulnerable population.

In our study, bivariate associations between genders showed a difference in perceived peer approval and perceived parental disapproval, which indicate gender differences in how the adolescents perceive cultural acceptability about sex. In a South African study, the effect of peer approval was the key factor impacting risky sexual behaviors [16]. Our finding of a gender difference in perceived parental disapproval is similar to a small review of other sub-Saharan African studies demonstrating gender differences in parental influence on sexual and reproductive health behaviors

**Table 5**  
Significance of interaction terms in the multivariable logistic regression models in the Kampala Youth Survey.

	Sexually Active	Age at sexual debut	HIV history	STI history	First sex condom use	Last sex condom use
Male*peersex	0.5595	0.8221	0.9367	0.0509	0.5795	0.0534
Male*peerapproval	0.7124	0.7880	0.9958	<b>0.0051</b>	0.3239	0.3152
Male*adultapproval	0.0811	0.2537	0.8513	0.2417	0.4747	0.6437
Male*parentapproval	0.3976	0.6483	0.3598	0.7336	0.9137	0.5645
Male*parentcondom	0.7861	0.2450	0.3756	0.9340	0.6739	0.5644

Significant values are bolded.

[14]. These findings frame the argument that both gender and perceived influence from parents and/or peers are critical in ideation of, and participation in, risky sexual behaviors.

Our findings that males were less likely to engage in risky behaviors (Table 4) are in line with other published reports of increased HIV incidence in females. There are several elements that may feed into this increased likelihood, including the age-disparate relationships of transactional sex common in sSA [7–9], the increased odds of HIV per sexual encounter for females [8], the prevalence of male sexual partner concurrency [30], and the cultural gender disparities that exist in Uganda. The finding that older adolescents are more likely to participate in risky sexual behavior is perhaps also an artifact of increased prevalence of sexual activity with age. Condom use at either first or last sexual encounter was not consistently associated with any variables analyzed herein, which is aligned with a condom usage rate of 54% in a similar population of adolescents in Kampala's slums [30]. Condom usage rates were directly correlated to school attendance in a similar study [30]. As a whole, these results empha-

**Table 6**  
Significance of interaction terms in the multinomial model using Joint Tests in the Kampala Youth Survey.

	Sexually Active	Age at sexual debut	HIV history	STI history	First sex condom use	Last sex condom use
Male*peersex	0.7473	0.8300	0.9445	0.0560	0.5797	0.0527
Male*peerapproval	0.7936	0.7968	0.9989	<b>0.0144</b>	0.3233	0.3172
Male*adultapproval	<b>0.0251</b>	0.2546	0.8335	0.2953	0.4763	0.6698
Male*parentapproval	0.2765	0.6562	0.3468	0.8541	0.9125	0.5677
Male*parentcondom	0.7900	0.2335	0.3243	0.9725	0.6723	0.5986

In the full multinomial model, none of the interaction terms were significant. Significant values for the collapsed models are bolded.

size that gender, age, and education are all important factors in sexual behavior.

In the multinomial regression analysis, the odds ratios associated with peer, adult, and parental perception variables were associated with several sexual behaviors. The perception that peers were delaying sex was significantly associated with decreased odds of being sexually active and a decreased odds of having a self-reported positive HIV test when adjusting for other factors. This supports existing research that teens will have a negative view regarding sex if their peers do [31], which in turn may affect the actions of adolescents. Additionally, parental disapproval for sexual activity was strongly associated with adolescents who reported being sexually active. This is contradictory to the existing knowledge that perceived parental disapproval for sexual intercourse is associated with abstinence and decreased sexual intercourse frequency [12] and underlines the importance of peer perceptions over parental perceptions. These findings solidify that adolescent peer social networks are important in shaping adolescent sexual activity behaviors. Additionally, this vulnerable population of youth living in the slums faces unique challenges and high levels of orphanhood, and as such, parental perceptions may not be as impactful and comparable with other youth populations.

The body of research focusing on HIV in adolescents in Uganda and sub-Saharan Africa is growing but much more information must be determined to holistically approach the HIV epidemic in the vulnerable populations. These findings reiterate the need for studies that recognize the different experiences of males and females in Uganda and interventions that recognize the gender-unique experiences. Additionally, the increased odds of risky sexual behaviors in adolescent females is complicated and requires more information to extrapolate details that may be helpful when designing targeted interventions including how cultural norms affect the internalization of peer and parental pressures. In this study, these gender differences may have also been driven by the unique characteristics and hardships of those who live in poverty and in the slums.

## 5. Innovation

This paper presents innovative findings from a high-risk, understudied population in Kampala, Uganda. Additionally, we found that peer influences are associated with sexual risk behaviors, above and beyond parental approval. Other research has documented that parental approval of sexual risk behaviors are just as important as peer approvals [12]. Our study demonstrate that peer approval of sexual risk behaviors is linked to higher odds of sexual activity among at-risk youth in a low-resource setting. These youth also represent a population with high levels of orphanhood and low parental oversight [19,32]. Because of the strong findings linking peer perceptions of sexual activity and sexual activity risk behaviors among youth, peer to peer mentoring programs and social norms sexual risk intervention strategies may be an effective strategy for reducing risk of HIV/STI's among youth in low-resource settings [33]. Since school-based interventions often involve peers in group activities and discussions, school-based interventions for this population may also be effective in preventing risky sexual behavior [34]. For youth not enrolled in school, community-wide interventions aimed at improving peer normative behaviors regarding sexual risk behaviors may be effective [35].

## 6. Study Limitations

The cross-sectional nature of this study means that we are unable to determine temporal and causal relationships. Furthermore, the study variables were largely self-reported, likely resulting in an under-reporting due to lack of disease diagnosis and/or the sensitive nature of the topics that result in under-reporting of undesirable behaviors. The results of this study identify characteristics of a very specific population but might be generalizable when developing interventions related to adolescents in sub-Saharan Africa or adolescent sexual behavior in general. We know that there is a gender disparity in adolescents in Uganda, which is likely the case in the broader region. And, we now understand that the males and females in

Kampala internalize peer, adult, and parental influence in differing ways, which has large implications for prevention strategies.

## 7. Conclusion

The influence of social networks including peers, adults, and parents is important in adolescent behavior [12]. In the context of the HIV epidemic and high-risk sex behaviors that are especially prevalent in adolescents and females [1], this information offers an innovative way to approach the design and implementation of sexual and reproductive health programs and prevention strategies. Our study identified that the effect of these interpersonal relationships on sexual behavior varies by gender, which is especially pertinent in a community with abundant other gender disparities. This information contributes to the growing body of literature that identifies that young females are particularly vulnerable and at high-risk for engaging in risky sexual behaviors including HIV acquisition, likely due the prevalence of age-disparate relationships and sexual concurrency for those living in poverty.

## Funding

Research reported in this paper was supported by the National Institute on Alcohol Abuse and Alcoholism of the National Institutes of Health under Award Number R21AA22065 (to Dr. Swahn). The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

## Availability of data and material

Data is available upon request.

## Declaration of Competing Interest

The authors have no conflicts of interest to declare.

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