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HIV Knowledge and Sexual Behaviors in Perinatally Infected Ugandan Youth: A Cross-Sectional Survey

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Abstract

Our objective was to assess human immunodeficiency virus (HIV) knowledge and sexual behaviors in 294 perinatally HIV-infected youth aged 18 to 25 years from a psychosocial support group in Kampala using a self-administered survey. Seventy-nine percent reported an undetectable viral load, 9.5% detectable, and 12% did not know. Of those with sexual partners, 19% did not know the HIV status of their partner, 64% knew negative, and 22% knew positive. Sixty-two percent disclosed their HIV status to their partner. Seventy-two percent of participants previously had sex, and of those, 57% were sexually active in the last three months. Sixty-eight percent of participants used methods to prevent pregnancy. Seventy percent of participants denied physical, sexual, or emotional intimate partner violence. There was good adherence to antiretroviral therapy and a high proportion of contraceptive use, highlighting the importance of integrating these topics into psychosocial support programs for youth living with HIV.

Keywords

young persons, Uganda, perinatal HIV, sexual risk behavior, disclosure and stigma < psychosocial aspects of HIV/AIDS

Plain Language Summary

Understanding HIV and Sexual Behavior Among Ugandan Youth Who Contracted the Virus at Birth: A Survey

We wanted to find out what young people who were born with human immunodeficiency virus (HIV) in Uganda know about the virus and how they handle their relationships. We included 294 young adults from a support group in Kampala. They answered a 25-question survey. Most (79%) reported a very low level of the virus in their blood, 9.5% reported a detectable level, and 12% did not know their viral load in their blood. Of those with sexual partners, 19% did not know their partner's HIV status, 64% knew their partner was negative, and 22% knew they were positive. A total of 62% had told their partner about their HIV status. A total of 72% had sex before, and of those, 57% were sexually active in the last 3 months. A total of 68% of participants regularly used methods to prevent pregnancy. A total of 70% of participants said they had not experienced physical, sexual, or emotional violence in a relationship. In general, young people with HIV in the study knew a lot about their viral load and their partner's HIV status. There were low rates of violence between partners. However, there were some gaps in knowledge about preventing pregnancy and sharing HIV status, so it is important to include these topics more in education and support programs for young people with HIV.

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Introduction

For decades, Uganda has grappled with the severe impact of human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS), with national seroprevalence rates estimated at 30% in pregnant women in the late 1980s, when mother-to-child transmission (MTCT) was as high as 43%.[1,2] In 2002, Uganda's National AIDS Control Program initiated an MTCT prevention program, in response to the HIVNET 012 trial, revealing that single-dose nevirapine could reduce MTCT by half.[3] In 2004, Uganda was the first country globally to implement PEPFAR-supported antiretroviral therapy (ART) which has significantly reduced MTCT, from over 20% in 2000 to 2.8% in 2021.[4]

Today, young adults living with perinatally acquired HIV constitute a unique cohort in Uganda with distinct experiences and challenges. Born in an era predating the widespread availability of ART, many of their peers, who were also perinatally infected, did not survive infancy. This relatively large group of survivors has witnessed major advancements in HIV treatment. Their long-term exposure to HIV and ART has shaped their physical health, psychosocial development, and social interactions.[5–7] As they transition to adulthood, they continue to deal with the challenges of chronic disease management, while navigating typical developmental milestones, including achieving independence, and forming intimate relationships.

Adopting safe sexual practices in this population is critical not only to prevent HIV transmission to HIV-negative sexual partners, but also to protect themselves from other sexually transmitted infections (STIs), resistant strains of HIV, and unintended pregnancies.[8] A sexual risk behavior is defined as a behavior, typically unprotected intercourse, that puts one at risk for an adverse health outcome, including unintended pregnancy or STIs.[9] Sexual risk behaviors are influenced by various factors among youth, including individual factors (substance use and mental health), relationship factors (living with a partner), family factors (orphanhood), structural factors (education and food insecurity), and HIV-related factors (ART adherence).[10]

Our study objective was to assess HIV knowledge and sexual behaviors in perinatally HIV-infected youth between the age of 18 to 25 years who are members of a monthly psychosocial support group in Kampala, Uganda. Our long-term goal is to assess the impact of sustained psychosocial support on HIV knowledge and sexual risk behaviors among youth living with perinatally acquired HIV.

Methods

We conducted a 25-item, cross-sectional survey among Makerere University-Johns Hopkins University Research Collaboration's "Young Generation Alive" (YGA) psychosocial support group in Kampala, Uganda from August 2023 to October 2023.

YGA is a youth-led initiative started in 2005. The group provides support to almost 500 members aged 5 to 30 through monthly psychosocial support meetings with age-group-specific activities. The group uses a peer adolescent/youth-implemented structured curriculum with thematic areas addressing the unique needs of youth living with HIV including building self-esteem, adherence to ART, disclosure, sexual behavior and relationships, intimate partner violence, stigma and discrimination, and viral load suppression.

We used purposive sampling and included individuals who were YGA members between the ages of 18 and 25. Potential participants were contacted by YGA staff members using phone numbers listed in the YGA membership directory. Written informed consent was obtained prior to the survey by counselors not affiliated with the YGA group. Of the 376 YGA members who were prescreened over the phone, 320 came in for appointments, 20 chose not to consent, and 300 were consented and enrolled. Of the 300 individuals who completed the survey, 294 reported being perinatally infected with HIV. Six participants reported being HIV-negative and were excluded from the analysis.

Data were collected through computer-assisted self-interview using the Research Electronic Data Capture (REDCap) survey mode. The survey was available in either English or Luganda. Participants who were unable to read were administered a paper copy of the survey by study staff who were not affiliated with the YGA group in order to avoid biased responses. For identifying variables of interest, a priori considerations were based on the themes addressed in the YGA curriculum. The survey included questions on demographics, HIV status and viral load, personal and professional goals, education and income, relationship and parenthood status, sexual history, HIV disclosure, and history of intimate partner violence.

Data were described using counts and percentages for categorical variables and means and standard deviations for continuous variables. Bivariate relationships between sex and other variables of interest were assessed using Fisher's exact tests for categorical variables and two sample t-tests for continuous variables. P-values $< .05$ were considered statistically significant and all analyses were performed using R, Version 4.3.2.

Results

Demographic characteristics are listed in Table 1. A total of 294 youth living with perinatally acquired HIV completed the survey, with 135 males (46%) and 159 females (54%). The mean age was 21.7 years (SD 2.1). The majority of participants were from Central Uganda, with 168/294 (57%) from Kampala district, 98/294 (33%) from Wakiso district, and 28/294 (9.5%) from other districts. In regard to religion, 87/294 (30%) participants identified as Pentecostal, 83/294 (28%) Catholic, 58/294 (20%) Muslim, and 50/294 (17%) Anglican. Thirty-five of 294 (12%) participants had reached primary school, 158/294 (54%) secondary school, 46/294 (16%) vocational school, and 55/294 (19%) university, while 130/294 (44%) were currently in school and 123/294 (42%) currently earned an income.

Table 2 lists characteristics related to HIV knowledge. Twenty-eight of 294 (9.5%) participants reported detectable viral loads, 14/135 (10%) males and 14/159 (8.8%) females ($P = .29$), and 35/294 (12%) did not know their viral load

Table 1. Demographic characteristics of 294 youth living with perinatally acquired human immunodeficiency virus (HIV) in Uganda.

	Total ($N = 294$)	Male ($N = 135$)	Female ($N = 159$)	*P*-value
Age—mean (standard deviation)	21.7 (2.1)	21.5 (2.1)	21.8 (2.2)	.29
District—no. (%)				.077
Kampala	168 (57)	84 (62)	84 (53)	
Wakiso	98 (33)	36 (27)	62 (39)	
Other	28 (9.5)	15 (11)	13 (8.2)	
Religion—no. (%)				.100
Catholic	83 (28)	35 (26)	48 (30)	
Anglican	50 (17)	24 (18)	26 (16)	
Pentecostal	87 (30)	37 (27)	50 (31)	
Islam	58 (20)	28 (21)	30 (19)	
Seventh Day	7 (2.4)	4 (3.0)	3 (1.9)	
Other	6 (2.0)	7 (5.2)	0	
Not religious	2 (0.7)	0	2 (1.3)	
Highest education level—no. (%)				.28
None	0	0	0	
Primary	35 (12)	20 (15)	15 (9.4)	
Secondary	158 (54)	73 (54)	85 (53)	
Vocational training	46 (16)	22 (16)	24 (15)	
University	55 (19)	20 (15)	35 (22)	
Currently in school—no. (%)				.24
No	164 (56)	70 (52)	94 (59)	
Yes	130 (44)	65 (48)	65 (41)	
Earn income—no. (%)				.15
No	171 (58)	85 (63)	86 (54)	
Yes	123 (42)	50 (37)	73 (46)	
Biological mother alive—no. (%)				.54
No	101 (36)	44 (33)	57 (36)	
Yes	192 (65)	90 (67)	102 (64)	
Do not know	1 (0.3)	1 (0.7)	0	
Biological father alive—no. (%)				.22
No	105 (36)	55 (41)	50 (31)	
Yes	181 (62)	76 (56)	105 (66)	
Do not know	8 (2.7)	4 (3.0)	4 (2.5)	

status. Of the participants who reported a detectable viral load, 12/28 (43%) reported possible viral resistance, 4/28 (14%) reported low adherence to ART, and 3/28 (11%) reported no access to ART. Of the participants in relationships, 80/130 (62%) had disclosed their HIV status to their partner, with no significant difference found between males and females ($P = .47$). Among those in relationships, 83/130 (64%) knew their partner was HIV-negative, 28/130 (22%) knew their partner was HIV-positive, and 19/130 (15%) did not know their partner's HIV status. Of the 39 participants with children, 38/39 (97%), knew their child's HIV status.

Characteristics related to relationships and family dynamics are listed in Table 3. The majority of individuals, 164/294 (56%), identified as single, 103/294 (35%) had a boyfriend or girlfriend but were not cohabiting; 22/294 (7.5%) were cohabitating, and 5/294 (1.7%) were legally married. Of those who were not married, 250/289 (87%) desired future legal marriage. The majority of participants, 255/294 (87%), did not have children, with females being more likely to have a child compared to males ($P = .003$). Of those without children, 242/255 (95%) desired future parenthood. Seventy percent (205/294) reported no experiences of intimate partner violence, with no significant difference between males and females ($P = .128$).

Table 4 lists sexual behaviors and practices. Seventy-two percent (211/294) reported ever having sex, 74% of females and 69% of males ($P = .36$). In the last 3 months, 90/211 (43%) reported zero sexual partners, 93/211 (44%) reported one sexual partner, and 28/211 (13%) reported more than one sexual partner. Males were more likely than females to have more than one sexual partner ($P = .001$). Of those who had sex in the prior 3 months, 82/121 (68%) reported having sex for love or pleasure, 18/121 (15%) for money, 7/121 (5.8%) for food, 6/121 (5.0%) for a job, and 6/121 (5.0%) shelter. Men were more likely than females to have sex for shelter ($P = .036$). Sixty-three percent (132/211) routinely used contraception, 72% of males and 55% of females ($P = .039$), and male condoms, 127/211 (60%), were the most common form of contraception. Seventy-five percent (158/211) reported using male condoms to prevent STIs. Friends, 104/211 (49%), were the most common way to meet sexual partners, followed by social media 25/211 (12%), and work, 25/211s (12%).

Table 2. HIV related knowledge among youth living with perinatally acquired HIV in Uganda.

	Total ($N = 294$)	Male ($N = 135$)	Female ($N = 159$)	*P*-value
Viral load—no. (%)				.29
Detectable	28 (9.5)	14 (10)	14 (8.8)	
Undetectable	231 (79)	101 (75)	130 (82)	
Do not know	35 (12)	20 (15)	15 (9.4)	
Reason why viral load is detectable—no./total no. (%)				.35
No access to ART	3/28 (11)	1/14 (7.1)	2/14 (14)	
Low adherence to ART	4/28 (14)	1/14 (7.1)	3/14 (21)	
Possible Viral Resistance	12/28 (43)	7/14 (50)	5/14 (36)	
Do not know	7/28 (25)	5/14 (36)	2/14 (14)	
Other	2/28 (7.1)	0/14 (0)	2/14 (14)	
Disclosure of HIV Status to Partner—no./total no. (%)				.47
No	50/130 (38)	23/54 (43)	27/76 (36)	
Yes	80/130 (62)	31/54 (57)	49/76 (64)	
Knowledge of Partner's HIV Status—no./total no. (%)				.81
Negative	83/130 (64)	33/54 (61)	50/76 (66)	
Positive	28/130 (22)	12/54 (22)	16/76 (21)	
Do not know	19/130 (15)	9/54 (17)	10/76 (13)	
HIV-positive children—no./total no. (%)				.23
No	38/39 (97)	8/9 (89)	30/30 (100)	
Yes	0	0	0	
Do not know	1/39 (2.6)	1/9 (11)	0	

Abbreviations: HIV, human immunodeficiency virus; ART, antiretroviral therapy.

Table 3. Relationships and family dynamics among youth living with perinatally acquired human immunodeficiency virus (HIV) in Uganda.

	Total ($N = 294$)	Male ($N = 135$)	Female ($N = 159$)	*P*-value
Relationship status—no. (%)				.46
Legally married	5 (1.7)	1 (0.7)	4 (2.5)	
Cohabitating but not legally married	22 (7.5)	9 (6.7)	13 (8.2)	
Boyfriend/girlfriend but not cohabitating	103 (35)	44 (33)	59 (37)	
Single	164 (56)	81 (60)	83 (52)	
Wants legal marriage in future—no./total no. (%)				**.020**
No	7/289 (2.4)	1/134 (0.7)	6/155 (3.9)	
Yes	250/289 (87)	112/134 (84)	138/155 (89)	
Do not know	32/289 (11)	21/134 (16)	11/155 (7.1)	
Currently has children—no. (%)				**.003**
No	255 (87)	126 (93)	129 (81)	
Yes	39 (13)	9 (6.7)	30 (19)	
Wants children in future—no./total no. (%)				.26
No	3/255 (1.2)	0	3/129 (2.3)	
Yes	242/255 (95)	120/126 (95)	122/129 (95)	
Do not know	10/255 (3.9)	6/126 (4.8)	4/129 (3.1)	
HIV status preference in partner—no. (%)				.112
HIV Positive	78 (27)	39 (29)	39 (25)	
HIV negative	117 (40)	45 (33)	72 (45)	
No preference	99 (34)	51 (38)	48 (30)	
Experienced intimate partner violence—no. (%)				
None	205 (70)	88 (65)	117 (74)	.128
Any[a]	64 (22)	33 (24)	53 (33)	
Do not know	14 (4.8)	8 (5.9)	6 (3.8)	
Do not wish to answer	11 (3.7)	6 (4.4)	5 (3.1)	

[a]Includes physical, sexual, and/or emotional intimate partner violence.

Among participants in relationships, there were no significant associations between viral load and disclosure status ($P = .130$) or viral load and awareness of the partner's HIV status ($P = .40$). Additionally, among participants who were sexually active, there were no significant differences in viral load and condom use ($P = .20$) or viral load and contraceptive use ($P = .086$) (Table 5).

Table 4. Sexual behaviors and practices among youth living with perinatally acquired HIV in Uganda.

	Total ($N = 294$)	Male ($N = 135$)	Female ($N = 159$)	*P*-value
Ever had sex—no. (%)				0.36
No	83 (28)	42 (31)	41 (26)	
Yes	211 (72)	93 (69)	118 (74)	
Had sex in the last 3 months—no./total no. (%)				.16
No	90/211 (43)	45/93 (48)	45/118 (38)	
Yes	121/211 (57)	48/93 (52)	73/118 (62)	
Number of sexual partners within the last 3 months—no./total no. (%)				**.001**
Zero	90/211 (43)	45/93 (48)	45/118 (38)	
One	93/211 (44)	29/93 (31)	64/118 (54)	
Greater than one	28/211 (13)	19/93 (20)	9/118 (8)	
Had sex in last 3 months for the following—no./total no. (%)				
Money	18/121 (15)	10/48 (21)	8/73 (11)	.191
Food	7/121 (5.8)	5/48 (10)	2/73 (2.7)	.112
A job	6/121 (5.0)	4/48 (8.3)	2/73 (2.7)	.21
Shelter	6/121 (5.0)	5/48 (10)	1/73 (1.4)	**.036**
Love/pleasure	82/121 (68)	29/48 (60)	53/73 (73)	.171
Other	20/121 (17)	8/48 (17)	12/73 (16)	>.99
Uses contraception—no./total no. (%)				**.039**
No	48/211 (23)	15/93 (16)	33/118 (28)	
Yes	132/211 (63)	67/93 (72)	65/118 (55)	
Sometimes	31/211 (15)	11/93 (12)	20/118 (17)	
Most common form of contraception—no./total no. (%)				
Male condom	127/211 (60)	73/93 (78)	54/118 (46)	**.001**
Pill	37/211 (18)	14/93 (15)	23/118 (19)	.38
Implant	10/211 (4.7)	2/93 (2.2)	8/118 (44)	.115
Injection	17/211 (8.1)	4/93 (4.3)	13/118 (11)	.078
Female condom	3/211 (1.4)	2/93 (2.2)	1/118 (0.8)	.60
Intrauterine device	1/211 (0.5)	0	1/118 (0.8)	>.99
Other	7/211 (3.3)	4/93 (4.3)	3/118 (2.5)	.71
Use male condoms to prevent STIs—no./total no. (%)				**< .001**
No	26/211 (12.3)	3/93 (3.2)	23/118 (19)	
Yes	158/211 (75)	85/93 (91)	73/118 (62)	
Sometimes	27/211 (13)	5/93 (5.4)	22/118 (19)	
Most common way to meet potential sexual partners—no./total no. (%)				
Family	9/211 (4.3)	3/93 (3.2)	6/118 (5.1)	
Friends	104/211 (49)	54/93 (58)	50/118 (42)	
Church	11/211 (5.2)	1/93 (1.1)	10/118 (8.5)	
School	17/211 (8.1)	11/93 (12)	6/118 (5.1)	
Work	25/211 (12)	5/93 (5.4)	20/118 (17)	
Bars	2/211 (0.9)	1/93 (1.1)	1/118 (0.8)	
Social media	25/211 (12)	13/93 (14)	12/118 (10)	
Other	18/211 (8.5)	5/93 (5.4)	13/118 (11)	

Abbreviations: HIV, human immunodeficiency virus; STIs: sexually transmitted infections.

Discussion

In this cross-sectional survey of 294 youth living with perinatally acquired HIV, most were sexually active, though over half were not currently in a relationship. One-third had not disclosed their HIV status to their partner. The majority of youth regularly use contraception. Most had undetectable viral loads, with no difference between men and women.

The prevalence of sexual activity (ever had sex) was 72%, 57% within the last three months, and 13% had had more than one sexual partner in the last 3 months. A cross-sectional survey of 624 perinatally infected Ugandan youth aged 10 to 19 years found that 34% of adolescents were sexually active, with a mean age of sexual debut of 15.8 years. Sixteen percent of the adolescents who previously engaged in sexual activity had more than one concurrent sexual partner, comparable to our older cohort.[11]

Over half of the participants in our cohort were single, and among participants who were currently in a relationship, 38% had not disclosed their HIV status to their partner. A cross-sectional study of 238 young people aged 15 to 24, on ART, in Central Uganda found that 27% of participants had not disclosed to their sexual partner. Reasons for nondisclosure included fear of stigma or discrimination, desire to continue accessing basic needs, and fear of causing emotional trauma to a sexual partner.[12] A qualitative study in Mbarara City,

Table 5. Association between viral load and disclosure of HIV status, knowledge of partner's human immunodeficiency virus (HIV) status, condom use, and contraceptive use.

	Detectable ($N = 28$)	Undetectable ($N = 231$)	Do not know ($N = 35$)	*P*-value
Disclosure of HIV status to partner—no./total no. (%)				.13
No	5/10 (50)	38/109 (35)	7/11 (64)	
Yes	5/10 (50)	71/109 (65)	4/11 (36)	
Knowledge of partner's HIV status—no./total no. (%)				.40
Negative	7/10 (70)	71/109 (65)	5/11 (45)	
Positive	3/10 (30)	22/109 (20)	3/11 (27)	
Do not know	0	16/109 (15)	3/11 (27)	
Condom use—no./total no. (%)				.20
No	1/15 (6.7)	25/174 (14)	0	
Yes	13/15 (87)	128/174 (74)	17/22 (77)	
Sometimes	1/15 (6.7)	21/174 (12)	5/22 (23)	
Contraceptive use—no./total no. (%)				.086
No	7/15 (47)	36/174 (21)	5/22 (23)	
Yes	7/15 (47)	114/174 (66)	11/22 (50)	
Sometimes	1/15 (6.7)	24/174 (14)	5/22 (27)	

Uganda, interviewed twelve persons living with HIV who were in HIV-discordant relationships and had disclosed their status to their sexual partner. Participants reported that the benefits of disclosure included greater care and financial support from family members, improved discussions related to family planning, and reduced anxiety related to hiding their own status. Challenges of disclosure included being denied sex, partner neglect, and psychological torture by the partner, including accusations of prostitution.[13]

Seventy-five percent of participants routinely used condoms to prevent STIs, and 13% and 12% reported inconsistent or no use, respectively. A cross-sectional survey of 357 out-of-school young people on ART from seven districts in Central Uganda found that 51% of respondents routinely used condoms. Completing primary education, current employment, and rural residence were all associated with condom use.[13] Condoms continue to be a critical, cost-effective tool to prevent unplanned pregnancy and sexually transmitted infections. A 2022 mathematical modeling study estimated that 117 million HIV infections have been averted due to condoms since 1990.[14]

About 80% of our cohort reported an undetectable viral load, with no difference between men and women. Uganda's 2020-2021 Population-Based HIV Impact Assessment reported that women are more likely to achieve an undetectable viral load than men.[15] Possible reasons for the contrast in findings could be due to the effect of sustained psychosocial support, which includes educational sessions on viral suppression and effective healthcare management. Additionally, most of the study participants were from urban or periurban districts and may have better access to healthcare services compared to youth living in rural areas. Persons living with HIV travel further on average to healthcare facilities compared to those not living with HIV, and distance and cost of transport are common barriers to adherence and healthcare engagement in Uganda.[16,17]

The high levels of undetectable viral loads and condom and contraceptive use among participants indicate effective HIV management and low sexual risk behaviors within our cohort comprised of youth involved in long-term psychosocial support. Psychosocial interventions have been shown to enhance engagement in healthcare and behavioral outcomes among youth living with HIV. A randomized controlled trial in Uganda included 100 youth aged 14 to 21 who were randomized to the intervention group ($N = 50$) or control group ($N = 50$).[18] The intervention comprised 18 sessions covering either physical health and nutrition, mental health, and reducing HIV transmission. Condom use increased from 10% at baseline to 93% at 3-month follow-up ($P < .01$), compared to no significant difference in condom use among controls. A systematic review assessed the effectiveness of psychosocial interventions in improving health outcomes for adolescents and young people living with HIV.[19] These interventions improved adherence to ART (standardized mean difference [SMD] = 0.3907, 95% CI: 0.1059-0.6754, 21 studies) and decreased viral load (SMD = −0.2607, 95% CI: −0.4518 to −0.0696, 12 studies). However, they did not show significant impacts on sexual risk behaviors (SMD = 0.3261, 95% CI: −0.1542–0.8064, 9 studies) or sexual knowledge (SMD = 0.2671, 95% CI: −0.0957–0.6298, 4 studies). Most interventions were short-term (weeks or months) and primarily involved motivational interviewing or goal setting rather than content-based curricula. There is a need for further research on the role of sustained, long-term psychosocial support that incorporates sexual education to decrease sexual risk behaviors and increase sexual knowledge among youth living with HIV.

This study had several limitations. The data were collected through self-report and may be limited by recall bias, especially given the sensitive nature of the questions. Participants were assured that the data would remain anonymous and confidential. The study did not utilize laboratory testing or the medical records of participants. However, most YGA members are referred to the group from other Makerere-University Johns Hopkins Research Collaboration studies and/or nearby HIV clinics, which do utilize laboratory testing. This study was

conducted among members of one psychosocial support group within Kampala, and therefore cannot necessarily be generalized to all youth living with perinatally acquired HIV.

Conclusions

While the majority of participants reported undetectable viral loads and high contraceptive use, a significant proportion faced challenges in areas such as disclosure of HIV status and lack of income and employment, highlighting the interplay of medical and psychosocial factors influencing this population of youth living with perinatally acquired HIV. Recognizing the unique platform of the YGA support group, these findings will guide the development of future curricula that can be used to assess the effect of sustained psychosocial interventions on high-risk sexual behaviors. We hope to ultimately develop psychosocial interventions that can be shared with and implemented by other HIV-youth programs, fostering a broader impact in the education and support of young people.

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Authors' Contributions

GB, PN, CK, JN, JBJ, and JE: conceptualization; GR: data curation; LW: formal analysis; PN, CK, JN, and JE: investigation; GB, PN, CK, JN, JBJ, and JE: methodology; GB, MM, JBJ, and JE: project administration; GB, MM, and JE: resources; GR: software; JBJ and JE: supervision; GB: writing–original draft; and PN, CK, JN, LW, GR, IY, MM, MM, NV, JBJ, and JE: writing–review and editing.

Declaration of Conflicting Interests

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

Ethical Approval

The study was approved by the Makerere University School of Medicine Research and Ethics Committee (#Mak-SOMREC-2023-634), the Uganda Council of Science and Technology (#SS1910ES), and the University of Iowa Institutional Review Board (#202307027). Written informed consent was obtained prior to the survey.

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