Which groups are most affected by sexual violence? A disaggregated analysis by sex, age, and HIV-status of adolescents living in South Africa

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ABSTRACT

Background: Estimates on sexual violence (SV) among adolescents are rarely disaggregated by key indicators.
Objective: We examine the independent effects of sex, age, HIV status and mode of HIV acquisition on the exposure to SV using generalised estimating equations models and proportional hazard model.
Participant and setting: Data from a 4-year prospective cohort study of 1447 adolescents (ages 10–19, 57% girls, 76% living with HIV) in South Africa.
Methods: We describe the lifetime prevalence of three forms of SV: non-contact (unwanted showing of private parts), contact (coerced sexual debut, attempted and completed forced penetrative or oral sex,) and exploitative (sex in exchange for goods/money).
Results: Overall, 23.9% (95%CI = 21.7%–26.1%) reported exposure to SV at some point in their lives: non-contact = 5.7%, contact = 9.0% and exploitative = 15.8%. While girls reported higher rates of exploitative (18.4% vs 12.3%; $p < 0.001$) and contact SV (12.3% vs 4.6%; $p < 0.001$), there were no differences in levels of non-contact SV by sex (6.5% vs 4.6%; $p = 0.086$). Exposure to any SV doubled in late adolescence (10–14 years = 7.0% vs ≥15 years = 31.7%; aIRR = 2.07; 95%CI = 1.82–2.37). Though level of SV were comparable between those living with HIV and those HIV-uninfected (22.9% vs 26.2%; $p = 0.182$), adolescents who recently acquired HIV were twice as likely to experience SV compared to adolescents who perinatally acquired HIV (42.3% vs 15.7%; aIRR = 2.03; 95%CI = 1.73–2.39). This association persisted when analysis was restricted to incidence SV during follow-up (aIRR = 1.53; 95%CI = 1.23–2.10).
Conclusion: Exposure to SV was high for both sexes, increased with age and more prevalent among adolescents who recently acquired HIV. SV prevention and response services must also be offered to boys and strengthened in HIV care services.

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1. Introduction

In many settings in sub-Saharan Africa (SSA), adolescents (ages 10–19) experience high levels of sexual violence, often perpetrated by known members of their families and communities (Devries et al., 2018; Ward et al., 2018). Data from Violence Against Children surveys shows that 23% of girls and 10% of boys experience sexual violence by the age of 18 (Ligiero et al., 2019). In South Africa, these estimates are higher, with more than one-third of adolescents, both boys and girls, reporting exposure to sexual violence by the age of 18 (Artz et al., 2016). Exposure to sexual violence during adolescence has been shown to increase the risk of HIV acquisition and multiple negative developmental outcomes, including increased risk of poor mental health (Richter et al., 2018a, b) and substance abuse (Jewkes et al., 2010). Global efforts to end all forms of violence against children by 2030 (UNICEF, 2015) depend on understanding the epidemiology of sexual violence: who is exposed, to what forms of sexual violence and when are they most at risk of exposure. For South Africa and many other SSA countries, contextualizing these risks requires disaggregating sexual violence data by sex, age, and HIV status.

Sexual violence involves any sexual acts, contact or non-contact, attempted or completed, that happens without informed consent or through coercion, regardless of the relationship to the victim (Krug et al., 2002). Specific to adolescents, this also includes relationships whereby adolescents receive items (e.g., gifts, money, food, accommodation, alcohol) in exchange of sexual acts and/or having others perform sexual activities on them, commonly referred to as transactional sex (United Nations, 1989; Wamoyi et al., 2019). In this paper, we refer to transactional sex as a form of exploitative sexual violence, since it consists of abuse of an adolescent's vulnerability, trust, and limited power for sexual gain(Wamoyi et al., 2019; Williams et al., 2012).

Thus far, very few studies have described patterns of sexual violence among boys, particularly in comparison to girls (Collings, 2005; Madu & Peltzer, 2001; Richter et al., 2018a, b; Ward et al., 2018). Research on boys has mainly been conducted in conflict-affected (Chynoweth et al., 2020) or male dominated settings such as gangs and prisons (Carpenter, 2006; Wood, 2015). In research that included boys, the traditional use of narrow contact-based measures (attempted and completed rape) of sexual violence may have underestimated boys' vulnerability to other forms of sexual violence, such as unwanted exposure of private parts and coerced sexual debut (Madu & Peltzer, 2001). Findings from recent community-based studies that include boys and measure non-contact forms of sexual violence suggest that the risk of exposure to any form of sexual violence is comparable between boys and girls (Richter et al., 2018a, b; Ward et al., 2018). Therefore, population data on multiple forms of sexual violence by sex is crucial in developing our understanding of gender specific risks.

When examining the relationship between sexual violence and age, there is less empirical data from SSA on the exposure to sexual violence during early adolescences, aged 10–14. For instance, nationally representative studies such as Violence Against Children and Demographic and Health surveys sample adolescents of ages 13 and older (Ahinkorah et al., 2020; Chiang et al., 2016). Similarly, school-based studies often focus on adolescents over 15 years (Andersson et al., 2012; Ward et al., 2018). Exposure to different forms of sexual violence is likely to vary with age; non-contact sexual violence may be more prevalent in early adolescence, with contact and exploitative forms of sexual violence being more common during late adolescence (Madu & Peltzer, 2001). In several studies, older adolescents are asked if they experienced any form of sexual violence before age 15 (Barth et al., 2013). Although this retrospective question may provide a risk estimate of sexual violence during the early adolescence period, it is often restricted to inquiries about contact forms of sexual violence (forced penetrative sex), which may account for a small proportion of sexual violence exposure during the early adolescence period and is prone to recall bias (Jewkes et al., 2002; Madu & Peltzer, 2001). To better understand risk differences among age groups, we need analyses that include adolescents aged 10 to 19.

Moreover, when considering the high rates of HIV in SSA, in addition to disaggregating data by sex and age, experiences of sexual violence need to be investigated by HIV status. About 1.7 million adolescents in SSA are living with HIV, accounting for nearly 88% of the global estimate (UNAIDS, 2021). In South Africa, >420,000 adolescents are living with HIV, the highest number in the region (Johnson & Dorrington, 2021). Compared to adolescents who have not acquired HIV, adolescents living with HIV are more likely to come from disadvantaged households, lack school education, and experience poverty (Mabaso et al., 2018). These socio-economic factors are associated with increased likelihood of exposure to sexual violence forms such as coerced sexual debut, early marriage, and transactional sexual exploitation (Wamoyi et al., 2016). AIDS-related orphanhood among children who perinatally acquired HIV can compound their vulnerability to exploitative forms of sexual violence, especially among girls (Birdthistle et al., 2011; Cluver et al., 2011; Mathews et al., 2016). Despite this, only one study in the region has investigated the prevalence of sexual violence as the primary outcome among adolescent boys and girls living with HIV (Merrill et al., 2020). Still, the study's findings are limited to rape as a form of sexual violence, and estimated rates are not compared to adolescents who had not acquired HIV (Merrill et al., 2020). Examining the potential moderating effect of HIV on the risk of experiencing different forms of sexual violence is crucial in supporting the wellbeing of all adolescents.

These research gaps have significant consequences for practice and policy. First, the exclusion of boys' experiences of sexual violence hinders the development of gender responsive and transformative practices and policies. Second, data on patterns of sexual violence during early adolescence are insufficient to inform age-appropriate screening strategies. Consequently, young adolescents who may have experienced sexual violence and need psychosocial support are identified much later in life. And lastly, sexual violence screening may not be adequately integrated in adolescence HIV prevention and management tools.

To contribute towards addressing these research gaps, we use data from a 4-year longitudinal South African study to investigate the nature and extent of sexual violence exposure during adolescence. We describe the lifetime prevalence of each form of sexual violence, contact, non-contact and exploitative, and any sexual violence (composite of all three forms), disaggregating levels by sex, age, HIV status and mode of HIV acquisition. We examine the independent the association of these four factors (sex, age, HIV status and mode of HIV acquisition) using multivariate generalised estimation equations, controlling for other known factors associated with exposure to

sexual violence. Lastly, we conduct a sensitivity analysis on the effect of HIV status and exposure to sexual violence using incidence measures.

2. Methods

We used data from a prospective cohort of 1591 adolescents, ages 10–19 years, living in urban and peri-urban settlements in the Eastern Cape province of South Africa. Adolescents were recruited from 52 public health facilities and neighbouring households: median age = 13 years, 53% (n = 843) females and 67% (n = 1071) living with HIV. Participants were interviewed three times between 2014 and 2018, with a median follow-up of 32.9 months (Inter Quantile Range (IQR) = 27.6–40.0) between first and last interview. The retention was 94% across all three interviews: 1.5% mortality, 1.4% refusals and 3.1% untraceable. Further information about the sampling strategy is described elsewhere (Hodes et al., 2020).

2.1. Study procedures

During all three interviews, participants were asked if they had experienced any of the three forms of sexual violence: non-contact (unwanted showing of private parts), contact (coerced sexual debut, attempted and complete forced penetrative or oral sex,) and transactional (engaging in sexual activities in exchange for gifts or money) (Table 1). Self-reported measures of sexual violence included four items from the Juvenile Victimization Questionnaire (JVQ) and two items adapted from previous studies conducted in South Africa among boys and girls (Finkelhor et al., 2005; Pettifor et al., 2005). Several studies in SSA have found the JVQ to have good internal consistency and construct validity (Collings et al., 2014; Ritacco & Suffl, 2012).

The questionnaire was piloted with a teen advisory group, translated into the local language, IsiXhosa, and administered by a trained research staff member of the same sex. The order and wording of the sexual violence measures was retained across the three study interviews. To minimize social desirability bias, all participants were read an introductory text that explained the nature of the questions and the practice of no judgment and confidentiality by the research team (Supplementary Table A1). In addition, participants were provided with the option to complete sensitive sections of the interview using Audio-CASI (Audio-enhanced, computer-assisted self-interviewing). Special attention was paid to protecting the privacy of adolescents by conducting interviews at a safe distance from the home and/or caregiver.

2.2. Ethics

Ethical approvals were given by the University of Cape Town (CSSR 2013/4), Oxford University (CUREC2/12–21), provincial Departments of Health and Education, and local healthcare facilities. Research staff received training on administering of the questionnaire and conducting research with vulnerable groups such as children and adolescents affected by HIV. Participation in the study was voluntary and written informed consent was sought from adolescents and their caregivers at each study interview. The study enforced stringent safety and fieldwork study protocols, providing referrals for social, physical, and sexual harms. This included the referral for emergency contraception and HIV post-exposure prophylaxis (where relevant) for rape cases that occurred in the last 72 hours. In cases of heightened risk, and with the consent of the adolescent, they were referred to local organisations, and the choice of these options was made in consultation with the social worker and psychologist on the research team. There were no financial incentives for study participation, but all participants received a certificate of participation, snacks, and a small gift pack including stationery and toiletries.

2.3. Study measures

2.3.1. Sexual violence measures

Measures of non-contact and contact sexual violence (excluding forced sexual debut) had five categorised responses – "weekly",

Table 1
Measurement of the three forms of sexual violence.

Sexual violence form	Question
Non-contact	"Has anyone made you look at their private parts when you did not want to" and/or "Has any wanted to look at your private parts when you did not want them to" (Finkelhor et al., 2005)
Contact	Has anyone:
	• "touched your private parts or made you touch theirs when you did not want to?"; (Finkelhor et al., 2005)
	• "tried to have sex with you when you did not want to?" (Finkelhor et al., 2005);
	• "had sex (vaginal, anal or oral) with you when you did not want them to?" (Finkelhor et al., 2005);
	Think back to the first time you had sex (penetrative vaginal),
	• "were you forced to have sex?" (Pettifor et al., 2005)
Transactional exploitation	"Has anyone ever given you a present for having sex with them OR have you ever decided to have sex with someone in exchange for present, money or favours" (Pettifor et al., 2005).

"monthly", "at least once this year", "it has happened but more than a year ago" and "never"; and the participants could only select one response. Responses for forced sexual debut were restricted to "yes" and "no" options. Transactional sexual violence responses included "yes, in the last year", "yes but more than a year ago" and "never". Participants' responses we used to generate two measures of occurrence for each form of sexual violence: (i) lifetime prevalence and (ii) incidence. The lifetime prevalence is the cumulative percentage of adolescents who reported experiencing any sexual violence at some point in their life. Responses for lifetime prevalence excluded the "never" and "no" options. We defined incidence as the proportion of adolescents who had not experienced sexual violence a baseline and later reported "weekly", "monthly" and "at least once this year/ yes, in the last year" exposure to sexual violence at follow-up interviews.

2.3.2. Explanatory variables

Socio-demographic characteristics were measured at each interview and included: age, sex, school progression (delay if based on age, enrolled in lower grade than expected), housing type (informal if living in a shack), food insecurity (not enough food to eat for at least 3 days of the preceding 7 days), social protection (household receiving at least one government grant), employment (part-time and full-time) and orphanhood status (maternal or paternal). HIV measures included self-reported HIV status which were validated by review of paper-based and electronic medical records for HIV-related treatment. Mode of HIV acquisition was measured using an age cut-off of 10 years, validated with a detailed algorithm when in the absence of definitive clinic notes ascribing mode of HIV acquisition (CIPHER Global Cohort Collaboration, 2018). Perinatally infected adolescents were those who began antiretroviral treatment before the age of 10, supported by HIV-infected parents, parental orphanhood, no sexual activity, and history of chronic illness (Sherr et al., 2018).

2.4. Data analysis

Data analysis was conducted using Stata 15.1 (StataCorp LLC., College Station, Texas, USA; 2017). The lifetime prevalence of each form of sexual violence and overall are described using proportions with 95% confidence intervals (95% CI). Using chi-square and Fisher's exact tests for binary variables, we explored group differences by sex (boys vs girls), age group (10–14 years vs ≥15 years) and HIV status (HIV-uninfected vs living with HIV). Among adolescents living with HIV, we further disaggregated the findings by mode of HIV acquisition (perinatally acquired HIV vs recently acquired HIV). All p-values were based on a two-sided α at 0.05.

To examine the independent effects of sex, age, HIV status and mode of HIV acquisition, we used generalised estimating equations (GEE) models with a probit link function to model association with exposure to sexual violence. We fitted GEE models with an unstructured correlation matrix to account for repeated outcome measurements over time and we compared incidence rate ratios (IRRs) with 95% CIs across the four subgroups. The models controlled for sociodemographic characteristics such as housing type, food security, orphanhood, and school progression.

To account for the possibility that recent HIV infections might have resulted from exposure to sexual violence, we further estimated the risk of sexual violence using only incidence cases at follow-up interviews. We excluded adolescents who had experienced any form of sexual violence by the first interview ($n = 190$, 13%) and modelled the cumulative risk of being exposed to sexual violence by HIV status and mode of HIV infection using a Cox proportional hazard method. We censored participants at the interview date at which they first reported sexual violence exposure or at the second interview if they did not complete the third interview. We further assumed non-informative censoring: individuals who had one follow-up visit have the same probability of experiencing sexual violence as individuals who had two follow-up visits, as there were no differences in baseline sexual violence prevalence between these two groups. We used the log-rank test at the significance level of 0.05 to compare the hazard function between HIV acquisition mode strata.

3. Results

The analysis includes participants who had at least one follow-up interview ($n = 1447$, 95%). There were no differences in the

Table 2
Baseline characteristic of adolescents ages 10–19 years ($n = 1447$), stratified by sex.

	Total n = 1447	Boys (n = 626,43%)	Girls (n = 821,57%)	P value
Age years (median, IQR)	13 (11–16)	13 (11–15)	14 (11.5–17)	<0.001*
10–14 years	817 (60%)	407 (69%)	410 (53%)	<0.001*
Informal Housing	260 (18%)	99 (16%)	161 (20%)	0.064
Urban	1053 (73%)	463 (75%)	585 (71%)	0.138
School Grade Delay	714 (49%)	349 (56%)	365 (44%)	<0.001*
Grant/Employment	826 (59%)	368 (61%)	458 (58%)	0.270
Orphanhood	719 (52%)	317 (54%)	392 (50%)	0.096
Food Insecure	332 (23%)	118 (19%)	214 (26%)	0.001*
Living with HIV	1024 (71%)	453 (73%)	571 (69%)	0.243
vRecently acquired HIV	274 (27%)	80 (17%)	194 (34%)	<0.001*

n, % unless state otherwise | * statistically significant at $p < 0.05$.
School grade delay = Based on age, enrolled in a lower grade than expected | Food Insecure = not enough food to eat for at least 3 days in the last 7 days.

baseline exposure to the three forms of sexual violence between adolescents with no follow-up interview and those who were successfully followed-up (Supplementary Table A1). Adolescents with no follow-up interview were more likely to be younger, stay in informal housing and have recently acquired HIV.

Table 2 shows the baseline characteristics of the 1447 adolescents included in the analysis. The median age at first interview was 13 years (IQR = 11–16), and the majority were girls, living with HIV and in early adolescence (10–14 years). Among those living with HIV, nearly three-quarters (73%) had perinatally acquired HIV. Compared to boys, girls were older, less likely to report school grade delay and more likely to have experienced food insecurity in the proceeding seven days. Additionally, a higher proportion of girls had recently acquired HIV compared to boys.
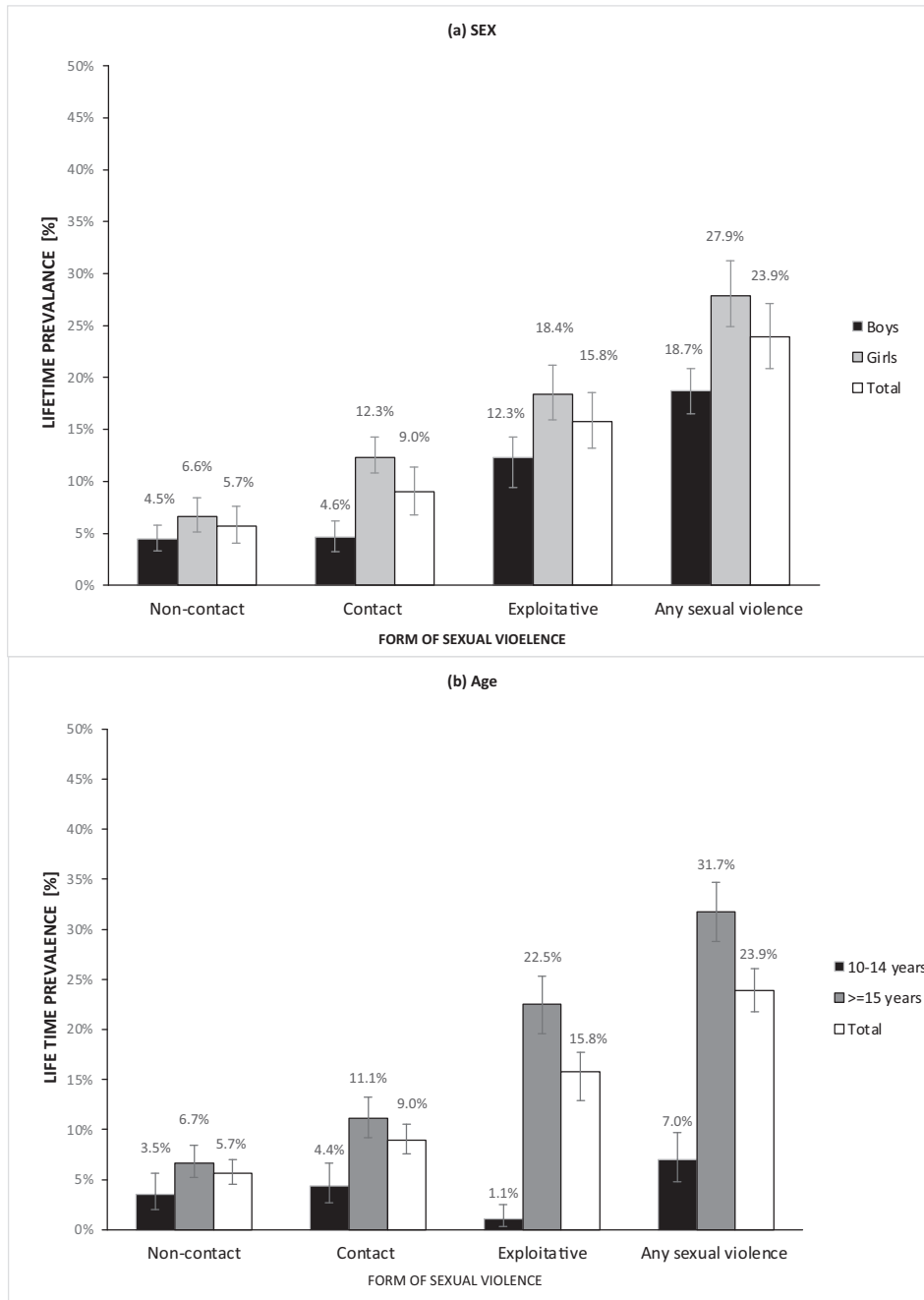

Fig. 1. Proportion of adolescents reporting experiencing sexual violence at some point of their lives, disaggregated by (a) sex, (b) age at last study interview, (c) HIV status and (d) HIV acquisition mode.
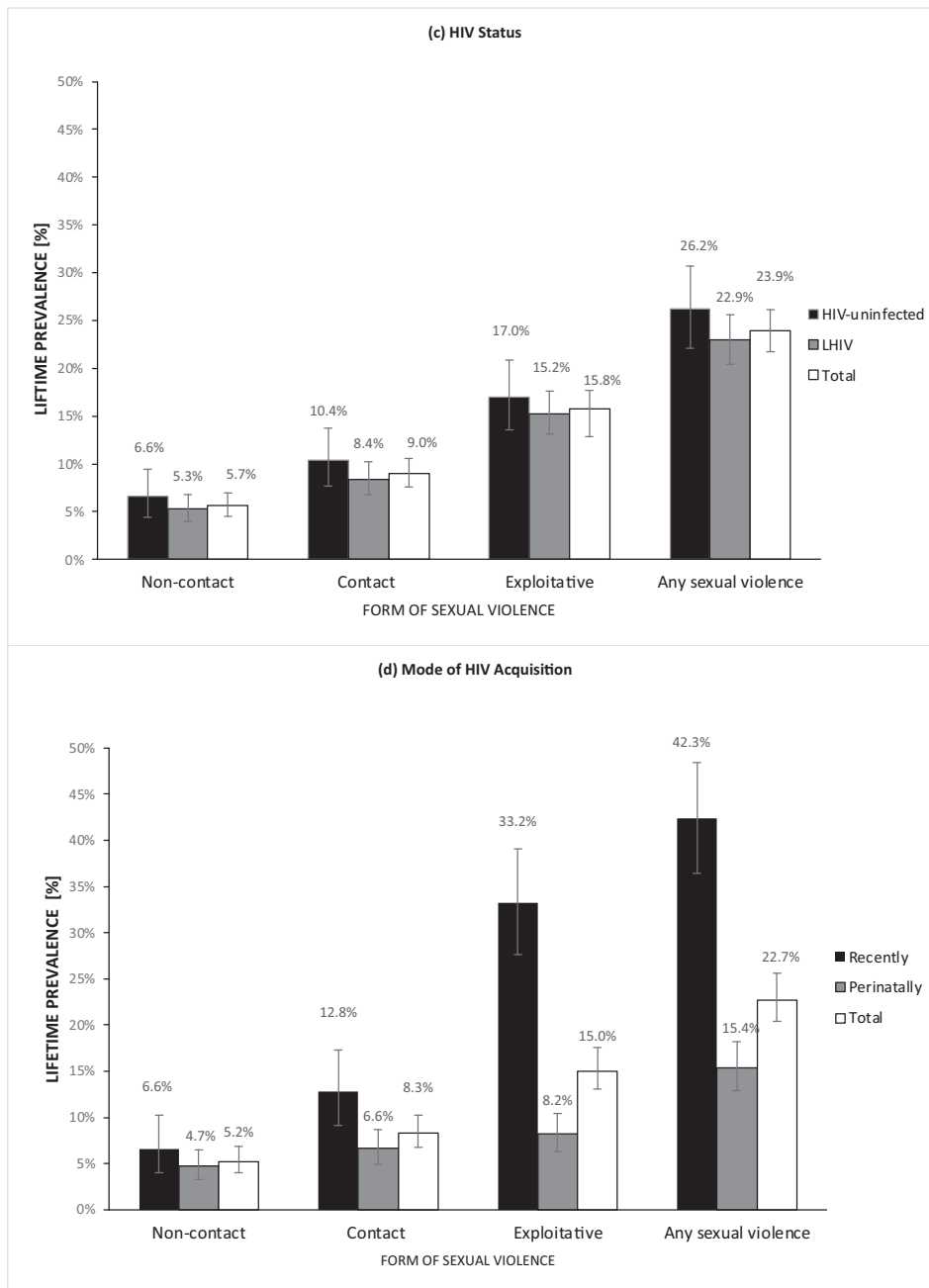
Fig. 1. (*continued*).

3.1. Lifetime prevalence of sexual violence

About 23.9% (95%CI = 21.7%–26.1%) of adolescents reported that they had experienced at least one of the three forms of sexual violence in their lifetime. The most common form of sexual violence was transactional exploitation, 15.8% (95%CI = 12.9%–17.7%), and nearly one-in-ten adolescents reported having experienced non-contact sexual violence, 9.1% (95%CI = 7.6%–10.6%). The proportion of adolescents who were exposed to non-contact sexual violence was 5.7% (95%CI = 4.5%–7.0%). Fig. 1 shows the disaggregated lifetime prevalence of sexual violence by sex, age group, HIV status and mode of HIV acquisition.

3.1.1. Association of sex with lifetime prevalence of sexual violence

Overall, girls were significantly more likely than boys to report exposure to any form of sexual violence (girls = 27.9% vs boys = 18.7%, *p* < 0.001) [Fig. 1a]. This increased vulnerability was further observed for contact and transactional forms of sexual violence (*p*

< 0.02 for both forms), but not for non-contact sexual violence ($p = 0.086$) [Fig. 1a]. However, for both sexes, the most prevalent form of sexual violence was transactional exploitation. Among boys, the prevalence of non-contact and contact forms of sexual violence was comparable (4.5% vs 4.6%), whereas for girls, the prevalence of contact sexual violence was nearly double that of non-contact violence (12.3% vs 6.6%).

3.1.2. Association of age with lifetime prevalence of sexual violence

The lifetime prevalence of any sexual violence among adolescents ≥15 years of age was four times greater than that of adolescents ages 10–14 years ($p < 0.001$) [Fig. 1b]. This was largely attributable to differences in the exposure to transactional exploitation, 1.1.% among 10–14-year-old adolescents compared to 22.5% in adolescents ≥15 years, $p < 0.001$. The lifetime prevalence of contact and non-contact sexual violence also varied considerably by age group, with both forms of sexual violence being twice as prevalent in older adolescents than younger adolescents ($p < 0.001$ for both).

3.1.3. Association of HIV status and HIV acquisition with lifetime prevalence of sexual violence

The lifetime prevalence of sexual violence, overall and by form, did not statistically differ between adolescents living with HIV and those who were HIV-uninfected (22.9% vs 26.2%, $p = 0.182$) [Fig. 1c]. However, when we disaggregated within adolescents living HIV, participants who had recently acquired HIV were significantly more likely to report exposure to any sexual violence than those who had acquired HIV perinatally (42.3% vs 15.4%, $p < 0.001$) [Fig. 1d]. Among adolescents who have recently acquired HIV, the prevalence of transactional exploitation was fourfold that of perinatally infected adolescents (33.2% vs 8.2%, $p < 0.001$) and the prevalence of contact sexual violence was nearly double that of perinatally infected adolescents (12.8% vs 6.6%, $p < 0.001$). The rates of non-contact sexual violence by HIV acquisition mode were comparable.

Given the potential bi-directional effect between HIV acquisition and sexual violence (exposure to sexual violence can lead to HIV infection and vice-versa), a Cox proportional hazard model was used to estimate the risk of exposure to sexual violence among adolescents reporting no sexual violence at baseline ($n = 1257$, 71% living with HIV). Like lifetime prevalence, we found that mode of HIV acquisition, but not HIV status, was as associated with increased risk of sexual violence. There was no difference in the past-year incidence of sexual violence between adolescents living with HIV and those who were HIV-uninfected: 11.5% ($n = 100$) vs 14.0% ($n = 54$) respectively, $p = 0.202$. Disaggregating by mode of HIV acquisition, the incidence of sexual violence was higher among adolescents who had recently acquired HIV in comparison to those who acquired HIV perinatally (19.1% vs 9.5%, $p < 0.001$). Fig. 2 shows the cumulative risk of experiencing sexual violence during the adolescence period, stratified by mode of HIV acquisition, and adjusting for age. At all ages, the risk of experiencing sexual violence was higher for adolescents who had recently acquired HIV compared to those who acquired HIV perinatally. The hazard ratio for this effect is shown in supplementary Table A3.

3.1.4. Independent association of sex, age, HIV status and mode of HIV acquisition with is the risk of experiencing any sexual violence

After adjusting for demographic and socio-economic characteristics, being older, a girl and having recently acquired HIV continued to be associated with increased risk of sexual violence (Table 3). Being ≥15 years old doubled the risk of an adolescent's exposure to sexual violence (aRR = 2.07; 95% CI = 1.82–2.37). Girls had a 23% increased risk of exposure to sexual violence compared to boys (aRR = 1.23; 95% CI = 1.08–1.39) and living with HIV did not increase an adolescent's risk of exposure to sexual violence (aRR = 0.94; 95% CI = 0.82–1.07). Among those living with HIV, adolescents who horizontally acquired HIV had a 62% increased risk of exposure to sexual violence compared to those who perinatally acquired HIV (aRR = 1.62; 95% CI = 1.37–1.92). We fitted separate models for boys and girls and found no moderation effect of sex on the impact of age and mode of HIV acquisition on the risk of experiencing sexual violence (Table 3).

Other factors associated with increased risk of sexual violence included being grade delayed and food insecure. Adolescents who
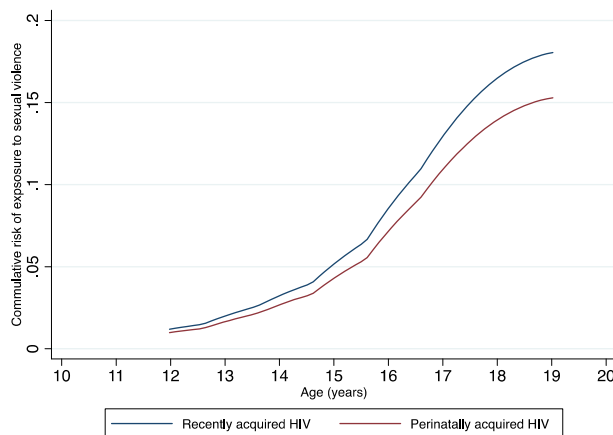

Fig. 2. Nelson-Aalen plot for the cumulative risk of sexual violence at each age of the adolescence period among adolescents living with HIV ($n = 870$).

Table 3

Result of a GEE univariable and multivariable model predicting the incidence risk ratio of any sexual violence among adolescents and when stratified by sex (*n* = 1447).

	Univariable models			Multivariable model		
	RR	(95% CI)	p-Value	aRR	(95% CI)	p-Value
≥15 years	2.11	1.86–2.39	<0.001	2.07	1.82–2.37	<0.001
Girl	1.32	1.17–1.49	<0.001	1.23	1.08–1.39	0.001
Living with HIV	0.94	0.83–1.07	0.393	0.94	0.82–1.07	0.405
[a]Recently Acquired HIV	1.97	1.70–2.28	<0.001	2.03	1.73–2.39	<0.001
Informal housing	1.12	0.97–1.30	0.128	1.15	0.98–1.36	0.085
Grant/Employment	0.92	0.82–1.02	0.098	1.05	0.90–1.22	0.513
School Grade Delay	1.27	1.13–1.43	<0.001	1.14	1.06–1.30	0.039
Food Insecure	1.40	1.25–1.57	<0.001	1.30	1.14–1.49	<0.001
Boys						
≥15 years	1.96	1.61–2.37	<0.001	1.88	1.54–2.31	<0.001
Living with HIV	0.83	0.66–1.05	0.130	0.81	0.62–1.05	0.121
[a]Recently Acquired HIV	1.68	1.75–2.42	0.005	1.72	1.19–2.48	0.004
Informal housing	0.87	0.63–1.20	0.422	0.93	0.66–1.29	0.615
Grant/Employment	0.28	0.78–1.11	0.402	0.98	0.78–1.24	0.903
School Grade Delay	1.06	0.85–1.31	0.580	1.11	0.89–1.38	0.369
Food Insecure	1.03	0.83–1.32	0.96	1.26	1.02–1.57	0.034
Girls						
≥15 years	2.16	1.82–2.56	<0.001	2.22	1.87–2.68	0.001
Living with HIV	1.03	0.89–1.19	0.125	0.98	0.83–1.16	0.833
[a]Recently Acquired HIV	1.52	1.29–1.80	<0.001	1.58	1.31–1.92	<0.001
Informal housing	1.21	1.01–1.44	0.036	1.30	1.12–1.57	0.009
Grant/Employment	0.91	0.80–1.04	0.172	0.95	0.81–1.11	0.484
School Grade Delay	1.13	0.97–1.32	0.098	1.16	0.99–1.36	0.072
Food Insecure	1.50	1.31–1.71	<0.001	1.33	1.12–1.57	<0.001

[a] Model restricted to adolescents living with HIV (*n* = 1024).

experienced food insecurity were 30% more likely to be exposed to sexual violence than those who were food secure, and this association held true for both boys and girls. While school grade delay was associated with a 14% increased risk of sexual violence, the association did not persist in sex stratified models. Informal housing was associated with a 30% increased risk of sexual violence among girls, but not boys.

4. Discussion

The study findings show that preventing and responding to sexual violence requires differentiated approaches by age and mode of HIV acquisition, while recognizing both girls' and boys' vulnerability to sexual violence. Approximately 1 in 4 girls and 1 in 6 boys in this study were exposed to sexual violence. The lifetime prevalence of all three forms of sexual violence (non-contact, contact and transactional) increased with age. Although there were no differences in the levels of sexual violence between adolescents living with HIV and those who were HIV-uninfected, exposure to any sexual violence was more likely to occur among adolescents who had recently acquired HIV than among those who perinatally acquired HIV.

Our study found that girls experienced sexual violence at very high rates, higher than boys, which is consistent with global findings (Barth et al., 2013; Stöckl et al., 2014; Stoltenborgh et al., 2015). One of the root causes identified for girl's heightened vulnerability to sexual violence are gender norms and beliefs that reinforce male dominance and superiority, creating power hierarchies that give men greater status and legitimizes society's acceptance of violence against women (Jewkes et al., 2020). The same social and power hierarchies are why children are subjected to sexual violence. In South Africa, men from within the home and community are most often the perpetrators of sexual violence against both boys and girls (Lalor, 2004; Ravi & Ahluwalia, 2017). Therefore, efforts to end sexual violence against adolescents must continue to address social gender dynamics that contribute to the disparities in sexual violence experiences among the sexes.

Yet, this study is also one of few demonstrating that boys are not exempt from experiencing sexual violence. The most prevalent form of sexual violence among boys was transactional sexual exploitation, followed by equal reporting of both non-contact and contact sexual violence. These results may point to the shared risk factors for non-contact and contact forms of sexual violence, such as the perpetrator's characteristics and the environment in which the violation occurs. Existing research from South Africa shows that both non-contact and contact forms of sexual violence against boys often occur at schools and are perpetrated by their peers (Richter et al., 2018a, b), while transactional sexual violence usually occurs outside of the school environment and is perpetrated by adults (Dunkle et al., 2007). To further explore these hypotheses' contextual difference, future studies should explicitly include a focus on boys and systematically examine the context in which sexual violence occurs as well as the perpetrators.

In addition, our findings call for the provision of services for sexual violence prevention and response efforts for boys, which

includes national and global policies. Majority of programs engaging boys in sexual violence prevention question norms related to masculinity and power, without recognizing boys' vulnerabilities (Hatcher et al., 2022; Russell et al., 2020). Existing program effectiveness measures such as reduction in sexual violence rates, increased disclosure of sexual violence experience and uptake of response services currently do not consider boys (Ligiero et al., 2019; Russell et al., 2020). Evidence on the effectiveness of programmes such as cash transfers on reducing transactional sexual exploitation among boys is virtually absent in literature. If we are to meet the Sustainable Development Goals call of leaving no one behind, we need to include both boys and girls in policy targets.

In this sample, estimates of contact and transactional sexual violence were comparable to those reported in other studies, whilst estimates of non-contact sexual violence were slightly higher than those reported in the literature. Using the same JVQ measures, Meinck et al. (2017a, b) and Ward et al. (2018) found similar rates of contact sexual violence, 9.0%–12.0%, among South African adolescents ages 10–17. The prevalence of transactional sexual violence among HIV-negative adolescents in this study was comparable to those reported in two South African HIV prevention clinical trials (13%–17%) (Jewkes, Dunkle, Nduna, Levin, et al., 2006b, 2006a; Ranganathan et al., 2016), but higher than estimates from an earlier community-based longitudinal study conducted of younger adolescents from the same province (5%–7%) (Cluver et al., 2011). The prevalence of non-contact sexual violence from our study is also higher than that reported by the South African Optimus study (4.5%), the only study we identified to have reported estimates of non-contact sexual violence among adolescent boys and girls. (Ward et al., 2018). Our finding of higher levels of non-contact sexual violence is likely due to the inclusion of a wider age range of adolescents (10–19 years).

The observed strong effect of older age on the exposure to sexual violence is not surprising. Being an older adolescent ($\geq$15 years) doubled the risk of exposure to any form of sexual violence, with the likelihood of transactional sexual violence being disproportionally heightened. One plausible explanation of these results is that with older age, adolescents are more likely to engage in sexual encounters, become more mobile (spend more time outside the home and in new environments) and potentially less supervised by their caregiver (Simons et al., 2018). This is often coupled by increased interactions with both adults and peers (Hampshire et al., 2011). Together, this places older adolescents at heightened risk of sexual violence exposure compared to younger adolescents. Even so, the prevalence of 7% among adolescents ages 10–14 is alarming and warrants targeted interventions.

Our findings of an elevated risk of sexual violence among adolescents who have recently acquired HIV reveals that sexual violence, a risk factor for HIV infection, is also pervasive after HIV infection (Stockman et al., 2013). Therefore, HIV care programmes need to extend existing sexual violence screening tools and referral protocols to include non-contact and transactional sexual violence, sensitive for boys and girls, and have these tools integrated into both HIV prevention and care and treatment services (Christofides & Jewkes, 2010; Colombini et al., 2021). A key component of this integration will be ensuring services are provided using a youth friendly approach: adolescents are respected, their records are kept confidential, and they are treated with kindness (Africa et al., 2015). Healthcare workers will also require support with navigating referral networks. The integration of gender-based violence screening in two adolescent friendly HIV prevention centres in South Africa and Tanzania was shown to be feasible and sustainable when accompanied by regular debriefing sessions among healthcare providers (Colombini et al., 2021).

Beyond the clinic setting, the study findings highlight the need to support promising evidence-based interventions aimed at primary prevention sexual violence among adolescents. Community-based programs such as DREAMS (Saul et al., 2018), Parenting for lifelong Health (Cluver et al., 2018) and Stepping Stones (Gibbs et al., 2017), aim to decrease the tolerance of sexual violence, foster equitable gender norms, and increase positive parenting and supervision of adolescents. School-based programs address inappropriate sexual conduct, consent, and examine gender norms and power dynamics in relationships, the home and community (de Koker et al., 2014). Together, these strategies form part of the INSPIRE-provision packages (World Health Organisation, 2018), with growing empirical evidence on the effectiveness of either a single provision or combined provisions in reducing sexual violence among adolescents (Cluver et al., 2020; Ligiero et al., 2019; UNICEF, 2017).

A variety of limitations need to be considered when interpreting the study findings. Since caregivers, who are also possible perpetrators of sexual violence, provided consent for adolescents to participate, adolescents may have felt uncomfortable disclosing sexual violence in fear of their caregivers becoming aware they have done so (Meinck et al., 2017a, b). There was also no information on perpetrators and contextual information of the reported sexual violence. Therefore, experiences of all three forms of sexual violence are likely to be underreported. While four questions were used to assess contact forms of sexual violence, the study used one question each for measures of non-contact and exploitative forms of sexual violence. A one-question based measure does not comprehensively capture adolescents' experiences of these two forms of sexual violence, further underestimating the levels of these two forms of sexual violence. Additionally, the lifetime prevalence measure relies on retrospective recall of events that occurred prior to the baseline interview, contributing to the underestimation of all three forms of sexual violence. Finally, the lack of uniformity in baseline age may result in missed cases of sexual violence, occurring similarly across both age groups, which would weaken the association observed. Future studies should include birth cohorts to examine more nuanced casual pathways and provide more robust estimates of the association between HIV and sexual violence experiences.

Still, the present study had several methodological merits. The study included younger adolescents, those living with HIV and male participants: groups which are often neglected in sexual violence research. It extended sexual violence measures to non-contact forms, assessing all forms of sexual for both girls and boys. Literature of this nature is sparce within sub-Saharan African region. The longitudinal design of the study afforded the opportunity to estimate risk across the entire adolescence period, whilst adjusting for confounding variables at the individual and household level. In turn, we characterized patterns of three forms of sexual violence and identified groups that were at increased risk of sexual violence.

5. Conclusion

The study results offer insights into the different forms of sexual violence experienced by adolescents and identifies which groups are at greater risk. It highlights how exposure to sexual violence increases with age, particularly adolescents' and boys' vulnerability to transactional sexual violence. The study demonstrates that boys and adolescents who have recently acquired HIV - two groups often neglected in research and programming – are also at risk of experiencing sexual violence. The research underscores the need for disaggregated data to recognise all the affected groups in understanding the vulnerability of sexual violence during childhood. Violence prevention research should examine who perpetrates violence against boys, especially with non-contact rates being the same rate as contact forms. Explored vulnerabilities of adolescents should extend beyond violence and include livelihood components.

Declaration of competing interest

The authors have no conflict of interests to report.

Data availability

I have shared the code as supplementary material

Credit authorship contribution statement

N.L conceptualized, conducted the analyses, and wrote the manuscript draft. Both E.T. and L.C. designed the overall study, including data collection tools. L.C. advised on focus and framing of research, including the interpretation of results. E.T. and H.S reviewed the results and contributed to results interpretation. All authors have reviewed and approved this manuscript.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.chiabu.2022.105981.

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