

## Alcohol Use, Intimate Partner Violence, Sexual Coercion and HIV among Women Aged 15–24 in Rakai, Uganda

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Published online: 7 December 2007  
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**Abstract** Disinhibition due to alcohol may induce intimate partner violence and sexual coercion and increased risk of HIV infection. In a sample of 3,422 women aged 15–24 from the Rakai cohort, Uganda, we examined the association between self-reported alcohol use before sex, physical violence/sexual coercion in the past and prevalent HIV, using adjusted odds ratios (Adj OR) and 95% confidence intervals (95% CI). During the previous year, physical violence (26.9%) and sexual coercion (13.4%) were common, and alcohol use before sex was associated with a higher risk of physical violence/sexual coercion. HIV prevalence was significantly higher with alcohol consumption before sex (Adj OR = 1.45, 95% CI: 1.06–1.98) and *especially* when women reported both prior sexual coercion and alcohol use before sex (Adj OR = 1.79, 95% CI: 1.25–2.56). Alcohol use before sex was associated with physical violence and sexual coercion, and both *are jointly associated with* HIV infection risk in young women.

**Keywords** Intimate partner · Physical violence · Sexual coercion · Alcohol use before sex · HIV

### Introduction

Young women in developing countries suffer high rates of HIV infection, and there is concern that male-to-female physical violence and sexual coercion may contribute to their HIV acquisition (Maman et al. 2000; Koenig et al. 2003; Koenig et al. 2004a, b; Jewkes et al. 2003; Dunkle et al. 2004). Characteristics of the women and their male partners and the nature of the relationship are predictors of violent male behavior (Vlahov et al. 1998). Alcohol use has also been linked to violent behavior (Weinsheimer et al. 2005; Cunradi et al. 2002), and may be a part of the dynamics of sexual control (van der Straten et al. 1995) or may be used as a means to obtain sex against a woman's consent (Rickert et al. 2004). Alcohol use has also been linked to prevalent and incident HIV (Kalichman et al. 2007; Zablotska et al. 2006), and the disinhibiting effect of alcohol consumption is associated with sexual risk behaviors such as inconsistent condom use, increased number of sexual partners, and extramarital partners (Dolezal et al. 2000; Windle 1997; Robertson and Plant 1988; Plant 1990; Graves and Leigh 1995; Tveit et al. 1996; Stall and Leigh 1994). These latter behavioral risk factors have also been linked to HIV acquisition (Hankins 1998; Hearst and Chen 2004; Lau and Muula 2004; Sangani et al. 2004).

Alcohol consumption, intimate partner physical violence and sexual coercion, although often underreported, are prevalent in many cultures (Maman et al. 2000; Garcia-Moreno and Watts 2000; Manfrin-Ledet and Porche 2003; Krug et al. 2002; Mbulaiteye et al. 2000; National Institute on Alcohol Abuse and Alcoholism 1992). Previous studies

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explored the predictors and outcomes of intimate partner violence (IPV) among young women, including the risk of HIV infection. In countries with high HIV prevalence and alcohol use, it is not clear what role alcohol may play in instigating IPV and how a combination of these factors may contribute to the HIV epidemic among women. In this study, we assessed whether alcohol use is associated with intimate partner physical violence and/or sexual coercion, and if the latter are associated with HIV infection among young women in Uganda.

## Methods

### Participants and Measures

Data were derived from the Rakai community cohort, Uganda, wherein enrolled adults aged 15–49 were followed for eight survey rounds at 10–12 month intervals between 1994 and 2002. Individuals eligible for enrollment were identified by annual censuses, and consenting adults were interviewed confidentially by trained interviewers of the same gender and were asked to provide a venous blood sample for HIV testing. Two enzyme immunoassays were used for HIV testing: Vironostika HV-1 (Organon Teknika, Charlotte, North Carolina, USA) and Cambridge Biotech (Worcester, MA, USA). Discordant EIA results or new seroconversions were confirmed by Western blot [Bio-Merieux-Vitek, St. Louis, MO, USA] (Wawer et al., 1998). The interview and/or blood test refusal rate was 9.6%, suggesting little self-selection of participants. The details of the study design and implementation have been described previously (Wawer et al. 1998).

The interview collected information on socio-demographic characteristics, sexual behaviors, and health. Sexual network information was obtained for up to four partners in the previous year. The behavioral information included condom use, number and characteristics of sexual partners, sex for money/gifts, alcohol use, IPV and non-consensual sex (Wawer et al. 1998).

About sexual partners, women were asked “Does/Did your partner drink alcohol before sex?” and “Do/Did you drink alcohol before sex with this partner?” Responses to both questions included “Never”, “Sometimes” and “Always”, but we combined the latter two categories and explored any alcohol use before sex. In our sample, 96% of women had only one sex partner in the past 12 months, and 4% had more than one sex partner. The latter usually classified their last sex partner as a ‘husband’ or ‘partner’. For all women, we used the information about alcohol use before sex from the block of questions about the last sex partner.

The Rakai study in Uganda started data collection in 1994, but questions about physical violence and sexual coercion were added in two consecutive surveys in 2001–2002 and 2002–2003. Therefore we used the data from these two surveys. The questions about physical violence and sexual coercion formed a separate block in the questionnaire. Regarding physical violence, women were asked: “Has any of your sexual partners ever...” and “In the past 12 months, has your husband/partner: Verbally abused or shouted at you? Pushed, pulled, slapped or held you down? Punched you? Kicked or dragged you? Tried to strangle you or burn you? Threatened or attacked you with a knife, gun or other weapon?” (Yes/No for each). Physical abuse (ever and in the past 12 months) was defined as at least one positive response versus none during the specified time. Regarding sexual coercion, women were asked “Have any of your sexual partners ever physically forced you to have sex when you did not want to?” (Yes/No) and “In the past 12 months, how many times did your husband/partner physically force you to have sex when you did not want to?”. At least one event was considered as a report of sexual coercion in the past 12 months.

The age-specific lifetime prevalence of sexual coercion increased until age 25, indicating that most coercive experiences occurred during adolescence and young adulthood (Koenig et al. 2003; Koenig et al. 2004a). Therefore, we restricted the sample to women aged 15–24 years. In this age group, 6.8% of women had never had sex or had not had a partner in the past year before the interview. To explore intimate partner physical violence and sexual coercion, only sexually active women with at least one partner in the previous year before the interview were included in the analyses, and no criteria were specified for partnerships.

During 2001–2003, 10,826 women were interviewed; 3,789 (35%) were between 15 and 24-years old, and 3,531 of these were sexually active. The sample for these analyses includes 3,422 eligible women aged 15–24 who provided venous blood for HIV testing.

### Statistical Analyses

We first examined the prevalence of alcohol use before sex by a woman, her partner and both. In our sample, 22.2% of women reported that only their partners had used alcohol before sex, 17.3% reported both they and their partners had done so, and only 2.5% had been drinking while partners had not. In all three groups, similar proportions of women reported physical violence (36.9%, 34.6% and 33.7%, respectively) and sexual coercion (19.0%, 20.5% and 18.6%). Therefore, we combined these three groups and explored the association of alcohol use before sex by at

least one partner (Yes/No) with physical violence and sexual coercion in the previous year (Yes/No).

The socio-demographic and behavioral factors of interest were: age (young adults “20–24 years” vs. adolescents “15–19 years” old); education (“5–7 years”, “secondary and higher” compared to “none to less than 5 years”); religion (“non-Muslims” vs. “Muslims”), marital status (“currently”, “previously” compared to “never” married), and occupation (“agriculture” vs. a combined category of “trade, labor, professional job and driving”), number of sex partners in the previous year (“2 or more” compared to “1”), and condom use in last relationship (“inconsistent”, “always” compared to “never”).

We then explored the association between alcohol use before sex, intimate partner physical violence and sexual coercion in the previous year and prevalent HIV. Because the outcome of interest was prevalent HIV, we used lifetime measures of physical violence and sexual coercion. We observed a high correlation between sexual coercion and physical violence: 96% of women who reported lifetime experience of sexual coercion also previously experienced physical violence. To avoid over adjustment, we did not include physical violence as a covariate, and only sexual coercion, a more proximal predictor of HIV, was retained in the analysis. The main exposure of interest, “alcohol use before sex by at least one partner and ever experienced sexual coercion”, had four categories: “Only sexual coercion”, “Only alcohol use” and “Both sexual coercion and alcohol use” compared with “No sexual coercion and no alcohol use”. This variable allowed comparisons of the independent and combined effects of alcohol use before sex and sexual coercion in the past on HIV prevalence as compared to no alcohol use and no sexual coercion.

In above analyses, we used univariate and multivariate longitudinal logistic regression models with robust variance estimation and accounted for within-individual correlation over time, to assess unadjusted (OR) and adjusted odds ratios (Adj OR) and 95% Confidence Intervals (95% CI). Only variables statistically significant in univariate analyses at  $p < 0.05$  were included in multivariate adjusted models.

We also explored the association between alcohol use before sex, sexual coercion and incident HIV. We used the data from two follow-up surveys in 2001–2002 and 2002–2003. The selection criteria for this analysis included: age (15–24-years old); enrolment into the study during 1994–2002, at least one follow-up during 2001–2003 with complete information about alcohol use before sex and sexual coercion in the past 12 months, and HIV negative test result before the last follow-up (being at risk for HIV seroconversion). 1,824 women satisfied the selection criteria. Women who had had two follow-up interviews during 2001–2003 contributed two time periods of

observation. Some time-periods were longer than 12 months if women were previously interviewed more than a year before the last follow-up. The total person years (py) of observation were calculated from the previous HIV negative test result to the follow-up for HIV negative women or to the midpoint between the last negative and first HIV positive result for seroconverting women. HIV incidence was calculated as the number of seroconversions per 100 py. There were 63 seroconversions over 3,737 person years (py) with an HIV incidence of 1.7 per 100 py.

To estimate the relative risk (RR) of HIV seroconversion associated with an individual and a combined effect of alcohol use before sex and sexual coercion, we used the variable “alcohol use before sex by at least one partner and sexual coercion in the previous year”, which had four categories: “Only sexual coercion”, “Only alcohol use” and “Both sexual coercion and alcohol use” compared with “No sexual coercion and no alcohol use”. Since the outcome of interest was incident HIV, we measured sexual coercion and alcohol use in the previous year before the interview for each time period of observation. Small numbers of events in the strata of interest precluded detailed analyses.

All data analyses used the STATA 8.1 statistical package.

## Results

In our sample of 3,422 women, 50.2% reported intimate partner physical violence in the past and 26.9% in the previous year; 22.4% had experienced sexual coercion in the past and 13.4% in the previous year. Notably, 409 women (12.0% of the sample) reported both physical violence and sexual coercion during the previous year.

Tables 1 and 2 show the socio-demographic and behavioral factors associated with physical violence and sexual coercion in the previous year. The prevalence of physical violence in the previous year was 19.5% among 15–19 year-old women and 30.3% among women aged 20–24, but there was no significant difference in reported sexual coercion between these two age groups (11.9% and 14.1%, respectively). Physical violence and sexual coercion were lower when women had more education. Both physical violence and sexual coercion were significantly more common among currently married and previously married women than among never married women, as well as among women reporting more than one compared to those with only one sex partner in previous year. Both physical violence and sexual coercion were significantly lower among women who always used condoms compared to those who never used or used them inconsistently with the last partner.

There was a high correlation between sexual coercion and physical violence: 96% of women who reported lifetime experience of sexual coercion also reported physical violence. Both physical violence and sexual coercion were more likely when alcohol was used before sex by at least one of the partners. As shown in Table 1, the likelihood of physical violence in the previous year was higher when alcohol was used before sex (Adj OR = 1.68, 95% CI: 1.41–2.01) as compared to no alcohol use. Similarly, the likelihood of sexual coercion in the previous year was higher if at least one partner had had alcohol before sex (Adj OR = 1.85, 95% CI: 1.48–2.31) than when neither had (Table 2).

Table 3 shows the association of alcohol use before sex (by at least one partner) and lifetime sexual coercion, with prevalent HIV. Among all women who experienced intimate partner sexual coercion in the past, 58% reported alcohol use before sex. When adjusted for socio-demographic factors and sexual risk behaviors, HIV prevalence was significantly higher when women reported alcohol use before sex without sexual coercion (Adj OR = 1.45, 95% CI: 1.06–1.98) and when women reported both sexual coercion ever and alcohol use before sex (Adj OR = 1.79, 95% CI: 1.25–2.56). HIV prevalence among women who reported the lifetime experience of sexual coercion alone (no alcohol use before sex) was *higher* but not significantly

**Table 1** Factors associated with physical violence in the previous year: sexually active women 15–24-years old, Rakai, Uganda, 2001–2003

Characteristic	N reporting physical violence/Total N	% reporting physical violence	Univariate model OR (95% CI)	Multivariate model Adj OR <sup>a</sup> (95% CI)
Total	921/3,422 <sup>b</sup>	26.9		
<i>Alcohol use before sex by at least one partner</i>				
No	406/1,979	20.5	1.00	1.00
Yes	513/1,434	35.8	2.16 (1.84–2.54)	1.68 (1.41–2.01)
<i>Age (years)</i>				
15–19	209/1,074	19.5	1.00	1.00
20–24	712/2,348	30.3	1.56 (1.34–1.82)	1.02 (0.81–1.28)
<i>Religion</i>				
Muslim	126/514	24.5	1.00	
Non-Muslim	795/2,908	27.3	1.12 (0.95–1.32)	
<i>Education</i>				
None	242/722	33.5	1.00	1.00
Primary	439/1,604	27.4	0.82 (0.71–0.93)	0.90 (0.74–1.11)
Secondary or higher	239/1,094	21.9	0.65 (0.57–0.75)	0.88 (0.70–1.10)
<i>Occupation</i>				
Trade/Labor/Driver/Professional/Other	89/567	15.7	1.00	1.00
Agriculture	832/2,855	29.1	1.86 (1.57–2.20)	1.17 (0.89–1.54)
<i>Marital status</i>				
Never married	95/985	9.6	1.00	1.00
Currently married	780/2,286	34.1	3.54 (2.94–4.26)	4.79 (3.71–6.20)
Previously married	46/151	30.5	3.16 (2.29–4.35)	3.30 (2.05–5.34)
<i>Number of sex partners in past year</i>				
1	862/3,275	26.3	1.00	1.00
2+	59/147	40.1	1.52 (1.28–1.82)	2.59 (1.82–3.70)
<i>Condom use in last relationship</i>				
Never	677/2,465	27.5	1.00	1.00
Inconsistent	201/624	32.2	1.17 (1.00–1.37)	1.50 (1.16–1.93)
Always	43/331	13.0	0.47 (0.37–0.61)	0.86 (0.63–1.18)

<sup>a</sup> In multivariate model, the association between alcohol use before sex and physical violence in the past 12 months was adjusted for age, education, occupation marital status, number of sex partners in past year and condom use in last relationship. All variables are presented in the table

<sup>b</sup> Total N by exposure variables may be less than the grand total due to a small number of missing responses in some variables

**Table 2** Factors associated with sexual coercion in the previous year: sexually active women 15–24-years old, Rakai, Uganda, 2001–2003

Characteristic	<i>N</i> reporting sexual coercion/Total <i>N</i>	% reporting sexual coercion	Univariate Model OR (95% CI)	Multivariate model Adj OR <sup>a</sup> (95% CI)
Total	458/3,422 <sup>b</sup>	13.4		
<i>Alcohol use before sex by at least one partner</i>				
No	176/1,979	8.9	1.00	1.00
Yes	281/1,434	19.6	2.20 (1.77–2.74)	1.85 (1.48–2.31)
<i>Age (years)</i>				
15–19	128/1,074	11.9	1.00	
20–24	330/2,348	14.1	1.18 (0.93–1.50)	
<i>Religion</i>				
Muslim	51/514	9.9	1.00	1.00
Non-Muslim	407/2,908	14.0	1.41 (1.10–1.81)	1.07 (0.82–1.39)
<i>Education</i>				
None	115/722	15.9	1.00	1.00
Primary	227/1,604	14.2	0.89 (0.70–1.12)	1.00 (0.79–1.27)
Secondary or higher	116/1,094	10.6	0.67 (0.55–0.80)	0.89 (0.71–1.11)
<i>Occupation</i>				
Trade/Labor/Driver/Professional/Other	48/567	8.5	1.00	1.00
Agriculture	410/2,855	14.4	1.70 (1.20–2.40)	1.11 (0.79–1.57)
<i>Marital status</i>				
Never married	73/985	7.4	1.00	1.00
Currently married	357/2,286	15.6	2.11 (1.42–3.12)	1.82 (1.18–2.82)
Previously married	28/151	18.5	2.50 (1.55–4.04)	1.83 (1.12–3.00)
<i>Number of sex partners in past year</i>				
1	422/3,275	12.9	1.00	1.00
2+	36/147	24.5	1.90 (1.46–2.47)	1.66 (1.24–2.23)
<i>Condom use in last relationship</i>				
Never	317/2,465	12.9	1.00	1.00
Inconsistent	115/624	18.4	1.43 (1.15–1.79)	1.44 (1.11–1.88)
Always	26/331	7.9	0.61 (0.43–0.86)	0.876 (0.58–1.29)

<sup>a</sup> In multivariate model, the association between alcohol use before sex and sexual coercion in the past 12 months was adjusted for education, religion, occupation marital status, number of sex partners in past year and condom use in last relationship. All variables are presented in the table

<sup>b</sup> Total *N* by exposure variables may be less than the grand total due to a small number of missing responses in some variables

different from the reference group (Adj OR = 1.23, 95% CI: 0.82–1.85). Other factors associated with *higher* HIV prevalence were older age, being widowed, separated or divorced, and having had more than one lifetime sex partner.

In HIV incidence analyses, there were 40 events of seroconversion per 2,551 py of observation among women who reported no alcohol use before sex and no coercion in the previous year (incidence 1.6 per 100 py), but incidence increased to 2.2 (16 events per 716 py) and 2.3 per 100 py (4 events per 174 py) if alcohol use before sex alone and sexual coercion in the previous year alone were reported. However, the independent effects of alcohol use and sexual coercion were not statistically significant because of the small size of these groups. 3 events happened in the group

of women with missing information about the exposures of interest. The group of women who reported both alcohol use before sex and sexual coercion in the previous year contributed only a small number of person-years, and no events of seroconversion.

## Discussion

Alcohol consumption before sex is common in Uganda (Zablotska et al. 2006). We found that this practice is associated with intimate partner physical violence and sexual coercion. Similar proportions of women reported these negative experiences regardless of who was drinking alcohol before sex: a woman, her partner or

**Table 3** Association between sexual coercion and prevalent HIV: females 15–24-years old, Rakai, Uganda, 2001–2003

Characteristic	<i>N</i> HIV <sup>a</sup> / <i>N</i> person-observations	% HIV+	Univariate model OR (95% CI)	Multivariate model Adj OR <sup>b</sup> (95% CI)
Total	241/3,422 <sup>c</sup>	7.0		
<i>Alcohol use before sex by at least one partner and ever experienced sexual coercion</i>				
No sexual coercion and no alcohol use	74/1,657	4.5	1.00	1.00
Only sexual coercion	25/322	7.8	1.51 (1.05–2.18)	1.23 (0.82–1.85)
Only alcohol use	88/989	8.9	1.78 (1.36–2.34)	1.45 (1.06–1.98)
Both sexual coercion and alcohol use	54/444	12.2	2.28 (1.66–3.12)	1.79 (1.25–2.56)
<i>Age (years)</i>				
15–19	47/1,174	4.4	1.00	1.00
20–24	194/2,348	8.3	1.85 (1.35–2.51)	1.60 (1.11–2.30)
<i>Religion</i>				
Muslim	29/514	5.6	1.00	1.00
Non-Muslim	212/2,908	7.3	1.25 (0.85–1.84)	0.97 (0.63–1.50)
<i>Education</i>				
None	78/722	10.8	1.00	1.00
Primary	109/1,604	6.8	0.63 (0.47–0.85)	0.69 (0.49–0.97)
Secondary or higher	54/1,094	4.9	0.45 (0.32–0.65)	0.48 (0.31–0.75)
<i>Occupation</i>				
Trade/Labor/Driver/Professional/Other	24/567	4.2	1.00	1.00
Agriculture	217/2,855	7.6	1.70 (1.15–2.50)	1.58 (0.98–2.54)
<i>Marital status</i>				
Never married	53/985	5.4	1.00	1.00
Currently married	156/2,286	6.8	1.28 (0.93–1.76)	0.83 (0.55–1.25)
Previously married	32/151	21.2	3.42 (2.18–5.36)	1.98 (1.11–3.53)
<i>Number lifetime sexual partners</i>				
1	54/1,472	3.7	1.00	1.00
2+	184/1,942	9.5	2.38 (1.79–3.15)	2.06 (1.52–2.79)
<i>Marital status</i>				
Never	154/2,465	6.3	1.00	1.00
Inconsistent	59/624	9.5	1.41 (1.10–1.80)	1.41 (1.06–1.86)
Always	28/331	8.5	1.30 (0.91–1.84)	1.63 (1.05–2.52)

<sup>a</sup> HIV positive

<sup>b</sup> In multivariate model, the association between 'Alcohol use before sex by at least one partner and ever experienced sexual coercion' and prevalent HIV was adjusted for age, religion, education, occupation, marital status, lifetime number of partners and condom use in last relationship. All variables are presented in the table

<sup>c</sup> Total *N* of person-observations by exposure variables may be less than the grand total due to a small number of missing responses in some variables

both. HIV prevalence was significantly higher among women who reported alcohol use before sex alone and *especially* when women reported both alcohol use and sexual coercion compared with those who did not. HIV incidence was also *higher* among women who reported alcohol use before sex or sexual coercion. Although sexual coercion alone was not statistically associated with higher HIV prevalence, the latter was high among women reporting only sexual coercion. Interestingly, more than half of the women who experienced sexual coercion by their intimate partners reported alcohol use

before sex in their relationships. Alcohol may be an important catalyst for intimate partner physical violence and sexual coercion, and it has already been described as such previously (Cunradi et al. 2002; Weinsheimer et al. 2005).

Several interesting issues emerge from our findings. First, IPV is common among young sexually active women in Uganda. Previous studies in Sub-Saharan Africa have reported similar findings: 13–49% of women there have ever been physically assaulted by intimate partners and 5–29% were assaulted in the year before the survey (Garcia-



Moreno et al. 2006; Heise et al. 2002; Krug et al. 2002; Watts and Mayhew 2004). We also found that intimate partner abusive behaviors tend to cluster: 96% of women who reported lifetime experience of sexual coercion also experienced physical violence, and similar findings have been reported in other studies (Lichtenstein 2005; Karamagi et al. 2006). In traditional societies, men control many aspects of power, including sexual decision-making. In the dynamics of power control, sexual and physical violence may be used to reinforce women's subordination and men's claims of sexual privileges. Often, forced sex and wife beating are accepted or even expected expressions of masculinity (Jewkes et al. 2003), while women are usually expected to satisfy their partners' needs. These male behaviors are often more pronounced in the context of substantial age difference between partners, poverty, and low social support (Van der Straten et al. 1995). Males may use violence in response to their partner's accusations of infidelity (Van der Straten et al. 1995) and expose women to unprotected sex (Wingood and DiClemente 1997).

In our study, both physical violence and sexual coercion were significantly associated with having more than one sexual partner, as has been reported elsewhere (Karamagi et al. 2006). Risky behaviors adopted by women with a history of abuse, a greater likelihood of encountering an abusive partner for women with multiple partners as well as the violent response of males to women's factual or suspected infidelity can possibly provide an explanation to this finding.

Secondly, power imbalance in sexual interactions and non-consensual sex increase a woman's vulnerability to HIV. We found that sexual coercion combined with alcohol use before sex was significantly associated with prevalent HIV. Although not statistically significant, HIV incidence was higher among women with experience of sexual coercion compared to women without. This association can be mainly explained by exposure of women to unprotected intercourse. The risk of HIV infection may also be increased by vaginal trauma caused by forced penile penetration. However, despite growing recognition of the issue, there is little evidence of the relationship between sexual coercion and HIV in Sub-Saharan Africa and *our findings are supportive of this association*.

Finally, the unique finding of this study is that alcohol use in intimate circumstances may not only be a catalyst for IPV, but also may significantly increase the likelihood of HIV transmission. Previous studies in Uganda and elsewhere showed that alcohol use may be a risk factor for HIV because it disinhibits sexual risk-taking and is associated with unprotected sex (Zablotska et al. 2006; Kalichman et al. 2007). Our previous study in the same Rakai cohort found a significantly higher risk of HIV

among men and women who reported alcohol use before sex (Zablotska et al. 2006). Behavioral disinhibition and sexual risk-taking under the influence of alcohol, but not physical violence or sexual coercion, were considered as possible explanatory mechanisms. However, adjustment for sexual risk behaviors only partially explained the association, which suggested the possibility of other behavioral and/or biological pathways. Several studies suggested a possible biological effect of alcohol which may enhance HIV susceptibility in HIV-negative individuals and the replication of virus in HIV-positive persons (Bagasra et al. 1993; Bagasra et al. 1996; Balla et al. 1994). However, there has been little evidence yet that alcohol may operate as a risk factor for HIV through IPV. The recent household survey in Mbale district of Uganda found similar risk factors for IPV, including alcohol use (Karamagi et al. 2006). The authors of that study suggested looking into the effect of IPV on prevalent or incident HIV, though they did not have information to explore it further. We used data from a large population-based cohort to explore this association.

There are several limitations to our study that should be acknowledged. While the advantage of this study was in measuring alcohol use before sex rather than any alcohol use, we did not have the event-level data to link the events of alcohol use with the events of IPV. We had no information about the level of intoxication for women and their partners, the time between alcohol use and sex or partner's frequency of drinking. Our analyses were based on self-reported behaviors which may be prone to underreporting. However, rapport between interviewers and study participants was established over several years of data collection, and self-reported alcohol use was relatively consistent over time. There could be underreporting of sexual coercion among young women who consumed alcohol, because of memory impairment by alcohol, or women may feel responsible for what happened while drinking. In which case, the association between violent behaviors and HIV could be underestimated.

While a substantial body of literature has focused on the outcomes of IPV among young women, including the risk of HIV infection, factors instigating IPV, particularly highly common alcohol use, have not received a deserved attention. In countries like Uganda with high HIV prevalence, where alcohol use is also common, young women considerably suffer from a combination of these factors. The results of this study may help to identify a group of women at highest risk for HIV, and HIV prevention efforts may benefit from understanding the combined effect of these risk factors on HIV epidemic.

Since young women are disproportionately affected by HIV and are more exposed to physical and sexual violence, preventive interventions should focus on factors instigating

IPV and consider interventions focused on changing male behaviors, particularly alcohol use. Innovative interventions are needed to work with partners of young women and with men in general, to challenge their norms and behaviors regarding alcohol use and IPV.

**Acknowledgements** The authors wish to thank the Rakai project team for their efforts in study design, implementation, data collection and management, and special thanks to the study participants for providing extensive information for this research.

**Contributors** Iryna B. Zablotska contributed to formulating research issue and design of this analysis, assumed principal responsibility for data analysis and preparation of the paper. Ronald H. Gray (co-principal investigator of the Rakai Project) contributed to data collection and assisted with the analysis design, interpretation of results and preparation of the paper. Michael A. Koenig contributed to interpretation of results and preparation of the paper. David Servadda, Fred Nalugoda, Godfrey Kigozi, Nelson Sewankambo, Tom Lutalo Fred Wabire Mangen, and Maria Wawer contributed to the design and conduct of the data collection and preparation of this report. All authors have seen and approved the final version of this paper.

**Funding** The Rakai study was funded through the Department of the Army, United States Army Medical Research and Material Command Cooperative Agreement DAMD17-98-2-8007; grants R01 A134826 and R01 A134265 from the National Institute of Allergy and Infectious Diseases; grant 5P30HD06826 from the National Institute of Child and Health Development; the World Bank STI Project, Uganda; the Henry M. Jackson Foundation; a grant 5D43TW00010 from the Fogarty Foundation; and the Bill and Melinda Gates Institute for Population and Reproductive Health.

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