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ORIGINAL RESEARCH

Spousal Intimate Partner Violence is Associated with HIV and Other STIs Among Married Rwandan Women

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Abstract HIV is a health problem in Rwanda, where the adult HIV prevalence is 3.1% (WHO 2008 in Online database of HIV/AIDS epidemiological data, found at: http://www.who.int/globalatlas); the majority of those infected are women (UNAIDS 2008 in http://data.unaids.org/pub/Report/2008/rwanda_2008_country_progress_report_en.pdf). Prior studies indicate that intimate partner violence is frequently associated with increased HIV risk in women, often because men who abuse their wives also exhibit riskier sexual behaviors (Silverman et al. in JAMA 300:703–710 2008. Population—based data from the 2005 Rwanda Demographic and Health Survey indicate that women with few, if any, other sexual risk factors who have experienced sexual, physical, or emotional abuse within their marriages are 1.61–3.46 times as likely to test positive for HIV, and 2.14–4.11 times more likely to report another STI. These findings confirm prior clinical studies that indicate that intimate partner violence is a correlate of HIV/STIs in Rwanda. Further research is needed to determine whether Rwandan men that abuse their wives have higher baseline rates of HIV/STI infection.

Keywords HIV · Sexually transmitted infections · Intimate partner violence · Rwanda · Marriage

Introduction

HIV is a common health problem in Rwanda, with an estimated 3.1% of Rwandan adults living with HIV at the end of 2005 (WHO 2008). Other sexually transmitted infections [STIs], such as gonorrhea and chlamydia, are also endemic to the Rwandan population (Leroy et al. 1999; Van Dyck et al. 2001). A 2003 study indicated that syphilis prevalence among pregnant women attending antenatal care clinics was 3.7% (UNAIDS 2006). While the morbidity and mortality associated with these other STIs are worrisome on their own, extensive evidence suggests that coinfection with another STI enhances the ability of HIV to be passed from one person to another during sexual intercourse (Laga et al. 1993; Mattson et al. 2007). HIV infection, in turn, can enhance the transmissibility of other STIs, creating a cycle of infection (McClelland et al. 2005).

Women represent an increasing share of new HIV infections worldwide and in Rwanda, where 57% of HIV positive adults are female (UNAIDS 2006). UNAIDS identifies pervasive gender inequalities, including imbalances in social, economic, and sexual power, as increasing a woman's risk of contracting HIV or another STI as she may have reduced ability to negotiate when, with whom, and under what conditions she will have sex (UNAIDS 2005). One particular source of gender-based power differentials is the physical, emotional, and sexual violence men perpetrate against women. These violent behaviors can include rape, sexual assault, and coercing a woman into unwanted sexual acts; physically abusive acts such as hitting, kicking, slapping, or threatening a woman with a knife or other weapon; or emotionally demeaning and coercive acts such as verbal abuse, threats of harm to the woman or to others close to her, or arbitrary deprivation of food, liberty, or other necessities, among other acts (UNAIDS 2005). Previous empirical studies have linked all three types of violence with increased risk of HIV (Maman et al. 2000; Jewkes et al. 2003; Hoffman et al. 2006) and other STIs (Caldwell 2002; Johnson and Hellerstadt 2002).

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Intimate partner violence, therefore, might be one potential explanation for why women exhibit higher rates of HIV infection than men in Rwanda.

Previous literature has shown that women in abusive relationships are at higher risk of infection regardless of their own sexual behaviors because men who perpetuate violence are themselves at higher risk of HIV and other STIs (Dunkle et al. 2006; Silverman et al. 2008). These men are more likely to engage in other risky behaviors that can lead to HIV and other STIs, such as abusing drugs (Gielen et al. 2002), alcohol (Rao 1997), having more sexual partners (Martin et al. 1999), and avoiding condoms (Gielen et al. 2002). Patriarchal cultural pressures that encourage early sexual initiation and multiple sexual partners for men prior to marriage are also associated with increased incidence of infection (Varga 2003). These behaviors make it more likely that a male abuser will bring HIV or another STI into an intimate relationship, and subsequently infect his female partner.

Intimate partner violence can also foster conditions that make it likely that an HIV positive person will transmit that infection to a non-infected sexual partner. The nature of partner abuse itself can increase viral transmissibility, as forced sexual activity, including sexual assault within marriage, is traumatic to the vaginal canal, leaving microscopic tears that allow the virus to invade the vaginal epithelium (van der Straten et al. 1998). The threat of violence also often impedes open communication regarding disease risk. Women refrain from discussing their husband's potential risk behaviors such as extramarital partners or frequenting sex workers as they are often beaten in retaliation for scrutinizing male activities (Lasee and Becker 1997). Women avoid HIV testing or disclosing their serostatus to their partners because of fear of violence or economic abandonment, especially as women are often punished when other family members are subsequently found to be HIV positive (Turmen 2003).

In Rwanda, most of womens' sexual activity takes place within the context of marriage or cohabitation, especially sexual activity that leads to HIV infection (Dunkle et al. 2008). Rwandan women initiate sex at a late age relative to other countries in East Africa (Kayirangwa et al. 2006), and also at older ages than males (Rahlenbeck and Uhagaze 2004). Multiple sexual partnerships among both single and married sexually active females are estimated at less than one percent (Office National de la Population Rwanda and ORC Macro, 2001). While the decreased ability of women to negotiate condom use with abusive partners has been emphasized as an intermediary between intimate partner violence and increased infection risk in other settings (Santelli et al. 1996; Wingood and DiClemente 1997), this factor is unlikely to play a major role in HIV/STI transmission in Rwanda as very few married couples, abusive or otherwise, use them (Allen et al. 2007). Thus, a married Rwandan woman's infection risk is probably proportional to the likelihood that her partner brings HIV or another STI into the sexual partnership.

Information regarding the nationwide prevalence of intimate partner violence in Rwanda is scarce. Most published data focus on the extensive sexual violence experienced by women as an act of war during the time of the 1994 genocide, which is undoubtedly at least partially responsible for the spread of HIV among Rwandan women (Human Rights Watch 1996; Donovan 2002). A 1995 Rwandan government study found that up to one-fifth of married Rwandan women admitted to being physically abused by their husbands (Government of Rwanda 1995). Intimate partner violence has also been linked to HIV in Rwanda in clinical samples: a 1995 study from Kigali suggests that sexual coercion and physical violence on the part of male partners significantly increases the likelihood that a woman contracts HIV (van der Straten et al. 1995). A more recent clinical study indicates that women who are HIV positive are twice as likely to report physical partner violence in the past 12 months (Ntaganira et al. 2008).

Considering the body of literature on the links between intimate partner violence, sexual risk-taking, HIV, and other STIs, there is a gap in terms of large-scale, population-based studies conducted in sub-Saharan Africa, particularly outside of South Africa. As noted previously, most research in Rwanda focuses on rape at the time of the genocide. Many other African-based studies focusing on the links between sexual behavior, intimate partner violence, and HIV risk utilize small samples of women at high risk of HIV or other STIs, such as women using urban antenatal care clinics (Dunkle et al. 2004), patients at STI treatment centers (Fonck et al. 2005) and sex workers, rather than examining the general population. While many studies focus on adolescents in dating relationships (Erulkar 2004; Hoffman et al. 2006), fewer focus on partner abuse within marriage among all reproductive-aged women. Furthermore, while most published studies have found a significant link between HIV and intimate partner violence, there are other studies that have failed to find a consistent correlation between abuse and HIV because this association is often confounded by a woman's other sexual risk behaviors, such as multiple sex partners (Jewkes et al. 2006).

This study addresses this gap in prior research in one country—Rwanda—using a nationally representative dataset of married, reproductive-aged women with few other sexual risk factors to determine whether three different types of intimate partner abuse within marriage—emotional, physical, and sexual—are correlated with increased risk of STIs and HIV.

Data and Methods

Participants

This study utilizes data from the 2005 Rwanda Demographic and Health Survey (DHS), a population-based national survey of women aged 15–49 which includes data on demographics, sexual behavior, HIV and other STIs, and intimate partner violence (Institut National de la Statistique du Rwanda and ORC Macro 2006). Further information regarding survey design, sampling methods, and survey refusal rates is available in the 2005 Rwanda DHS final report (Institut National de la Statistique du Rwanda and ORC Macro 2006). While the DHS collects data on unmarried Rwandan women, these women are not included in the intimate partner violence module, and thus are eliminated from this study.

Women who are widowed, divorced, or remarried are likely quite different in terms of HIV risk from women currently married to their first husbands. Women are widowed when their husbands die of HIV, often leaving them HIV positive as well (Luginaah et al. 2005). Husbands often divorce their wives when they test positive for HIV, especially if the husbands themselves are HIV-negative (Porter et al. 2004). Women who are remarried were, of course, either widowed or divorced at one point. Therefore, because of these differences in baseline HIV/STI risk, women who are widowed, divorced, or remarried are eliminated from this study as well.

Extramarital sex is rare among women in this sample. Of all currently married women, only 0.44% report more than one sexual partner in the past year. Most women also do not engage in sexual activity prior to marriage: 16.8% of those currently married report an age of first sex that is less than their age at first marriage. Furthermore, among the women who do report premarital sexual debut, it is unclear whether this premarital sex was in fact a rape during the 1994 genocide. These women are thus dropped from the final sample in order to simplify interpretation of the results. Thus, women in the final analysis sample are those who have been married only once, did not engage in premarital sex, and have not had extramarital partners in the past year, indicating that if they are HIV positive or report another STI, the probability that they contracted these infections from anyone other than their husband is quite low. This sample allows for examination of the relationship between partner violence and HIV status in women while avoiding the potential confounding effects of a woman's potential premarital or extramarital partners, as much as is possible using these data.

In the Rwanda DHS, there are 2,496 ever—married women with complete data on HIV serostatus, STIs, and intimate partner violence. 355 of these have been married more than once and 209 are currently widowed or divorced; these women are dropped. 315 of the remainder report premarital sex, and six report extramarital partners in the past year, and thus are dropped. 35 of the 1,617 remaining are dropped because they lack one or more control covariates; *t* tests indicate that those women who are dropped because of missing control covariates do not differ significantly from those who are not dropped in terms of HIV status, self reported STIs, or intimate partner violence experiences. The final analysis sample contains 1, 582 women.

Measures: HIV/STIs

The DHS includes biomarker data from anonymous blood HIV seroprevalence testing. Blood samples were collected from all consenting women. Further details on coverage rates and reasons for refusing the HIV test can be found in the 2005 Rwanda DHS final report (Institut National de la Statistique du Rwanda and ORC Macro 2006).

In the survey, women were asked whether they have ever been diagnosed with another STI, as well as whether they have experienced genital symptoms of an STI in the past 12 months, such as genital sores or discharge. Individuals are classified as having had an STI if they respond 'yes' to either of these questions. No biomarker data were collected to corroborate these self—reports.

Measures: Intimate Partner Violence

In half of the households participating in the survey, one randomly—selected woman who reported being married at least once was asked whether her current or most recent husband had ever 'humiliated' her in front of others or had threatened her with harm, which are used as measures of emotional abuse. Respondents were also asked if her husband had ever forced her to have sexual intercourse against her will, and whether he had ever committed a physically violent act against her (i.e., kicked, pushed, slapped, dragged, punched, strangled, or attacked her with a knife or other weapon). Three binary variables are used to measure the effect of experiences of partner violence, one for each different type of intimate partner abuse: emotional, physical, and sexual. Finally, factor analysis is utilized to produce a single violence 'score' encompassing all three types of violence in a single measure; this score ranges from −0.43 to 2.24.

These violence variables reflect only an individual's experience of abuse at the hands of her current husband, and do not account for violence the woman might have endured from past husbands, former lovers, other family members, other acquaintances, or strangers. These variables do not, therefore, reflect the widespread sexual abuse experienced by Rwandan women during the 1994 genocide, unless the abuse at this time was committed by the

man who is now that woman's husband at the time of the survey in 2005.

Measures: Demographic and Relationship Variables

The models in this study also control for a number of personal characteristics of the woman that are likely associated with intimate partner violence, HIV/STI risk, or both (Chao et al. 1994). These control variables include an individual's age, religion [Catholic and Protestant/other], educational attainment, current employment status, age at first marriage, urban residence, whether the respondent is in a polygamous union, whether she wants to be pregnant within the next 2 years, and whether she is currently pregnant. Also included is whether a woman reports that her husband drinks alcohol or takes illegal drugs, as well as her husband's current age. Household wealth is accounted for using an index of assets and house quality according to the methods of Filmer and Pritchett (2001).[1] An individual is classified as using condoms either if she reports that she currently uses condoms as a method of family planning[2], or if she reports using a condom at last sex. Finally, dummy variables for eleven of twelve regions of the survey [with Kigali as the reference group] are also included. For reasons of space, the covariates for these regional variables are not reported in the tables.

Data Analyses

Logistic regression is first employed to determine predictors of each type of partner violence in this population, controlling for individual characteristics (age, age at first marriage, education, employment status, religion, currently pregnant, whether she wants to be pregnant in the next 2 years), household characteristics (wealth, urban area, region), and relationship/partner characteristics (age difference between respondent and her husband, whether her husband drinks alcohol, whether the couple currently uses condoms). Next, bivariate and multivariate logistic regression is used to determine the effect of each type of intimate partner violence on the likelihood of testing positive for HIV and reporting STIs. The three binary variables are incorporated into their own model, as is the total violence score, resulting in four separate models for each outcome. The multivariate models control for the same individual, household, and relationship/partner characteristics outlined above.

[1] These assets include running water, a flush toilet, a floor made of permanent materials, a motorcycle, car, telephone, television, radio, refrigerator, and electricity in the home. Cronbach's alpha = 0.44.

[2] These include potential 'dual users' who are using condoms in conjunction with other methods of family planning.

All statistical analyses are carried out in STATA Release 8.0 utilizing the STATA 'svy' commands with the included strata and PSU fixed effect variables which correct the standard errors for correlated data within sampling clusters. The included intimate partner violence sample weights are also utilized in order to control for survey design effects.

Results

About 1.8% of women in this sample tested positive for HIV and 3.9% reported another STI diagnosis or symptoms. Reported levels of intimate partner violence are substantial: 33.8% reported at least one form of abuse, with 9.2% reporting emotional abuse, 28.3% relating that they have been physically abused, and 12.9% reporting forced sex. These experiences of intimate partner violence are not random. Table 1 indicates that women in polygamous marriages are much more likely to have experienced emotional and physical intimate partner violence [OR = 1.74–4.75; 95% CI 1.02–8.17; $P < 0.05$ to <0.01]; 8.2% of this sample are from polygamous marriages. Those from urban areas are more likely to have experienced sexual abuse [OR = 2.66; 95% CI 1.41–5.01; $P < 0.01$]. Women who married at older ages are less likely to have had any abusive experiences [OR = 0.89–0.91; 95% CI 0.83–0.97; $P < 0.01$], while women from wealthier households are less likely to report physical abuse [OR = 0.62; 95% CI 0.45–0.85; $P < 0.01$]. Men who use alcohol are more likely to abuse their wives [OR = 1.62–2.14; 95% CI 1.08–3.78; $P < 0.05$ to <0.01]; 68% of the women in this sample report that their husbands use alcohol. 1.33% of women in this sample currently use condoms, but condom use is not associated here with any form of intimate partner violence.

Table 2 shows that women who have experienced sexual and emotional abuse are more likely to test positive for HIV [OR = 3.14–4.95; 95% CI 1.16–13.6; $P < 0.05$ to < 0.01]; those who have experienced any type of intimate partner violence are more likely to report other STIs [OR = 2.19–4.24; 95% CI 1.15–7.80; $P < 0.05$ to < 0.01]. Table 3 shows that emotional abuse is still a significant predictor of HIV even after controlling for other individual, partner, and household characteristics [OR = 3.46; 95% CI 1.34–8.78; $P < 0.05$]. Table 4 indicates that the relationship between all three types of abuse and STIs remains significant even after controlling for other factors [OR = 2.14–4.11; 95% CI 1.04–9.82; $P < 0.05$ to <0.01].

Tables 3 and 4 indicate other factors that are correlated with HIV and other STIs. While current condom use is not correlated with any form of intimate partner violence, it is highly correlated with both HIV [OR = 8.86–9.80; 95% CI 2.56–37.6; $P < 0.01$] and other STIs [OR = 10.13–12.06;

Table 1 Predictors of experiences of physical, emotional, and sexual intimate partner violence

	Column 1: emotional violence		Column 2: physical violence		Column 3: sexual violence		Column 4: total violence score[c]	
Variable	Odds ratio[a]	95% Cl	Odds ratio[a]	95% Cl	Odds ratio[a]	95% Cl	OLS coefficient[a]	95% Cl
Uses condom	0.51	0.12–2.11	0.40	0.11–1.43	1.03	0.27–3.96	−0.170	−0.475–0.136
Demographic variables								
Respondent's age	0.99	0.95–1.04	1.05**	1.02–1.08	1.01	0.97–1.05	0.009	−0.001–0.018
Seeking pregnancy	0.75	0.40–1.44	1.16	0.77–1.74	1.34	0.80–2.27	0.037	−0.076–0.149
Currently pregnant	1.21	0.73–2.00	1.08	0.74–1.58	0.94	0.60–1.47	0.016	−0.082–0.144
Urban residence	1.24	0.60–2.56	1.14	0.73–1.78	2.66**	1.41–5.01	0.144	−0.001–0.289
Household wealth	0.62	0.35–1.08	0.62**	0.45–0.85	0.76	0.57–1.02	−0.092**	–0.142 to −0.044
Age at first marriage	0.89**	0.83–0.96	0.90**	0.86–0.95	0.91**	0.86–0.97	−0.033**	−0.048 to −0.017
Polygamous marriage	4.75**	2.76–8.17	2.37**	1.41–3.99	1.74*	1.02–2.98	0.419**	0.227–0.612
Currently employed	1.34	0.81–2.22	1.11	0.81–1.52	1.77**	1.15–2.73	0.084	−0.001–0.169
Partner characteristics								
Age difference	1.01	0.97–1.04	0.98*	0.95–0.99	1.00	0.96–1.04	−0.004	−0.012–0.004
Partner uses alcohol	2.14**	1.21–3.78	2.12**	1.50–2.99	1.62*	1.08–2.43	0.204**	0.115–0.292
Religion								
Catholic (ref = Protestant or other religion)	0.84	0.53–1.32	0.78	0.58–1.05	0.85	0.59–1.21	−0.071	−0.159–0.17
Education								
Primary education	1.28	0.75–2.18	1.28	0.94–1.75	1.35	0.93–1.97	0.086	−0.002–0.173
Secondary education[b] (ref = no education)	1.40	0.51–3.87	0.79	0.40–1.55	0.67	0.27–1.61	−0.021	−0.173–0.131

$N = 1{,}582$

[a] In addition to the variables listed here, all models also control for region of residence, with Kigali as the reference group

[b] This group includes the 6 respondents who reported higher education

[c] This variable is a scale ranging from −0.43 to 2.24

* $P < 0.05$

** $P < 0.01$

Table 2 Bivariate associations between intimate partner violence, HIV, and STIs

	Column 1: emotional violence		Column 2: physical violence		Column 3: sexual violence		Column 4: total violence score[a]	
Variable	Odds ratio	95% CI	Odds ratio	95% CI	Odds ratio	95% CI	Odds ratio	95% CI
HIV positive	4.95**	1.80–13.6	1.56	0.62–3.95	3.14*	1.16–8.53	1.98*	1.13–3.49
Reports an STI	4.24**	2.30–7.80	2.26**	1.29–3.96	2.19*	1.15–4.19	1.93**	1.44–2.60

$N = 1{,}582$

[a] This variable is a scale ranging from −0.43 to 2.24

* $P < 0.05$

** $P < 0.01$

95% CI 3.05–40.2; $P < 0.01$]. Women in polygamous marriages are much more likely to be infected with HIV [OR = 4.37–5.53; 95% CI 1.55–17.5; $P < 0.01$], a marital arrangement that was also predictive of intimate partner violence. HIV is also much more common among those living in urban areas [OR = 6.31–6.63; 95% CI 1.01–23.0; $P < 0.01$], as are STIs [OR = 2.34–2.51; 95% CI 1.17–4.88; $P < 0.05$ to <0.01] suggesting a concentration of infections in cities. A woman's own age is inversely associated with HIV, meaning that older women are less likely to be infected [OR = 0.88–0.89; 95% CI 0.80–0.97; $p < 0.01$]. The opposite relationship holds between HIV and the age of a woman's husband relative to her own: the greater the age difference between a woman and her

Table 3 The effect of intimate partner violence on HIV risk

Variable	Column 1: emotional violence		Column 2: physical violence		Column 3: sexual violence		Column 4: total violence score[c]	
	Odds ratio[a]	95% Cl	Odds ratio[a]	95% Cl	Odds ratio[a]	95% Cl	Odds ratio[a]	95% Cl
Has ever had a STI	2.46	0.67–8.95	2.54	0.74–8.74	2.47	0.72–85.0	2.27	0.62–8.40
Uses condoms	9.80**	2.56–37.6	9.16**	2.80–29.9	8.86**	2.56–30.7	10.07**	2.69–37.7
Experiences of intimate partner violence								
Violence variable	3.46*	1.34–8.78	1.61	0.70–3.70	2.77	0.93–8.39	1.86*	1.07–3.24
Demographic variables								
Respondent's age	0.88**	0.81–0.95	0.88**	0.80–0.96	0.89**	0.81–0.97	0.88**	0.80–0.96
Seeking pregnancy	0.88	0.15–5.09	0.87	0.13–5.82	0.86	0.10–7.01	0.82	0.12–5.71
Currently pregnant	1.02	0.33–3.17	1.02	0.33–3.16	1.12	0.37–3.37	1.13	0.37–3.47
Urban residence	6.31**	1.73–23.02	6.63**	1.01–21.8	6.63**	2.01–21.8	6.38**	1.89–21.5
Household wealth	1.12	0.66–1.90	1.13	0.63–2.03	1.15	0.66–2.00	1.16	0.66–2.01
Age at first marriage	1.10	0.94–1.30	1.10	0.92–1.30	1.10	0.92–1.31	1.11	0.94–1.33
Polygamous marriage	4.37**	1.55–12.36	5.45**	1.85–16.1	5.53**	1.75–17.5	4.44*	1.44–13.7
Currently employed	1.66	0.57–4.84	1.76	0.59–5.26	1.59	0.52–4.90	1.61	0.54–4.77
Partner characteristics								
Age difference	1.09**	1.04–1.15	1.10**	1.04–1.16	1.09**	1.04–1.14	1.09**	1.04–1.15
Partner uses alcohol	0.68	0.20–2.36	0.76	0.22–2.59	0.71	0.19–2.71	0.65	0.17–2.46
Religion								
Catholic (ref = Protestant or other religion)	3.50*	1.18–10.4	3.13*	1.07–9.14	3.53*	1.13–11.0	3.64*	1.17–11.3
Education								
Primary education	0.70	0.26–1.85	0.71	0.26–1.94	0.75	0.28–2.04	0.71	0.27–1.88
Secondary education[b] (ref = no education)	0.34	0.05–2.34	0.34	0.04–2.64	0.32	0.04–2.47	0.36	0.05–2.55

$N = 1{,}582$

[a] In addition to the variables listed here, all models also control for region of residence, with Kigali as the reference group

[b] This group includes the six respondents who reported higher education

[c] This variable is a scale ranging from −0.43 to 2.24

* $P < 0.05$

** $P < 0.01$

husband, the more likely she is to be HIV positive [OR = 1.09–1.10; 95% CI 1.04–1.16; p < 0.01]. Women from wealthier households are less likely to have had other STIs [OR = 0.05–0.06; 95% CI 0.01–0.63; $P < 0.05$], although wealth has no significant effect on HIV serostatus.

Women in abusive marriages are less likely to have ever discussed HIV or HIV prevention with their husbands [OR = 0.56–0.72; $P < 0.05$ to <0.01]. This variable, however, is not a predictor of either HIV infection or of other STIs [data not shown].

Discussion

The intersection of gender—based violence and HIV has received much attention in recent years (Gupta 2002; UNAIDS 2005), particularly in areas such as sub-Saharan Africa where women have higher incidence and prevalence rates of HIV than men. Most prior research on gender—based violence and HIV in Rwanda has identified rape at the time of the 1994 genocide as a strong predictor of current HIV infection (Cohen et al. 2005; Donovan 2002). While survivors of the genocide—related rapes certainly constitute an important subgroup of HIV positive women, these rapes were concurrent with an event that hopefully will not be repeated and thus is unlikely to shape a woman's risk of acquiring HIV or another STI in the future. The results presented here indicate that sexual, physical, and emotional acts of violence perpetrated by a man against his wife within the setting of marriage are also significant correlates of HIV and other STIs. This ongoing violence in daily life is not due to an exceptional event, and might continue to shape HIV/STI risk in Rwanda in the future.

Table 4 The effect of intimate partner violence on STI risk

Variable	Column 1: emotional violence		Column 2: physical violence		Column 3: sexual violence		Column 4: total violence score[c]	
	Odds ratio[a]	95% CI	Odds ratio[a]	95% CI	Odds ratio[a]	95% CI	Odds ratio[a]	95% CI
Uses condom	12.06**	3.62–40.2	11.25**	3.43–40.2	10.13**	3.05–33.7	11.96**	3.56–40.2
Experience of intimate partner violence								
Violence variable	4.11**	1.72–9.82	2.14*	1.14–4.03	2.17*	1.04–4.50	1.97**	1.31–2.96
Demographic variables								
Respondent's age	1.29	0.44–3.82	1.18	0.41–3.38	1.21	0.43–3.40	1.16	0.39–3.42
Seeking pregnancy	1.29	0.44–3.82	1.18	0.41–3.82				
Currently pregnant	0.95	0.45–2.03	1.08	0.53–2.23	1.06	0.51–2.18	1.04	0.51–2.13
Urban residence	2.36*	1.17–4.75	2.51**	1.29–4.88	2.34**	1.24–4.41	2.31*	1.17–4.56
Household wealth	0.06*	0.01–0.57	0.06*	0.01–0.63	0.05*	0.004–0.54	0.06*	0.01–0.60
Age at first marriage	0.95	0.87–1.03	0.95	0.88–1.03	0.94	0.87–1.02	0.96	0.88–1.04
Polygamous marriage	0.61	0.17–2.17	0.86	0.29–2.55	0.90	0.30–2.69	0.65	0.19–2.22
Currently employed	1.00	0.51–1.94	1.04	0.54–1.95	0.96	0.52–1.78	0.97	0.51–1.84
Partner characteristics								
Age difference	1.00	0.96–1.04	1.00	0.97–1.04	1.00	0.96–1.04	1.00	0.96–1.04
Partner uses alcohol	0.89	0.48–1.63	0.94	0.52–1.68	1.01	0.58–1.75	0.87	0.48–1.58
Religion								
Catholic	0.78	0.41–1.48	0.82	0.44–1.53	0.79	0.43–1.46	0.83	0.44–1.58
(ref = Protestant or other religion)								
Education								
Primary education	0.63	0.32–1.24	0.61	0.31–1.20	0.62	0.31–1.23	0.60	0.30–1.18
Secondary education[b]	2.27	0.66–7.86	2.31	0.68–7.84	2.43	0.75–7.89	2.33	0.65–8.31
(ref = no education)								

$N = 1{,}582$

[a] In addition to the variables listed here, all models also control for region of residence, with Kigali as the reference group

[b] This group includes the 6 respondents who reported higher education

[c] This variable is a scale ranging from −0.43 to 2.24

* $P < 0.05$

** $P < 0.01$

Simulation models using clinical data from urban Rwanda indicate that most heterosexual transmission from men to women in Rwanda occurs within marriage (Dunkle et al. 2008). Recent literature has emphasized that it is not always the man who brings HIV into the marriage: in up to 40% of serodiscordant couples (where one partner is infected with HIV and the other is not), it is the woman who is infected (Chomba et al. 2008; DeWalque 2007). In this sample, however, the 1.8% of the women that tested positive for HIV, and the 3.9% that reported other STIs, reported no premarital sex partners, recent extramarital partners, or prior marriages, indicating that it is highly probable that these women acquired their infections from their husbands. Thus, marriage is 'risky' from an infection perspective; these results indicate some marital contexts might be riskier than others.

These results do not give a definitive answer as to why Rwandan women without other behavioral risk factors who have experienced marital partner abuse have higher rates of HIV/STIs, and, in a cross—sectional study, it is impossible to know whether spousal abuse is causally related to infection, or whether partner violence and other factors only serve as markers of disease. These results do suggest some potential explanations for this correlation. Foremost among these is the role of men, both as abusers and as the likely source of infection. Other studies have found that men who abuse their wives are also more likely to engage in other behaviors that increase HIV risk, such as transactional sex (Dunkle et al. 2006), multiple sexual partners (Raj et al. 2006), and unprotected sex (Frye et al. 2007). These men probably have a higher baseline infection rate of HIV/STIs than non-abusive men, which translates into greater HIV/STI risk for their wives, regardless of a woman's own sexual behavior (Silverman et al. 2008).

This paper neither includes males nor studies male risk behavior, apart from the finding that men that drink alcohol

are more likely to be abusive. While this risk behavior has been associated with increased rates of HIV and STIs in other settings (Radcliffe et al. 2001; Zablotska et al. 2006), it is not correlated with higher rates of infection among women here. There is little prior research on the behaviors of male abusers in Rwanda, although a recent study of women in antenatal care clinics indicates that women who have experienced physical abuse in the past 12 months are more likely to be HIV positive, to have a male partner who drinks alcohol, and to have a partner with other sexual partners (Ntaganira et al. 2008). Further research in Rwanda could confirm whether abusive men have higher rates of infection and sexual risk behavior than non-abusive men on the population level.

Another likely pathway is that abuse within marriage coexists with other relationship factors that promote infection. Being in a polygamous marriage is correlated with increased likelihood of both intimate partner violence and HIV/STIs. Each individual wife in a polygamous relationship might be devalued relative to women in marriages with a single wife, and these women are more likely to be viewed as property rather than as sexual and personal equals (Bove and Valeggia 2008). Polygamy also frequently exists in cultures with mores that have traditionally promoted men's hegemony over women, including their 'right' to maintain order within the household through abuse, while simultaneously discouraging women from leaving abusive marriages (McCloskey et al. 2005). In polygamous marriages, concurrent sexual partnerships between a man and multiple wives can quickly spread HIV and other STIs to all family members (Morris and Kretzschmar 1997). Other studies have suggested that in marriages with multiple wives, the new/younger wives often behave in ways, such as having multiple sex partners, that put older wives at risk even if they remain monogamous (Bove and Valeggia 2008). The combination of increased violence, decreased power within the household, and the increased likelihood that someone will bring an infection into the family could result in the higher HIV/STI rates seen in women from polygamous households here.

A greater age gap between husbands and wives exists within physically abusive marriages in this study; these women are also at greater risk of HIV/STIs. Increased age differences in sexual partnerships have long been associated with increased risk of inter—generational HIV transmission (Gregson et al. 2002), especially between older men and younger women (Longfield et al. 2004), in part because older men have had more time to acquire infections from other partners (Kelly et al. 2003). Age differentials can serve as a proxy for power differentials within relationships, as older husbands are less likely to see young wives as equals, a condition that can foster increased rates of intimate partner violence within these relationships (Sa and Larsen 2007). Younger women are also more likely to be economically dependent on their partner, and less likely to leave a sexually risky or abusive relationship (Luke 2003). Younger wives facing abuse could be less prone to ask their husbands about their other previous or current sexual partners and HIV status, leaving them more vulnerable to infection.

The reality of intimate partner violence might also hamper future HIV/STI prevention efforts. While condom use among the women in this survey and in other prior studies of married women is quite rare (Allen et al. 2007), the Rwandan government, the UN, and other aid groups have promoted condoms in recent years as a means of preventing HIV (Rwanda Ministry of Health 2006). The results in this survey show that current condom use is highly correlated with increased risk of HIV/STIs, which is the opposite of the expected relationship: increased condom use is usually correlated with decreased risk of HIV/STIs (Bracher et al. 2004). Research has shown that serodiscordant married couples substantially increase condom use when one member of the couple tests positive for HIV (Roth et al. 2001), which could be the case here, as so few couples otherwise use condoms. While many of the women reported that they had had another HIV test prior to the time of survey, it is impossible to test whether condom use preceded or followed HIV/STI testing or infection using a cross-sectional survey.

Encouraging condom use among women facing abuse, however, might prove more difficult. Although condom use is not associated with increased levels of intimate partner violence in this survey, a study in neighboring Uganda found that women who had experienced intimate partner violence were more fearful of requesting that their partners use condoms, even if their partners were HIV positive or had another STI (Karamagi et al. 2006). Avoiding sex with an infected partner, too, might be difficult for women in abusive marriages, as work in nearby Tanzania indicates that women are often forced to have sex if they refuse their husbands' advances (Lary et al. 2004) Addressing differential negotiation power and the potential barrier of intimate partner violence might increase the success of promoting these strategies for HIV prevention within marriage in the future.

These data suffer from a number of potential reporting biases and other limitations. Firstly, intimate partner violence is often under—reported in surveys. Generally, women will under—report partner violence because they feel ashamed, want to forget the event, or psychologically repress the memory of a traumatic experience (Ellsberg et al. 2001). These same authors also specifically found that intimate partner violence is under—reported in the Demographic and Health Surveys, which include an intimate partner violence module as part of a much larger study, relative to a

questionnaire specifically designed to uncover intimate partner violence (Ellsberg et al. 2001). It is impossible to know whether women are differentially reporting abuse experiences based on HIV or STI status, but differential under—reporting might lead to biased conclusions.

This study includes self-reported sexual behavior variables, such as self-reports of the age of sexual debut, and multiple sex partners in the past year. In addition to being subject to recall bias, these sexual behaviors could either be prone to upwards or downwards revision, depending on an individual's cultural beliefs regarding premarital sexual activity, or perhaps depending on whether one chose the timing of sexual debut, or whether an individual's first sexual experience was coerced or forced. Given that these respondents are female, these variables are likely to be under—reported (Zaba et al. 2004), and thus some women who engaged in premarital or extramarital sex might be erroneously included in the analysis sample. This error increases the probability that women in the analysis sample could have been infected with HIV/STIs by someone other than their current husbands.

Also, while the HIV serostatus outcome is measured objectively in the survey, the STI infection outcome is self—reported, and thus is also subject to these reporting biases. Given the stigma associated with sexually transmitted infections in other East African countries, including neighboring Kenya, STIs are likely under—reported in this survey (Moss et al. 1999). Self—reporting of STIs also requires that women recognize symptoms or receive a medical diagnosis, which could lead to over—reporting of STIs by some groups. This bias underscores the importance of biomarker data in surveys in independently confirming self—reported diagnoses and symptoms where possible, which unfortunately is not the case in this survey.

Finally, this survey is cross—sectional in nature, and all findings are correlational only, not causal.

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