Published in final edited form as:
Sex Transm Dis. 2012 May ; 39(5): . doi:10.1097/OLQ.0b013e3182478fa5.

Intimate Partner Violence and Sexually Transmitted Infections among Young Adult Women

Kristen L. Hess, PhD[1], **Marjan Javanbakht, PhD**[1], **Joelle M. Brown, PhD**[1], **Robert E. Weiss, PhD**[1], **Paul Hsu, PhD**[1], and **Pamina M. Gorbach, DrPH**[1]

[1]University of California, Los Angeles

Abstract

Background—Intimate partner violence (IPV) is common among young adult relationships, and is associated with significant morbidity, including sexually transmitted infections (STI). This study measured the association between IPV victimization and perpetration and prevalent STIs and STI-risk behaviors among a sample of young women.

Methods—This analysis uses wave 3 of the National Longitudinal Study of Adolescent Health and was restricted to the 3,548 women who reported on a sexual relationship that occurred in the previous three months and agreed to STI testing. A multivariate random effects model was used to determine associations between STI and STI-risk behaviors and IPV.

Results—The IPV prevalence over the past year was 32%: 3% victim-only, 12% perpetrator-only, and 17% reciprocal. The STI prevalence was 7.1%. Overall, 17% of participants reported partner concurrency and 32% reported condom use at last vaginal intercourse. In multivariate analysis, victim-only and reciprocal IPV were associated with not reporting condom use at last vaginal intercourse. Perpetrator-only, victim-only, and reciprocal IPV were associated with partner concurrency. Victim-only IPV was associated with a higher likelihood of having a prevalent STI (OR: 2.1; 95% CI: 1.0-4.2).

Conclusions—This analysis adds to the growing body of literature that suggests that female IPV victims have a higher STI prevalence, as well as a higher prevalence of STI-risk behaviors, compared to women in non-violent relationships. Women in violent relationships should be considered for STI screening in clinics and IPV issues should be addressed in STI prevention messages given its impact on risk for STI acquisition.

Keywords

intimate partner violence; sexually transmitted infections; STI-risk behaviors

Introduction

Intimate partner violence (IPV) defined as physical, sexual, or psychological harm by a current or former partner or spouse[1] is commonly reported among young adult heterosexual relationships. The National Longitudinal Study of Adolescent Health (Add Health) carried out between 2001-2002 found that 29% of women and 25% of men aged 18-28 years old reported ever being victimized by physical IPV.[2] In the same survey, 36% of women and

Corresponding Author: Kristen L Hess, MPH, PhD Department of Epidemiology University of California, Los Angeles 650 Charles E. Young Dr South, CHS 41-295 BOX 951772, Los Angeles, CA 90095-1772 Tel: (310) 794-2555 Fax: (310) 825-7387 kristenhess@gmail.com.

There is no conflict of interest.

17% of men reported ever perpetrating physical IPV.[2] Among the relationships that were reported as violent, about half (52%) were reciprocally violent, meaning the participant reported both victimization and perpetration of IPV. These reciprocally violent relationships were found to be associated with a higher frequency of violence and injury occurrence compared to relationships in which the violence was unidirectional.[2] In addition, the study found that the woman was the perpetrator in a majority of unidirectional violent relationships. This previous study offered a few explanations for this counter-intuitive finding, including that men may be less likely to hit back if their partner initiates physical violence such as slapping or that more severely abused women that are captured in clinical studies may be excluded from survey studies.

There is evidence to indicate that women in abusive relationships experience adverse health outcomes including sexually transmitted infections (STIs) and infertility.[3] Several studies have looked at associations with STI-risk behaviors and have found that abused women are at increased risk for unprotected intercourse[3-7] and partner non-monogamy[3, 8, 9]. Findings based on the nationally representative Add Health data reveal that current involvement in a verbally abusive relationship in adolescence was associated with not using a condom at last vaginal intercourse[6] and that physical IPV in the most recent relationship in adolescence was associated with inconsistent condom use in that relationship[5]. Among women in wave 3 of Add Health, who are now young adults, physical abuse victimization in the previous year was associated with inconsistent condom use in the previous year.[4]

Women who are victims of IPV also have increased odds of having a history of STI.[3, 10-14] In one study conducted among women who completed the Massachusetts Youth Risk Behavior Survey, which was a representative sample of youth in grades 9 through 12, being an IPV victim was associated with ever testing for STIs or HIV and ever being diagnosed with an STI or HIV.[11] However, this was based on self-reported history of STI and did not include a currently diagnosed STI. The majority of studies on IPV and sexual health outcomes have focused on women as the victim of abuse. However, there is evidence to indicate that women are often both the perpetrators and victims of violence in intimate relationships.[2] It is plausible that women who are both IPV perpetrators and victims may experience a different power dynamic in their intimate relationships compared to women who are only victims and not perpetrators of violence, and therefore, these women may exhibit different sexual risk taking behaviors and have different risks for STIs compared to women who are victims only. This study examined the association between both IPV perpetration and victimization and their association with prevalent STI and STI-risk behaviors among a national sample of young adult women.

Methods

Source of data

This study analyzes data from wave 3 of Add Health. The Add Health dataset contains demographic and behavioral information from a sample of adolescents in grades 7-12 in the United States enrolled in the 1994-1995 academic year.[15] Wave 3 data was collected in 2001-2002 when participants were between the ages of 18 and 28 years of age. Participation, which involved an in-home interview, included both a face-to-face interview and an audio computer assisted self-interview (ACASI) for more sensitive questions including questions on sexual behavior. During the ACASI portion, respondents were asked to list all their sexual and romantic relationships from the previous five years. Based on an algorithm that took into account factors such as duration, marital status, and recency, ‘important’ relationships were selected, e.g. if there was a current marriage it was selected, if not then a current co-habitation was selected. More detailed information was gathered on these ‘important’ relationships, including questions about IPV perpetration and victimization, as

well as sexual behaviors within that relationship.[15] In addition, participants provided a urine specimen for STI testing. *Chlamydia trachomatis* and *Neisseria gonorrhoeae* were detected using the Abbott LCx Probe System (Abbott Park, IL). *Trichomonas vaginalis* was detected by using an in-house polymerase chain reaction enzyme-linked immunosorbent assay.[16]

Among the 8,030 women in wave 3, 163 were excluded because they did not have a high school identifier (required to control for the clustered survey design), 1,763 were excluded because they reported no sexually-active heterosexual relationships. An additional 101 were excluded because of missing abuse data and 754 were excluded because they did not consent to STI testing. Finally, because the relevant time frame for assessing behaviors in relation to STI acquisition is three months, 1,700 women were excluded because their relationships were not sexually active in the previous three months. This resulted in a sample size of 3,548 women for the present analyses. Furthermore, while women could report on several 'important' relationships, given our interest in current STI status, we analyzed data only on the most recent 'important' relationship. The women included in this analysis did not differ from the full sample of wave 3 women in terms of age or educational status. However, there was a larger proportion of white non-Hispanic women in the sub-sample used for this analysis compared to the full sample.

Measures

Outcome variables—Our outcome variables included a positive STI result, condom use, and concurrent partnerships. The presence of a prevalent STI was based on laboratory test results for *C. trachomatis*, *N. gonorrhoeae*, and *T. vaginalis*. Women who tested positive for at least one of these three infections were defined as STI positive. Condom use was assessed at last vaginal intercourse. In order to assess concurrent partnerships, women were asked if they believed their partner was having sex with other partners during their sexual relationship.

Exposure variables—Both physical and sexual IPV were assessed. Questions for IPV were based on the Conflict Tactics Scale, a tool used to measure IPV that is based on asking about specific acts and events.[17] The behaviors included in the questions were: (1) threatening your partner with violence, pushing or shoving, or throwing something that could hurt; (2) slapping, hitting, or kicking; and (3) injuring your partner. For each behavior a separate question was asked about perpetration and victimization. Women who reported committing any of these behaviors in the previous year were considered IPV perpetrators while those who reported partners who perpetrated any of these behaviors in the previous year were considered IPV victims.

Women were grouped into four IPV categories: perpetrator-only, victim-only, reciprocal, and non-abusive relationships. The 'perpetrator-only' relationships were ones where the woman was the only perpetrator, and 'victim-only' were relationships where their partner was the only perpetrator. 'Reciprocal' relationships were relationships where both perpetration and victimization were reported. Non-abusive relationships were ones where no perpetration or victimization was reported. Participants were also asked about sexual victimization, 'In the past year, has your partner insisted on or made you have sexual relations with him when you didn't want to?' A dichotomous variable was created to indicate whether the woman had been a victim of sexually aggressive behavior in the previous year or not.

Individual and relationship specific covariates—Data on variables that could potentially confound or modify the relationship between IPV and STI and STI-risk behaviors were included in this analysis. These variables included age, race/ethnicity, and

education. Relationship characteristics included level of commitment in the relationship ("only sex"/casual dating, exclusive dating, ever lived together, ever married), and age discordance in the relationship (same age, partner ≥ 3 years younger, partner ≥ 3 years older). Other variables considered for inclusion in the model were substance use in the past year, frequent heavy drinking in the past year (≥5 alcoholic drinks in one sitting at least twice per month vs. less than this amount), exchanging sex for money in the past year, and number of sex partners in the previous year.

Statistical Analysis

Bivariate analyses examined associations between IPV status and prevalent STI and STI-risk behaviors as well as associations between demographic and relationship characteristics and prevalent STI and STI-risk behaviors. Pearson's chi-square test was used to test for significant associations between categorical variables and the Wilcoxon rank-sum test was used for continuous variables. Multivariate analyses of the relationship between IPV status and prevalent STI and STI-risk behaviors were conducted using a random effects model to control for the clustered survey design. Covariates were selected for the multivariate model based on *a priori* knowledge and statistically significant bivariate results (p-value<0.05). All analyses were performed with Stata 11.0, and the multivariate analyses were performed using the xtlogit command.

Results

Of the 3,548 women included in this analysis, over half were white non-Hispanic (58%), 19% were black non-Hispanic, 14% were Hispanic, and 10% were women of another race (Table 1). The mean age was 22 years, with more than one quarter (27%) being married, 31% cohabiting with their partner, and 33% in exclusive dating relationships. Overall, 32% of women reported being in a relationship that included physical IPV over the past year. Seventeen percent (17%) of relationships were reciprocally abusive. In 3% of the relationships, the woman was the only IPV victim, and in 12%, the woman was the only IPV perpetrator. The prevalence of sexual victimization was 8% (Table 1). Women who were sexually victimized were more likely to be in a physically abusive relationship (reciprocal: 47%, victim: 8%, perpetrator: 16%) than women who were not sexually victimized (reciprocal: 14%, victim: 3%, perpetrator: 12%) (p<0.001). The overall STI prevalence was 7%. The prevalence of *C. Trachomatis, N. gonorrhea, and. T. vaginalis* was 4.6%, 0.4%, and 2.8%, respectively.

IPV and STIs

Women who reported being physical IPV victims, but not perpetrating IPV, had a higher prevalence of STIs compared to women in non-abusive relationships (13.2% vs. 6.3%, p<0.01) (Table 1). The STI prevalence also varied by race/ethnicity, with the highest prevalence among non-Hispanic black women (18.4%) and the lowest among non-Hispanic white women (3.6%)(p<0.001). Women who believed their partner had concurrent partners also had a higher STI prevalence than those who did not (11% vs. 6%, p<0.001).

In multivariate analyses, women who were the only physical IPV victims were more likely to have an STI compared to women in non-abusive relationships (adjusted odds ratio (AOR): 2.1, 95% confidence interval (CI): 1.0- 4.2) after controlling for confounding factors and the clustered survey design (Table 2). In contrast, women who were sexually victimized by their partner were less likely to have an STI (AOR: 0.5, 95% CI: 0.3-0.9).

IPV and condom use

Overall, 32% of women reported condom use at last vaginal intercourse (Table 1). Women who were sexually victimized in the previous year had a lower prevalence of condom use at last vaginal intercourse compared to women who were not sexually victimized (26% vs. 32%, $p<0.05$) (Table 1). Women who were in reciprocally violent (24%) and victim-only relationships (21%) reported a lower prevalence of condom use at last vaginal intercourse compared to women who were in perpetrator-only (31%) and non-abusive relationships (35%) ($p<0.001$).

In multivariate analysis, women in reciprocally violent relationships (AOR: 0.8, 95% CI: 0.6-1.0) and those in victim-only relationships (AOR: 0.6, 95% CI: 0.3-1.0) were significantly less likely than women in non-abusive relationships to report condom use at last vaginal intercourse after adjusting for potential confounding factors (Table 2). In contrast, there was no significant difference in reported condom use at last sex between women who only perpetrated IPV compared to women in non-violent relationships.

IPV and concurrent partnerships

Overall, 17% of participants believed that their partner had concurrent partners. Women who had been sexually victimized in the previous year had a higher prevalence of believing their partner had concurrent partners (27%) than those who had not been victimized (16%). Women in any type of physically abusive relationship, perpetration (22%), victimization (25%), or reciprocal (28%), were more likely to believe their partner was concurrent than women in non-abusive relationships (12%).

Believing that your partner has concurrent partners was reported by a greater number of non-Hispanic black women (25%) than non-Hispanic white women (14%), Hispanic women (16%), and women of another race (17%) ($p<0.001$) (Table 1). Approximately one third (34%) of women in “only sex” or casual dating relationships believed their partner had concurrent partners compared to less than one-fifth (13% - 18%) of women in more committed relationships ($p<0.001$).

In multivariate analysis, women who were the only victim (AOR: 2.2, 95% CI: 1.4-3.6), the only perpetrator (AOR: 1.8, 95% CI: 1.4-2.4), and those in reciprocally violent relationships (AOR: 2.4, 95% CI: 1.9-3.0) were significantly more likely than women in non-abusive relationships to believe that their partner had concurrent partners (Table 2).

Discussion

This analysis, which is based on a sub-sample of women in a nationally representative survey, found that women who are IPV victims have a higher STI prevalence, as well as a higher prevalence of STI-risk behaviors such as unprotected vaginal intercourse and partners with concurrent partnerships, compared to women in non-violent relationships. To our knowledge, this is the first study to separately evaluate STI-risk behaviors and STI prevalence among female victims, female perpetrators, and women in reciprocally violent relationships. Women who were IPV victims were less likely to report condom use at last vaginal intercourse than women in non-violent relationships, regardless of IPV perpetration status. A possible explanation for this association could relate to the underlying balance of power characterized by their partnerships; women who are victims, regardless of IPV perpetration, may have less negotiating power in their relationships than women in non-violent relationships. This is supported by a New Zealand study that found that female IPV victims were more likely than non-abused women to have a partner refuse to use a condom.[18]

This analysis also found that women in violent relationships, regardless of whether the woman is a victim, perpetrator, or both a victim and a perpetrator of IPV, are approximately twice as likely to report that they believe their partner has concurrent partners. Given that partner concurrency is a risk factor for STI acquisition,[19, 20] female IPV perpetrators as well as victims may be at increased risk of exposure to an STI. While other studies have demonstrated the increased risk to female IPV victims through their partners' behavior,[8, 9, 21] to our knowledge, this is the first study to show that female IPV perpetrators are also more likely to believe that their partner has concurrent partnerships compared to women in non-violent relationships.

We also found an elevated risk of a laboratory-confirmed STI among women who were victims of, but did not perpetrate IPV in their relationship. It could be that women who are being victimized and are not perpetrating have the largest imbalance of power in their relationship, which could result in increased exposure to STIs and potentially less ability to seek care for an infection. Further research is needed to understand why victims who do not perpetrate IPV are at greater risk to test positive for an STI than victims who perpetrate IPV against their partner given that use of condoms and partner's concurrency does not explain the difference in STI risk between these two groups. Other risk behaviors that could possibly explain the difference in risk between these two groups are having sex while high on drugs or alcohol and condom failures, which were both found to be mediators between IPV victimization and chlamydia infection in previous work.[22]

The inverse relationship between being sexually victimized by an intimate partner in the previous year and having a prevalent STI is not intuitive; i.e. those who were sexually victimized had a lower STI prevalence. However, this could be explained by a higher motivation among these women to seek STI testing and treatment prior to the study than women who have not been sexually victimized. Thus, these women could be less likely to have an undetected STI at the time of the interview. Indeed, sexual victimization was associated with being tested for chlamydia, gonorrhea, or trichomoniasis in the previous year (37% vs. 31%, $p=0.03$) and with having a positive diagnosis for a STI in the past year (10% vs. 5%, $p<0.001$) compared to women who were not sexually victimized.

Another surprising finding is that 12% of relationships were uni-directionally violent with the woman being the only perpetrator where as in only 4% of relationships the woman was the only victim. This replicates previous findings from this data set.[2] This could be due to the type of violence captured in the CTS questions used in the questionnaire, which included actions such as slapping and pushing. If more severe types of violence were included more male perpetrated violence may have been reported. In addition, women who are experiencing more severe forms of male-perpetrated violence might not be captured in this survey because their abuser could limit their ability to participate.

This study has several limitations, including the possibility of social desirability bias, which may have resulted in under reporting of IPV and concurrency, and over reporting of condom use. However, these questions were asked by ACASI instead of face-to-face interview, which may have minimized the potential bias in these estimates due to social desirability. In addition, we limited our analysis to women who reported vaginal intercourse with their partner in the previous three months, which is the relevant time-frame for a prevalent STI. However, it was not possible to restrict the reports of IPV to the same time frame. The time frame for reported IPV was within the previous year. Therefore, the IPV might not have been happening concurrently with the acquisition of the STI. However, if the variables were more directly relevant to the analysis the association would be expected to be stronger not weaker, so the fact that an association was found suggests that there may be a true effect.

Finally, it would also add to the analysis if the survey had included more context about the violent episodes, such as who typically initiated the violence.

Despite these limitations, this study offers insight into the association between STI risk behaviors, STIs, and IPV. Others have shown that female IPV victims are at an increased risk of STI,[10-14] but this study is the first to ask this question using a nationally representative sample, and to separately consider female perpetration as well as victimization. In addition, most previous work has examined self-reported STI history instead of prevalent laboratory-diagnosed STI. The results found in this study could be used to improve STI prevention interventions; given the high prevalence of IPV in young adult relationships and the increased risk of STI associated with being in an abusive relationship, addressing IPV within STI prevention interventions may help to reduce STI risk in this vulnerable population. These messages should be sensitive to that fact that women in abusive relationships may not be able to negotiate condom use, and include information on IPV and how it could increase risk for STI acquisition as well as where women in abusive relationships can access help. It is also important for medical practitioners to recognize the increased risk of STI among female IPV victims and to screen for these infections.

Acknowledgments

This research uses data from Add Health, a project directed by Kathleen Mullan Harris and designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris at the University of North Carolina at Chapel Hill, and funded by grant P01-HD31921 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, with cooperative funding from 23 other federal agencies and foundations. Special acknowledgment is due Ronald R. Rindfuss and Barbara Entwisle for assistance in the original design. Information on how to obtain the Add Health data files is available on the Add Health website (http://www.cpc.unc.edu/addhealth). No direct support was received from grant P01-HD31921 for this analysis.

This work was supported by the UCLA AIDS Institute and the UCLA Center for AIDS Research (AI28697).

References

1. CDC. [Accessed March 31, 2011] Intimate Partner Violence: Definitions. http://www.cdc.gov/ViolencePrevention/intimatepartnerviolence/definitions.html
2. Whitaker DJ, Haileyesus T, Swahn M, et al. Differences in frequency of violence and reported injury between relationships with reciprocal and nonreciprocal intimate partner violence. Am J Public Health. May; 2007 97(5):941–947. [PubMed: 17395835]
3. Coker AL. Does physical intimate partner violence affect sexual health? A systematic review. Trauma Violence Abuse. Apr; 2007 8(2):149–177. [PubMed: 17545572]
4. Teitelman AM, Ratcliffe SJ, Dichter ME, et al. Recent and past intimate partner abuse and HIV risk among young women. J Obstet Gynecol Neonatal Nurs. Mar-Apr;2008 37(2):219–227.
5. Manlove J, Ryan S, Franzetta K. Contraceptive use and consistency in U.S. teenagers' most recent sexual relationships. Perspect Sex Reprod Health. Nov-Dec;2004 36(6):265–275. [PubMed: 15687085]
6. Roberts TA, Auinger P, Klein JD. Intimate partner abuse and the reproductive health of sexually active female adolescents. J Adolesc Health. May; 2005 36(5):380–385. [PubMed: 15837341]
7. Mittal M, Senn TE, Carey MP. Mediators of the relation between partner violence and sexual risk behavior among women attending a sexually transmitted disease clinic. Sex Transm Dis. Jun; 38(6): 510–515. [PubMed: 21258269]
8. Bauer HM, Gibson P, Hernandez M, et al. Intimate partner violence and high-risk sexual behaviors among female patients with sexually transmitted diseases. Sex Transm Dis. Jul; 2002 29(7):411–416. [PubMed: 12170131]
9. Raj A, Silverman JG, Amaro H. Abused women report greater male partner risk and gender-based risk for HIV: findings from a community-based study with Hispanic women. AIDS Care. May; 2004 16(4):519–529. [PubMed: 15203419]

10. Wu E, El-Bassel N, Witte SS, et al. Intimate partner violence and HIV risk among urban minority women in primary health care settings. AIDS Behav. Sep; 2003 7(3):291–301. [PubMed: 14586191]
11. Decker MR, Silverman JG, Raj A. Dating violence and sexually transmitted disease/HIV testing and diagnosis among adolescent females. Pediatrics. Aug; 2005 116(2):e272–276. [PubMed: 16061580]
12. Johnson PJ, Hellerstedt WL. Current or past physical or sexual abuse as a risk marker for sexually transmitted disease in pregnant women. Perspect Sex Reprod Health. Mar-Apr;2002 34(2):62–67. [PubMed: 12043710]
13. Martin SL, Matza LS, Kupper LL, et al. Domestic violence and sexually transmitted diseases: the experience of prenatal care patients. Public Health Rep. May-Jun;1999 114(3):262–268. [PubMed: 10476996]
14. Augenbraun M, Wilson TE, Allister L. Domestic violence reported by women attending a sexually transmitted disease clinic. Sex Transm Dis. Mar; 2001 28(3):143–147. [PubMed: 11289195]
15. Harris, KM.; Halpern, CT.; Whitsel, E., et al. The National Longitudinal Study of Adolescent Health: Research Design. 2009. [WWW document] URL: http://www.cpc.unc.edu/projects/addhealth/design
16. DiClemente RJ, Sales JM, Danner F, et al. Association between sexually transmitted diseases and young adults' self-reported abstinence. Pediatrics. Feb; 2011 127(2):208–213. [PubMed: 21199852]
17. Straus MA, Hamby SL, Boney-McCoy S, et al. The revised conflict tactics scales (CTS2): Development and preliminary psychometric data. Journal of Family Issues. 1996; 17(3):283–316.
18. Fanslow J, Whitehead A, Silva M, et al. Contraceptive use and associations with intimate partner violence among a population-based sample of New Zealand women. Aust N Z J Obstet Gynaecol. Feb; 2008 48(1):83–89. [PubMed: 18275577]
19. Drumright LN, Gorbach PM, Holmes KK. Do people really know their sex partners? Concurrency, knowledge of partner behavior, and sexually transmitted infections within partnerships. Sex Transm Dis. Jul; 2004 31(7):437–442. [PubMed: 15215701]
20. Zhan W, Krasnoselskikh TV, Niccolai LM, et al. Concurrent sexual partnerships and sexually transmitted diseases in Russia. Sex Transm Dis. Jan 20.2011
21. Raj A, Santana MC, La Marche A, et al. Perpetration of intimate partner violence associated with sexual risk behaviors among young adult men. Am J Public Health. Oct; 2006 96(10):1873–1878. [PubMed: 16670216]
22. Salazar LF, Crosby RA, Diclemente RJ. Exploring the mediating mechanism between gender-based violence and biologically confirmed Chlamydia among detained adolescent girls. Violence Against Women. Mar; 2009 15(3):258–275. [PubMed: 19139491]

Table 1

Bivariate associations between IPV, socio-demographic and partnership characteristics with prevalent STI and STI-risk behaviors of women in wave 3 of the National Longitudinal Study of Adolescent Health

	Total N = 3548	Prevalent STI	Condom used at last vaginal intercourse	Concurrent partner
	n (col %)	n (row %)	n (row %)	n (row %)
Prevalent STI				
Yes	250 (7.1)	---	92 (36.8)	62 (25.8)$^{+}$
No	3298 (92.9)	---	1036 (31.5)	513 (15.8)$^{+}$
Partner has concurrent partners				
Yes	575 (16.5)	62 (10.8)$^{+}$	174 (30.3)	---
No	2909 (83.5)	178 (6.1)$^{+}$	930 (32.0)	---
Condom used at last vaginal intercourse				
Yes	1128 (31.8)	92 (8.2)	---	174 (15.8)
No	2416 (68.2)	158 (6.5)	---	400 (16.8)
Physical IPV – past year				
Reciprocal	603 (17.0)	44 (7.3)**	143 (23.8)$^{+}$	164 (27.8)$^{+}$
Victim-only	106 (3.0)	14 (13.2)**	22 (20.8)$^{+}$	25 (24.5)$^{+}$
Perpetrator-only	423 (11.9)	40 (9.5)**	129 (30.5)$^{+}$	93 (22.3)$^{+}$
No abuse	2416 (68.1)	152 (6.3)**	834 (34.6)$^{+}$	293 (12.3)$^{+}$
Sexually victimized – past year				
Yes	290 (8.2)	15 (5.2)	75 (26.0)*	77 (27.3)$^{+}$
No	3252 (91.8)	235 (7.2)	1052 (32.4)*	496 (15.5)$^{+}$
Race/ethnicity				
Non-Hispanic white	2052 (57.9)	74 (3.6)$^{+}$	581 (28.4)$^{+}$	285 (14.1)$^{+}$
Non-Hispanic black	659 (18.6)	121 (18.4)$^{+}$	278 (42.3)$^{+}$	155 (24.5)$^{+}$
Hispanic	493 (13.9)	26 (5.3)$^{+}$	155 (31.4)$^{+}$	79 (16.3)$^{+}$
Other	342 (9.6)	29 (8.5)$^{+}$	113 (33.0)$^{+}$	56 (16.6)$^{+}$
Age$^{\wedge}$				
Yes to outcome	21.9 [1.71]	21.7 [1.79]	21.7 [1.74]$^{+}$	21.9 [1.74]
No to outcome	---	21.9 [1.70]	22.0 [1.69]$^{+}$	21.9 [1.71]
Education				
<HS	266 (7.5)	37 (13.9)$^{+}$	83 (31.3)**	42 (16.3)
HS	1225 (34.5)	102 (8.3)$^{+}$	347 (28.3)**	222 (18.6)
Some college	1594 (44.9)	96 (6.0)$^{+}$	545 (34.3)**	242 (15.4)
College graduate	462 (13.0)	15 (3.3)$^{+}$	153 (33.1)**	69 (15.0)
Level of commitment				
casual dating/only sex	330 (9.3)	38 (11.5)$^{+}$	181 (54.9)$^{+}$	105 (34.1)$^{+}$

	Total N = 3548	Prevalent STI	Condom used at last vaginal intercourse	Concurrent partner
	n (col %)	n (row %)	n (row %)	n (row %)
exclusive dating	1157 (32.8)	94 (8.1)$^{+}$	497 (43.0)$^{+}$	143 (12.5)$^{+}$
cohabiting	1109 (31.4)	90 (8.1)$^{+}$	265 (23.9)$^{+}$	197 (18.1)$^{+}$
married	936 (26.5)	28 (3.0)$^{+}$	177 (18.9)$^{+}$	125 (13.5)$^{+}$
Age discordant ≥ 3 years				
Same age	2031 (57.3)	131 (6.5)$^{+}$	668 (32.9)	333 (16.7)
Partner older	1455 (41.1)	108 (7.4)$^{+}$	440 (30.3)	228 (16.0)
Partner younger	58 (1.6)	11 (19.0)$^{+}$	20 (34.5)	14 (24.1)
Drug use$^{\sim}$ – past year				
Yes	367 (10.4)	21 (5.7)	106 (28.9)	79 (21.8)**
No	3163 (89.6)	228 (7.2)	1020 (32.3)	494 (15.9)**
Frequent heavy drinking$^{\$}$ – past year				
Yes	483 (13.8)	30 (6.2)	156 (32.4)	95 (20.0)*
No	3021 (86.2)	215 (7.1)	960 (31.8)	475 (16.0)*
Exchange sex for money – past year				
Yes	29 (0.8)	8 (27.6)$^{+}$	5 (17.2)	12 (41.4)$^{+}$
No	3518 (99.2)	242 (6.9)$^{+}$	1122 (31.9)	563 (16.3)$^{+}$
Number of sex partners – past year$^{\wedge}$				
Yes to outcome	1.57 [1.51]	1.93 [1.60]$^{+}$	1.59 [1.27]	1.87 [1.51]$^{+}$
No to outcome	---	1.55 [1.50]$^{+}$	1.56 [1.60]	1.51 [1.52]$^{+}$

*p<0.05,

**p<0.01,

$^{+}$p<0.001,

$^{\wedge}$mean [standard deviation]

$^{\sim}$drug use = cocaine, crystal meth, injected drugs, any other illegal drug (LSD, PCP, ecstasy, mushrooms, inhalants, ice, heroin, prescription medication not prescribed to you)

$^{\$}$frequent heavy drinking = 5 or more alcoholic drinks in one sitting at least 2x per month

Table 2

Adjusted odds ratios for the association between prevalent STI and STI-risk behaviors and IPV**

	Prevalent STI* N = 3400 AOR^ (95%CI)	Condom used at last vaginal sex N = 3400 AOR^ (95%CI)	Concurrent partner N = 3417 AOR^ (95%CI)
Physical IPV – past yr			
Reciprocal	0.95 (0.63-1.43)	**0.79 (0.62-0.99)**	**2.40 (1.89-3.04)**
Victim-only	**2.06 (1.01-4.21)**	**0.58 (0.34-0.97)**	**2.23 (1.38-3.62)**
Perpetrator-only	1.26 (0.84-1.88)	0.90 (0.71-1.15)	**1.80 (1.37-2.37)**
Ref: No abuse	p=0.15+	p=0.06+	p<0.001+
Sexually victimized – past year	**0.48 (0.26-0.87)**	0.91 (0.68-1.23)	1.33 (0.98-1.81)
Race/ethnicity			
Ref: Non-Hispanic white	p<0.001+	p<0.001+	p<0.001+
Non-Hispanic black	**5.45 (3.77-7.88)**	**1.59 (1.29-1.96)**	**1.86 (1.45-2.40)**
Hispanic	1.45 (0.85-2.46)	1.16 (0.92-1.46)	1.17 (0.87-1.58)
Other	**2.68 (1.65-4.36)**	1.17 (0.90-1.52)	1.12 (0.80-1.56)
Age	1.04 (0.95-1.14)	0.96 (0.91-1.00)	1.02 (0.96-1.09)
Education			
Ref: <HS	p<0.001+	p=0.99+	p=0.13+
HS	0.69 (0.43-1.11)	0.95 (0.69-1.31)	1.41 (0.96-2.08)
Some college	**0.49 (0.30-0.79)**	0.94 (0.69-1.29)	1.13 (0.77-1.66)
College graduate	**0.25 (0.12-0.51)**	0.95 (0.65-1.37)	1.28 (0.80-2.03)
Level of commitment			
casual dating/only sex	**2.26 (1.23-4.17)**	**5.08 (3.69-7.00)**	---
exclusive dating	**2.43 (1.49-3.98)**	**3.01 (2.40-3.77)**	---
cohabiting	**2.20 (1.38-3.51)**	**1.40 (1.12-1.76)**	---
Ref: married	p=0.001+	p<0.001+	---
Age discordant ≥ 3 years			
Ref: Same age	p=0.05+	p=0.79+	---
Partner older	1.11 (0.83-1.49)	0.95 (0.81-1.11)	---
Partner younger	**2.62 (1.21-5.68)**	0.90 (0.49-1.64)	---
Partner has concurrent partners	**1.53 (1.09-2.16)**	0.86 (0.69-1.07)	---
Condom used at last vaginal intercourse	1.00 (0.73-1.36)	---	0.98 (0.79-1.20)
Any drug use - past year~	0.92 (0.53-1.60)	0.88 (0.67-1.15)	1.31 (0.97-1.78)
Frequent heavy drinking - past yr$	1.18 (0.75-1.85)	0.89 (0.71-1.13)	1.27 (0.97-1.67)
Exchange sex for money - past yr	1.68 (0.66-4.26)	**0.32 (0.11-0.88)**	1.82 (0.81-4.09)
Number of sex partners - past yr	1.06 (0.99-1.13)	0.94 (0.88-1.00)	**1.12 (1.05-1.20)**

* any STI = chlamydia, gonorrhea, or trichomoniasis

** Each multivariate analysis is controlled for the clustered survey design (high school random effect) as well as all covariates in the table (except those with a dashed line '---')

[^] AOR= adjusted odds ratio

[+] global test of significance for multi-categorical variables

[~] drug use = cocaine, crystal meth, injected drugs, any other illegal drug (LSD, PCP, ecstasy, mushrooms, inhalants, ice, heroin, prescription medication not prescribed to you)

[$] frequent heavy drinking = 5 or more alcoholic drinks in one sitting at least 2x per month