INTIMATE PARTER VIOLENCE AND SYMPTOMS OF SEXUALLY TRANSMITTED INFECTIONS AMONG MARRIED INDIAN WOMEN

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INTRODUCTION

Studies across the globe are increasingly documenting the important public health topic of intimate partner violence (IPV) and its negative health effects on women (Campbell, 2002; Heise, Ellsberg, & Gottmoeller, 2002; Krug, Mercy, Dahlberg, & Zwi, 2002; World Health Organization, 1996). According to the World Health Organization (WHO), IPV is the most common form of violence in women's lives (2005). In a review of 48 population-based studies from around the world, the prevalence of IPV among women, measured as the report of physical assault by an intimate partner, ranged from 10-69% (Krug, et al., 2002). IPV is not just physical violence; it also includes verbal and physical threats, psychological abuse, controlling actions, sexual coercion, deprivation and neglect (Krug, et al., 2002; World Health Organization, 1996). A growing body of literature reflects that high levels of IPV exist throughout South Asia, specifically in India where gender cultural norms concerning the treatment of women have acted to increase the tolerance of IPV in this setting (Jeyaseelan et al., 2007; Koenig, Stephenson, Ahmed, Jejeebhoy, & Campbell, 2006). In fact, 35.49% of married Indian women reported experiencing physical IPV with or without sexual violence, and 7.68% reported both physical and sexual IPV (Silverman, Decker, Saggurti, Balaiah, & Raj, 2008).

There is a demonstrated link between intimate partner violence and symptoms of sexually transmitted infections (STIs) (Coker, Smith, Bethea, King, & McKeown, 2000; Jamieson & Steege, 1997; Letourneau, Holmes, & Chasedunn-Roark, 1999; McCauley et al., 1995). The majority of these studies come from developed country settings, utilized clinic-based samples, or measures only one type of IPV (verbal, physical, or sexual IPV). In the current analysis we use population-based data to examine the association between self-reported verbal, physical, and sexual IPV and self-reported symptoms of STIs among married Indian women (age 15-49). This

paper fills a gap in the literature for three distinct reasons: it utilizes a population-based sample; it is set in a developing country setting; and IPV is uniquely measured by examining verbal IPV (in addition to physical and sexual IPV), and the number of types of violence.

BACKGROUND

The association and causal pathways between intimate partner violence and STIs' symptoms have been studied in a range of settings, with different samples, and using a variety of measurements. The majority of studies, however, were based in developed country settings. For example, a 1993 study surveyed women in the Baltimore area (n=1952) and found that after controlling for a range of confounders, physical and/or sexual IPV was associated with genital discharge ($p<0.001$) (McCauley, et al., 1995). Coker, Smith et. al (2000) study of American women revealed that those who reported psychological IPV alone were 82% more likely to report an STI (95% CI 1.19-2.68), and 62% more likely to report chronic pelvic pain (95% CI 1.03-2.48). One study, which utilized a population-based sample of 3,568 Idahoan women, found that those who reported any type of IPV within the last three partners were more likely to have an STI (OR=3.15, 95% CI 1.45-6.86), vaginitis/vulvitis/cervicitis (OR=1.56 95% CI 1.07-2.27), and urinary tract infection (OR=1.79, 95% CI 1.36-2.36) (Bonomi et al., 2009).

Minimal evidence on the association between IPV and symptoms of STIs come from developing countries. One seminal study, conducted by the WHO between 2000 and 2003, utilized population-based surveys that were conducted in 15 sites in ten study countries (Bangladesh, Brazil, Thailand, Ethiopia, Japan, Namibia, Peru, Samoa, Serbia and Montenegro, and United Republic of Tanzania). This cross-sectional analysis concluded that a lifetime experience of physical and/or sexual IPV was significantly associated with genital discharge in all study sites except Japan (Ellsberg, Jansen, Heise, Watts, & Garcia-Moreno, 2008). However,

the WHO did not consider the combined effect of multiple types of IPV, including verbal violence. Among 2,865 Bangladeshi married couples, it was revealed that women who reported physical IPV only were 1.34 times more likely to report genital itching or irritation and discharge than non-abused women; and women who reported sexual IPV only were 2.08 times more likely to report odor with discharge than non-abused women (Decker et al., 2008). Interestingly, genital sore or ulcer was not associated with IPV measures, and there was no measure of verbal IPV assessed in this analysis (Decker, et al., 2008).

Four studies from India have addressed the link between IPV and symptoms of STIs; however, gaps remain in the literature. A 2005 population-based study in Goa, India, utilized a sample of 2,494 reproductive age women to assess IPV and clinical diagnosis of STIs (V. Patel, Weiss, et al., 2006). After adjusting for a range of confounders, sexual IPV alone was associated with any STI. The second study based in India interviewed 3,642 couples from Uttar Pradesh, and found that IPV was significantly associated with symptoms of gynecologic morbidity, including abnormal genital discharge (Stephenson, Koenig, & Ahmed, 2006b). Specifically, wives whose husbands reported sexual IPV alone were 42% more likely to report at least one symptom of gynecologic morbidity (95% CI 1.04-1.75), and wives whose husbands reported both physical and sexual IPV were 72% more likely to report any symptom of gynecologic morbidity (95% CI 1.05, 2.58). However physical IPV alone was not significantly associated with any symptom of gynecologic morbidity (Stephenson, et al., 2006b). Silverman et al. (2008) utilized the same data as our analysis, in addition to HIV status of participants, to conclude that married women experiencing both physical and sexual IPV in their lifetime had a higher prevalence of HIV infection compared to women experiencing no IPV (Silverman, et al., 2008). A similar study examining HIV and IPV in 10 countries did not find a significant association

between these two factors in India (Harling, Msisha, & Subramanian, 2010). These four studies from India are thorough, but failed to measure verbal IPV, or the experience of up to three forms of IPV. In addition, Silverman et al. (2008) and Haring et al. (2010) examined the effect of IPV on HIV infection only, and came up with contradictory results. The HIV prevalence rate in India among women is low at 0.22%, therefore the bigger picture regarding the effect of IPV on the HIV/AIDS epidemic of India is missing in these analyses (Stephenson, 2007). Because STIs increase a person's risk of HIV infection, this analysis is better able to understand the comprehensive effect of IPV as a risk factor for STIs and in turn, HIV/AIDS, by assessing symptoms of STIs (Fleming & Wasserheit, 1999).

There are several potential causal pathways to explain the association between STIs and IPV. Men who perpetrate IPV against their wives are also more likely to engage in extramarital relations, have inconsistent condom use, and a history of STIs (Martin et al., 1999; Seth, Raiford, Robinson, Wingood, & Diclemente, 2010). In turn, forced sex, or sexual IPV, may lead to genital trauma, through a lack of lubrication or direct physical force, which increases the risk of STI's transmission (Campbell, 2002). Maman et al. (2000) verified this causal pathway and listed forced sex with an infected partner as one main mechanism that increases a woman's risk of HIV infection.

In addition, limited or compromised negotiation of safer sex practices places women at risk of STIs (Maman, Campbell, Sweat, & Gielen, 2000). A woman may fear to ask her husband to use a condom, believing that her insistence will imply unfaithfulness, and she may be at risk of a violent reaction (Kalichman, Williams, Cherry, Belcher, & Nachimson, 1998). Women who lack sexual autonomy are often powerless to use condoms or refuse sex, therefore placing them at risk of STIs (Heise, et al., 2002). Negotiation is also closely tied to relationship power

dynamics; the lower the equity in relationship power the more likely a woman would become infected with HIV in the future (Jewkes, Dunkle, Nduna, & Shai, 2010). Therefore, gender inequity is also tied to symptoms of STIs.

The last causal pathway is the effect of mental health on gynecological health. Women who experience IPV are more likely to report mental health problems (Ellsberg, et al., 2008; Jamieson & Steege, 1997; Yoshihama & Sorenson, 1994). Three studies from India found an association between mental health and symptoms of STIs, specifically abnormal genital discharge (V. Patel, Kirkwood, et al., 2006; Vikram Patel & Oomman, 1998; Prasad, Abraham, Akila, & Jacob, 2003). These cross-sectional analyses did not provide a temporal causal pathway, but illuminated links between IPV and genital discharge that may be somatic idioms for common mental health disorders. In other words, severe psychological distress, which may result from IPV, causes increased somatic symptoms including abnormal genital discharge.

What remains missing in the literature is a more stringent analysis at the association between IPV and symptoms of STIs, specifically by examining verbal IPV, in addition to physical and sexual, and by assessing the combined effect of the experience of multiple types of IPV.

DATA AND METHODS

Data from the 2005-2006 National Family Health Survey-III (NFHS-III), the Indian equivalent of the Demographic and Health Survey (DHS), were utilized for this analysis. The sample covered 99% of India's population, residing in its 29 states, and ultimately included a total of 124,385 reproductive-aged women (15-49) residing in 109,041 households.

The data set for analysis was comprised of ever-married women of reproductive age (15-49) who were asked the IPV module. The NFHS-III asked questions on IPV to only one eligible

woman from each selected household in order to maintain confidentiality and protect the respondents as recommended by the WHO ethical guidelines (World Health Organization, 2001). The selection of one woman per sample household was random so that women who were selected for the IPV module of the questionnaire were a subsample of the entire NFHS-III sample (excluding 54,901 respondents). Additionally, this analysis was limited to currently married women, excluding respondents who were not currently at risk of IPV by husband (excluding 3,874 respondents). The final sample size for analysis was 65,610 married women aged 15-49.

The NFHS-III included questions on self-reported symptoms of STIs in the 12 months prior to the survey. Two outcomes were measured: genital sore or ulcer, and abnormal genital discharge. Specifically, women were asked 'during the last 12 months, have you had a genital sore or ulcer?'; 'during the last 12 months, have you had a bad smelling abnormal genital discharge?' The two outcomes are dichotomous, coded as no or don't know=0, and yes=1.

The key exposure of interest in modeling of symptoms of STIs is the self-reported experience of verbal, physical, or sexual IPV. Verbal IPV was assessed by asking the respondent if her husband had ever humiliated her, threatened her with harm, insulted her, or made her feel bad. To measure physical IPV, respondents were asked whether their husbands had ever pushed, shook, or threw something, slapped, punched with fist or something harmful, kicked or dragged, tried to strangle or burn, or attacked them with a knife or weapon. Sexual IPV was assessed by asking the respondent if her husband had ever physically forced sex when not wanted, or forced other sexual acts when not wanted. For each type of IPV (verbal, physical, sexual) the respondents were asked if they had experienced that type of violence in the past 12 months; one dichotomous variable was created for each IPV type where no=0, and yes=1. For the measure of

number of types of IPV, one categorical variable was created. Here, IPV was categorized as follows: not experienced violence in the past 12 months (0), experienced at least one type of IPV in the past 12 months (1), experienced any two types of IPV in the past 12 months (2), and experienced all three types of violence in the past 12 months (3).

Socio-economic status was measured by the standard DHS's wealth index, based on questions concerning household ownership on a variety of consumer items. Respondents were asked how many extramarital sexual partners the respondent had in the prior 12 months, the variable was coded as at least one partner=1, and no other partners=0. Complications during pregnancy were defined as experience of any of the following complications during her last pregnancy since 2001: difficulty of daylight vision, difficulty with night blindness, convulsions from fever, leg, body, or face swelling, excessive fatigue, genital bleeding, and in first two months after birth massive genital bleeding, or very high fever.

Data Analysis

Two logistic regression models were fitted for each of the two symptoms of STIs: the first set of two models included the variables measuring each type of IPV in the 12 months prior to the survey; the second set of two models included the categorical variable measuring the number of types of violence. The models controlled for several factors that have been shown to be associated with STIs' symptoms in previous studies: region of India, respondent's age and education, socio-economic status, rural/urban residence, parity, current use of contraceptives, additional sex partners other than husband, pregnancy complications, marital duration, and husband's education. In addition, a test for trend was utilized to analyze the linear association between each symptom of STIs symptom across the four levels of the number of types of IPV. The analysis was weighted to reflect the complex sample of the DHS.

RESULTS

Genital discharge was the most reported symptom in which 8.65% of respondents abnormal genital discharge; 2.09% percent of respondents reported a genital sore or ulcer (Table 1). Among all respondents, 10.13% experienced verbal IPV, 19.05% experienced physical IPV, and 6.03% experienced sexual IPV. Additionally, IPV measured the number of types of violence in the past 12 months. Seventy-six percent of women reported experiencing no form of violence in the past 12 months. As expected, a larger percentage of women experienced only one type of IPV (14.87%), compared to any two types of IPV (6.86%), or all three types of IPV (2.17%). The majority of respondents (75.95%) were between the ages of 20 and 39. Thirty-nine percent of the respondents had no education, and 8.99% had more than a secondary education completed. Over half of the respondents were from rural areas (56.06%), and only 8.76% of respondents had had no children born.

Table 1 about here

Tables 2 and 3 show the results of the four logistic regression models that were fitted in this analysis; the following two paragraphs will report the results for genital sores or ulcers, and then for abnormal genital discharge.

Table 2 about here

After controlling for all other variables in the model, IPV was significantly associated with genital sores (Table 2, 3). Relative to women who reported no experience of verbal IPV, women who reported experiencing any verbal IPV in the past 12 months were significantly more likely to report genital sores (OR=1.64, 95% CI 1.41-1.92). Respondents who reported

experiencing any physical IPV were 1.78 (1.55-2.05) times more likely to report genital sores then respondents who reported no physical IPV in the past 12 months. Relative to women who reported no experience of sexual IPV, women who reported experiencing any sexual IPV were significantly more likely to report genital sores (OR=1.79 95% CI 1.51-2.12). A significant dose-response relationship existed between the number of types of IPV and genital sore (test for trend p-value=0.000). As a woman experienced more forms of IPV, her risk of a genital sore also increased (one type of IPV OR=2.00, 95% CI 1.74-2.31; two types of IPV OR=3.29, 95% CI 2.81-3.86; all three types of IPV OR=4.57, 95% CI 3.65-5.71).

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Table 3 about here
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IPV was also significantly associated with abnormal genital discharge after controlling for all other variables in the model. Relative to women who reported no experience of verbal IPV, women who reported experiencing any verbal IPV in the past 12 months were significantly more likely to report abnormal genital discharge (OR=1.46, 95% CI 1.34-1.59). Respondents who reported experiencing any physical IPV were 1.62 (1.51-1.74) times more likely to report abnormal genital discharge then respondents who reported no physical IPV in the past 12 months. Relative to women who reported no experience of sexual IPV, women who reported experiencing any sexual IPV were significantly more likely to report abnormal genital discharge (OR=1.56, 95% CI 1.42-1.72). A significant dose-response relationship existed between the number of types of IPV and abnormal genital discharge sore (test for trend p-value=0.000). As women experienced more forms of IPV, her risk of abnormal genital discharge also increased (one type of IPV OR=1.80, 95% CI 1.68-1.94; two types of IPV OR=2.50, 95% CI 2.28-2.73; all three types of IPV OR=3.24, 95% CI 2.83, 3.71).

Demographic, social, economic, and partnership characteristics were also associated with symptoms of STIs (Tables 2 & 3). The region of India in which women resided was a significant factor. Specifically, women in the north, central, east, and west were significantly less likely to report genital sores than women in the northeast region. In addition, women in the west and south were also less likely to report abnormal genital discharge than women the in the northeast; but central Indian women were the most likely to report abnormal genital discharge. Age was in general not significantly associated with symptoms of STIs; however, women between the ages of 45-49 were less likely to report genital discharge than women ages 20-24. Compared to women with no reported education, women with primary or secondary education were more likely to report genital sore, and women with higher than secondary education were less likely to report abnormal genital discharge. A similar relationship was seen for the husbands' education. Women with husbands of primary education were more likely to report genital sores, but women with husbands of more than secondary education were less likely to report abnormal genital discharge. Only women in the poorest social economic class were more likely to report genital sore than women in the middle class, no other SES category was associated with STIs' symptoms. Rural women and women with previous pregnancy complications were also more likely to report genital sore and abnormal genital discharge than urban women or women with no past of pregnancy complications. Relative to null parous women, women with one or more children born were significantly less likely to report both STIs' symptoms. Any reported contraceptive method placed women at a higher risk of abnormal genital discharge, and sterilization (male or female) was also associated with genital sore. Extramarital sexual relations had a large impact on genital sores, in which women with reported extramarital relations were over 3 times more likely to report genital sores; this association was not significant for abnormal

genital discharge. Last, women who had been married for more than 10 years were much more likely to report both STIs' symptoms, compared to women who had been married for four years or less.

DISCUSSION

We have demonstrated that intimate partner violence is associated with symptoms of STIs among married Indian women, even after controlling for a number of demographic, social, economic, and partnership factors. Each type of violence is independently associated with genital sore and abnormal genital discharge. The results also demonstrate a differential impact on symptoms of STIs by the number of types of IPV. The more types of violence a woman reported in the past 12 months, the more likely she was to also report genital sores and abnormal genital discharge. These findings establish that there are multiple pathways by which women's experience of IPV can result in STIs; and there is no one type of IPV that explain women's risk of STIs. The findings of each of the independent measures of IPV point to the range of pathways between IPV and STIs: the relationships between physical and sexual IPV and STIs' symptoms points to the role of physical violence and sexual trauma as causes of STIs' symptoms. The associations with verbal IPV point to the role of stress and the psychosomatic manifestation of STIs' symptoms. The experience of IPV puts women in a stressful environment, and it may be argued that the experience of multiple types of violence has an additive effect to create an environment in which a woman experiences extreme forms of control and abuse, putting her at risk of STIs' symptoms through multiple pathways. The results thus highlight the dynamic pathways that exist between IPV and STIs' symptoms. For example, women's limited negotiation for safer sex practices as a result of physical IPV, *and* vaginal trauma as a result of sexual IPV coalesce to create a higher risk of STIs' symptoms for women who reported two

types of violence (Campbell, 2002; Maman, et al., 2000). The experience of multiple forms of IPV may also be an indicator for other dyadic factors: men who perpetrate multiple forms of IPV may have other STIs' risk factors, such as extra-marital sex partners, placing their spouse and increased risk for STIs' symptoms.

Severe psychological distress, potentially as a result of IPV, causes increased somatic symptoms including STIs' symptoms such as abnormal genital discharge. Our analysis that verbal, physical, and sexual has more of an influence on genital sore, compared to genital discharge, suggesting a differential influence of psychological distress on abnormal genital discharge compared to genital sores. Further work is required to understand these results.

The results in this study largely corroborate findings of previous studies from developed and developing countries concerning risk factors for self-reported STIs (Coker, et al., 2000; Decker, et al., 2008; Ellsberg, et al., 2008; McCauley, et al., 1995; Parish, Wang, Laumann, Pan, & Luo, 2004; V. Patel, Kirkwood, et al., 2006; Salam, Alim, & Noguchi, 2006; Seth, et al., 2010; Stephenson, Koenig, & Ahmed, 2006a). For example, our finding of increased risk of self-reported abnormal genital discharge and genital sores/ulcers among women with IPV has been reported in at least four other developing country studies (Decker, et al., 2008; Ellsberg, et al., 2008; Parish, et al., 2004; Stephenson, et al., 2006b).

A 10-country study found that a lifetime experience of physical and/or sexual IPV was associated with reported vaginal discharge (Ellsberg, et al., 2008). This same finding was verified in our study that women who reported physical IPV or sexual IPV were more likely to report vaginal discharge. Decker et al. (2008) found that discharge (measured as vaginal irritation with a discharge and odor with discharge) was associated with physical IPV only, and sexual IPV only, which is consistent with our findings. However, in contrast to our results,

Decker, Miller et al. (2008) reported that experience of physical and sexual IPV was not associated with genital discharge or with genital sore/ulcer; this study found that two types of violence significantly increased a woman's odds of genital sore, and abnormal genital discharge. It is puzzling that two similar studies from South Asia have contradictory results. It is possible that social and economic distinctions between India and Bangladesh may elucidate reported differences; however this finding requires further investigation. Second, the sample sizes differ, n=2,865 in Bangladesh and n=65,610 in our study; a larger sample size results in more power and significance of association is more likely. Third, the Bangladesh study controls for husband's recent STIs; however, our data did not include this information and it was therefore not controlled for in our models. Our finding that physical IPV alone was associated with symptoms of STIs contradicts a northern Indian study's finding that physical IPV was not associated with gynecologic morbidity, including abnormal discharge (Stephenson, et al., 2006b). In this case the husband's reported extramarital sex was taken into account (Stephenson, et al., 2006b). It is possible that husband's sexual behavior (such as extramarital sex, or recent STIs) would confound the relationship in our models; however, because the demonstrated associations between IPV and STIs' symptoms are so strong, it is unlikely that inclusion of husband's extramarital sex or recent STIs into the model would result in an insignificant link between IPV and STIs' symptoms.

There are a few remaining limitations that should be considered in this study. Due to the cross-sectional nature of this analysis, temporal order cannot be determined. However, our findings meet several criteria for the inference of causality, including strength of the associations, consistency of the associations, and the plausibility of effect (Ellsberg, et al., 2008; Susser, 1977). Second, abnormal genital discharge and genital sore is self-reported, rather than

clinically diagnosed. Results of previous studies have demonstrated that there are low levels of agreement between medically diagnosed symptoms of gynecologic morbidity or STI's and self-reported symptoms (Bulut, Yolsal, Filippi, & Graham, 1995). We acknowledge that self-reported measurement technique is likely to result in lower reported STIs' symptoms. Despite these limitations, this study fills a large gap in the literature by demonstrating the independent contribution of IPV to women's risk of STIs' symptoms in India, and specifically by measuring verbal IPV (in addition to physical and sexual), and the number of types of IPV. The unique analysis demonstrated the effect of various types of IPV on STIs' symptoms, establishing that there are multiple pathways to explain the association between IPV and STIs.

As a result of these findings, there are several public health implications. Despite the Protection of Women from Domestic Violence Act of 2005, rates of IPV remain high and undermine women's health. Therefore, it is imperative to decrease the overall prevalence of IPV in women's lives so that programs' attempts to empower women and improve women's health and societal quality of life will not be undermined (IIPS and Macro, 2009). There is also a need to incorporate IPV screening and services in gynecologic clinic settings, especially in research-poor settings such as rural India where both IPV and STIs are often overlooked. When women present for gynecologic care, specifically with STIs' symptoms, health care providers should be attuned to the possible role of IPV. Last, it is important to expand community programs that advertise to help women who have been abused, and then integrate questions regarding women's sexual health when talking to women who have experienced IPV. Women who then report symptoms of gynecologic morbidity can be lead to health services that will treat STIs and RTIs

CONCLUSION

This study adds to the depth and breadth of our understanding of the effects of IPV on women's sexual and reproductive health in a developing country setting, as requested by the WHO in order to end domestic violence against women and its negative consequences (World Health Organization, 2005). It demonstrated the link between IPV and STIs' symptoms in a resource-poor setting by utilizing a population-based sample, and measured verbal, physical, and sexual IPV, and the combined effect of multiple forms of violence. After controlling for other covariates, experiencing any verbal, physical, or sexual IPV is associated with an increased risk of symptoms of sexually transmitted infections. There was also a demonstrated association of trend between the number of types of IPV and genital sores and abnormal genital discharge. Therefore, women who seek care for STIs should be screened for IPV; and those who seek services for women who have experienced IPV should also be screened for STIs' symptoms, especially among women who report multiple types of violence.

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Table 1: Distribution of independent variables and prevalence of genital sores and genital discharge across independent variables, among married women age 15-49, India (n=65,610)

		Overall n (column %)	Genital Sore n (row %)	Genital Discharge n (row %)
Genital Sore[a]		1,349 (2.09)		
Abnormal Genital Discharge[b]		5,671 (8.65)		
Verbal IPV[c] *past 12 months*	**no verbal**	58,833 (89.87)	1,014 (1.73)	4,545 (7.73)
	any verbal	6,633 (10.13)	326 (4.92)	1,106 (16.70)
Physical IPV[d] *past 12 months*	**no physical**	53,019 (80.95)	822 (1.55)	3,769 (7.11)
	any physical	12,475 (19.05)	522 (4.19)	1,893 (15.19)
Sexual IPV[e] *past 12 months*	**no sexual**	61,617 (93.97)	1,122 (1.82)	4,881 (7.93)
	any sexual	3,954 (6.03)	226 (5.73)	784 (19.87)
Number of types of IPV[f] *past 12 months*	**none**	49,741 (76.10)	705 (1.42)	3,312 (6.66)
	one type only	9,717 (14.87)	299 (3.08)	1,224 (12.61)
	any two types	4,483 (6.86)	229 (5.11)	781 (17.43)
	all three types	1,420 (2.17)	101 (7.14)	322 (22.76)
Region of India	**northeast**	10,836 (16.52)	314 (2.90)	1,088 (10.05)
	north	11,933 (18.19)	110 (0.92)	1,042 (8.74)
	central	11,802 (17.99)	223 (1.89)	1,628 (13.8)
	east	9,885 (15.07)	249 (2.52)	1,054 (10.67)
	west	8,541 (13.02)	159 (1.86)	465 (5.45)
	south	12,613 (19.22)	294 (2.33)	394 (3.13)
Age	**15-19 years old**	2,979 (4.54)	46 (1.55)	248 (8.33)
	20-24 years old	10,514 (16.02)	210 (2.00)	932 (8.88)
	25-29 years old	14,546 (22.17)	298 (2.05)	1,345 (9.25)
	30-34 years old	13,798 (21.03)	295 (2.14)	1,283 (9.31)
	35-39 years old	10,975 (16.73)	257 (2.34)	930 (8.48)
	40-44 years old	7,611 (11.60)	140 (1.84)	595 (7.82)
	45-49 years old	5,187 (7.91)	103 (1.99)	338 (6.52)
Education[g]	**no education**	25,598 (39.02)	545 (2.13)	2,773 (10.84)
	primary	10,022 (15.28)	261 (2.61)	972 (9.71)
	secondary	24,089 (36.72)	476 (1.98)	1,697 (7.05)
	higher	5,897 (8.99)	67 (1.14)	229 (3.89)
Residence	**urban**	28,832 (43.94)	471 (1.64)	1,923 (6.68)
	rural	36,778 (56.06)	878 (2.39)	3,748 (10.20)
SES	**poorest**	9,054 (13.80)	276 (3.05)	1,183 (13.08)
	poorer	10,407 (15.86)	271 (2.61)	1,160 (11.16)
	middle	12,675 (19.32)	262 (2.07)	1,133 (8.94)
	richer	15,174 (23.13)	270 (1.78)	1,164 (7.68)
	richest	18,300 (27.89)	270 (1.48)	1,031 (5.64)
Parity	**0**	5,745 (8.76)	111 (1.94)	444 (7.74)
	1-2	28,999 (44.20)	548 (1.89)	2,087 (7.20)

	3-4	21,399 (32.62)	451 (2.11)	2,031 (9.50)
	≥5	9,467 (14.43)	239 (2.53)	1,109 (11.73)
Current Contraceptive Use	**no method**	27,501 (41.92)	528 (1.92)	2,269 (8.26)
	traditional method	5,462 (8.32)	121 (2.22)	611 (11.19)
	female / male sterilization	23,540 (35.88)	533 (2.27)	1,988 (8.45)
	other modern method	9,107 (13.88)	167 (1.84)	803 (8.82)
Extramarital Sexual Partners[h]	**none**	65,465 (99.91)	1339 (2.05)	5,656 (8.65)
	one or more	62 (0.09)	8 (12.90)	13 (20.97)
Pregnancy complications	**not pregnant or none**	48,245 (73.53)	856 (1.78)	3,656 (7.58)
	one or more	17,365 (26.47)	493 (2.84)	2,015 (11.62)
Marital Duration	**≤4 years**	10,998 (16.76)	177 (1.61)	794 (7.23)
	5-9 years	14,080 (21.46)	284 (2.02)	1,197 (8.51)
	10-19 years	25,040 (38.16)	542 (2.17)	2,368 (9.46)
	≥20 years	15,492 (23.61)	346 (2.24)	1,312 (8.48)
Husband's Education[i]	**no education**	14,614 (22.44)	327 (2.24)	1,579 (10.82)
	primary	10,190 (15.65)	277 (2.72)	999 (9.81)
	secondary	30,905 (47.46)	607 (1.97)	2,534 (8.21)
	higher	9,406 (14.45)	127 (1.35)	499 (5.31)

[a] n missing=66 [b] n missing=59 [c] n missing=144 [d] n missing=116 [e] n missing=39
[f] n missing=249 [g] n missing=4 [h] n missing=83 [i] n missing=495

Table 2: Logistic regression models for genital sores and genital discharge among married women age 15-49, India (n=65,610): key covariates are recent experience of each type of intimate partner violence

		Genital Sore aOR (95% CI)	Genital Discharge aOR (95% CI)
Verbal IPV *(ref=no verbal)*	**any verbal**	1.64 (1.41, 1.92)†	1.46 (1.34, 1.59)†
Physical IPV *(ref=no physical)*	**any physical**	1.78 (1.55, 2.05)†	1.62 (1.51, 1.74)†
Sexual IPV *(ref=no sexual)*	**any sexual**	1.79 (1.51, 2.12)†	1.56 (1.42, 1.72)†
Region of India *(ref=northeast)*	**north**	0.36 (0.28, 0.45)†	0.92 (0.84, 1.01)
	central	0.63 (0.52, 0.75)†	1.39 (1.27, 1.52)†
	east	0.74 (0.62, 0.89)†	0.93 (0.84, 1.02)
	west	0.73 (0.59, 0.89)†	0.58 (0.52, 0.66)†
	south	0.87 (0.73, 1.04)	0.30 (0.26, 0.34)†
Age *(ref=20-24 years old)*	**15-19 years old**	0.71 (0.50, 1.01)	0.85 (0.73, 1.01)
	25-29 years old	1.01 (0.82, 1.24)	1.00 (0.90, 1.11)
	30-34 years old	1.10 (0.86, 1.39)	0.99 (0.87, 1.12)
	35-39 years old	1.17 (0.89, 1.54)	0.89 (0.77, 1.03)
	40-44 years old	0.92 (0.66 1.28)	0.84 (0.71, 1.00)
	45-49 years old	1.02 (0.71, 1.47)	0.72 (0.59, 0.87)†
Education *(ref=no education)*	**primary**	1.25 (1.06, 1.47)†	1.03 (0.95, 1.13)
	secondary	1.26 (1.06, 1.49)†	0.93 (0.86, 1.02)
	higher	0.95 (0.67, 1.34)	0.63 (0.53, 0.76)†
Residence *(ref=urban)*	**rural**	1.27 (1.11, 1.46)†	1.23 (1.15, 1.32)†
SES *(ref=middle)*	**poorest**	1.44 (1.19, 1.76)†	1.09 (0.99, 1.21)
	poorer	1.19 (0.99, 1.43)	1.06 (0.97, 1.16)
	richer	0.96 (0.79, 1.15)	1.00 (0.91, 1.10)
	richest	1.05 (0.85, 1.31)	0.94 (0.84, 1.05)
Parity *(ref=0)*	**1-2**	0.53 (0.41, 0.68)†	0.66 (0.58, 0.75)†
	3-4	0.46 (0.35, 0.61)†	0.64 (0.55, 0.74)†
	≥5	0.48 (0.36, 0.66)†	0.63 (0.54, 0.74)†
Current Contraceptive Use *(ref=none)*	**traditional method**	1.18 (0.96, 1.46)	1.52 (1.38, 1.69)†
	female / male sterilization	1.33 (1.15, 1.54)†	1.37 (1.27, 1.48)†
	other modern method	1.16 (0.95, 1.40)	1.32 (1.20, 1.44)†
Extramarital Sexual Partners *(ref=none)*	**one or more**	3.78 (1.68, 8.53)†	1.59 (0.82, 3.08)
Pregnancy complications *(ref=none)*	**one or more**	1.89 (1.64, 2.18)†	1.48 (1.38, 1.59)†
Marital Duration *(ref ≤4 years)*	**5-9 years**	1.19 (0.95, 1.49)	1.08 (0.97, 1.21)
	10-19 years	1.48 (1.13, 1.93)†	1.31 (1.14, 1.51)†
	≥20 years	1.99 (1.41, 2.82)†	1.54 (1.28, 1.85)†
Husband's Education *(ref=no education)*	**primary**	1.25 (1.05, 1.48)†	0.98 (0.90, 1.07)
	secondary	1.13 (0.96, 1.33)	0.98 (0.91, 1.07)
	higher	1.02 (0.78, 1.33)	0.86 (0.75, 0.98)†

† Significant at alpha level 0.05

Table 3: Logistic regression models for genital sores and genital discharge among married women age 15-49, India (n=65,610): key covariate is the number of types of recent experienced intimate partner violence

		Genital Sore aOR (95% CI)	Genital Discharge aOR (95% CI)
Number of Types of IPV[f] *(ref=no violence)*	**one type only**	2.00 (1.74, 2.31)†	1.80 (1.68, 1.94)†
	any two types	3.29 (2.81, 3.86)†	2.50 (2.28, 2.73)†
	all three types	4.57 (3.65, 5.71)†	3.24 (2.83, 3.71)†
Region of India *(ref=northeast)*	**north**	0.36 (0.28, 0.45)†	0.93 (0.84, 1.02)
	central	0.62 (0.52, 0.75)†	1.39 (1.27, 1.52)†
	east	0.74 (0.62, 0.89)†	0.93 (0.84, 1.02)
	west	0.72 (0.59, 0.89)†	0.58 (0.52, 0.66)†
	south	0.87 (0.72, 1.04)	0.30 (0.26, 0.34)†
Age *(ref=20-24 years old)*	**15-19 years old**	0.72 (0.51, 1.01)	0.86 (0.73, 1.01)
	25-29 years old	1.01 (0.82, 1.24)	1.00 (0.90, 1.11)
	30-34 years old	1.10 (0.86, 1.39)	0.99 (0.87, 1.12)
	35-39 years old	1.17 (0.89, 1.54)	0.90 (0.77, 1.03)
	40-44 years old	0.92 (0.66 1.28)	0.84 (0.71, 1.00)
	45-49 years old	1.02 (0.71, 1.47)	0.72 (0.59, 0.87)†
Education *(ref=no education)*	**primary**	1.25 (1.06, 1.47)†	1.03 (0.95, 1.13)
	secondary	1.26 (1.07, 1.50)†	0.93 (0.86, 1.02)
	higher	0.96 (0.68, 1.36)	0.64 (0.53, 0.77)†
Residence *(ref=urban)*	**rural**	1.27 (1.11, 1.46)†	1.23 (1.15, 1.32)†
SES *(ref=middle)*	**poorest**	1.44 (1.19, 1.75)†	1.09 (0.99, 1.20)
	poorer	1.19 (1.00, 1.43)	1.06 (0.97, 1.16)
	richer	0.96 (0.79, 1.14)	1.00 (0.91, 1.10)
	richest	1.06 (0.85, 1.31)	0.95 (0.85, 1.06)
Parity *(ref=0)*	**1-2**	0.53 (0.41, 0.68)†	0.66 (0.58, 0.75)†
	3-4	0.46 (0.35, 0.61)†	0.64 (0.55, 0.74)†
	≥5	0.48 (0.36, 0.66)†	0.63 (0.54, 0.74)†
Current Contraceptive Use *(ref=none)*	**traditional method**	1.18 (0.96, 1.46)	1.52 (1.38, 1.68)†
	female / male sterilization	1.33 (1.14, 1.54)†	1.37 (1.27, 1.48)†
	other modern method	1.16 (0.96, 1.40)	1.32 (1.20, 1.44)†
Extramarital Sexual Partners *(ref=none)*	**one or more**	3.79 (1.69, 8.53)†	1.61 (0.83, 3.11)
Pregnancy complications *(ref=none)*	**one or more**	1.88 (1.63, 2.17)†	1.48 (1.38, 1.58)†
Marital Duration *(ref ≤4 years)*	**5-9 years**	1.19 (0.95, 1.48)	1.08 (0.97, 1.21)
	10-19 years	1.48 (1.13, 1.93)†	1.31 (1.14, 1.51)†
	≥20 years	2.00 (1.41, 2.82)†	1.54 (1.28, 1.85)†
Husband's Education *(ref=no education)*	**primary**	1.24 (1.05, 1.48)†	0.98 (0.90, 1.07)
	secondary	1.13 (0.96, 1.34)	0.99 (0.91, 1.07)
	higher	1.02 (0.78, 1.33)	0.86 (0.75, 0.98)†

† Significant at alpha level 0.05