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The Role of Dyad-Level Factors in Shaping Sexual and Drug-Related HIV/STI Risks among Sex Workers with Intimate Partners

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Abstract

Background—Despite high HIV burden among sex workers (SWs) globally, and relatively high prevalence of client condom use, research on potential HIV/STI risk pathways of intimate partnerships is limited. This study investigated partner/dyad-level factors associated with inconsistent condom use among SWs with intimate partners in Vancouver, Canada.

Methods—Baseline data (2010–2013) were drawn from a community-based prospective cohort of women SWs. Multivariable generalized estimating equations logistic regression examined dyad-level factors associated with inconsistent condom use (<100% in last six months) with up to three male intimate partners per SW. Adjusted odds ratios and 95% confidence intervals were reported (AOR[95%CI]).

Results—Overall, 369 SWs reported having at least one intimate partner, with 70.1% reporting inconsistent condom use. Median length of partnerships was 1.8 years, with longer duration linked to inconsistent condom use. In multivariable analysis, dyad factors significantly associated with increased odds of inconsistent condom use included: having a cohabiting (5.43[2.53–11.66]) or

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non-cohabiting intimate partner (2.15[1.11–4.19]) (versus casual partner), providing drugs (3.04[1.47–6.30]) or financial support to an intimate partner (2.46[1.05–5.74]), physical intimate partner violence (2.20[1.17–4.12]), and an intimate partner providing physical safety (2.08[1.11–3.91]); non-injection drug use was associated with a 68% reduced odds (0.32[0.17–0.60]).

Conclusions—Our study highlights the complex role of dyad-level factors in shaping sexual and drug-related HIV/STI risk pathways for SWs from intimate partners. Couple and gender-focused interventions efforts are needed to reduce HIV/STI risks to SWs through intimate partnerships. This research supports further calls for integrated violence and HIV prevention within broader sexual/reproductive health efforts for SWs.

Keywords

sex workers; HIV prevention; drug use; condom use; risk environment; intimate partners

1. INTRODUCTION

Intimate partner relationships are an important determinant of sex workers' (SWs') health and wellbeing, including shaping HIV-related vulnerability and risk of other sexually transmitted infections (STIs). Globally, SWs face disproportionately high levels of HIV and related harms, with significant heterogeneity across settings (Kerrigan et al., 2013; Shannon et al., 2015). Overall, the prevalence of HIV among SWs has been estimated to be 11.8% in lower and middle-income countries (LMICs) and 1.8% in higher income settings (Baral et al., 2012; Beyrer et al., 2015a, 2015b). As in the general population, condom use with intimate or non-paying partners is consistently low among SWs, including being significantly lower than with clients (Argento et al., 2014; Deering et al., 2011; Johnson et al., 2001; Murray et al., 2007); this is a nearly universal trend, yet research and HIV prevention efforts that explore dyad-level factors within SWs' intimate partnerships (with non-paying male partners) are limited. The complex roles of intimacy, gendered power, and pregnancy intentions are rarely considered at a partner/dyad-level. The majority of the literature focuses on SWs' paying partners and increasing condom use with clients (Ang and Morisky, 2012; Blankenship et al., 2008; Krüsi et al., 2012; Urada et al., 2013).

Several studies have examined differences in prevalence of SWs' condom use by clients versus with intimate partners; results from Benin and Cambodia indicate that close to 80% of SWs report using condoms with clients in the past week, compared to 20% with their intimate partners (Alary et al., 2002; Wong et al., 2003). Similarly, a study in India found that between 7–12% of SWs reported inconsistent condom use with occasional clients, while 58–97% reported inconsistent condom use with intimate partners (Travasso et al., 2014). Among SWs in a US study, 56% reported always using condoms with their clients, compared to 32% and 14% with occasional partners and regular partners, respectively (Johnson et al., 2001). With the advent of the HIV/AIDS epidemic and ensuing prevention programs, there has been a significant shift in SWs' awareness of and insistence on using condoms with clients, however, this does not reflect in SWs' intimate partner relationships.

Several studies highlight the importance of socio-structural factors and community empowerment efforts in preventing the transmission of HIV among SWs by increasing

prevalence of client condom use (Blankenship et al., 2008; Decker et al., 2014; Erausquin et al., 2012; Lippman et al., 2010; Pando et al., 2013; Shannon et al., 2009). While community/SW-led and structural interventions show promising results for reducing HIV/STI related risks, HIV prevention interventions that focus on behavior change may not be successful in increasing condom use by intimate partners (Foss et al., 2007). A recent brief behavioral intervention targeting SWs effectively increased client condom use, yet failed to increase condom use by intimate partners (Ulibarri et al., 2012).

Economic and emotional elements are often fused in intimate relationships, making the decision to use condoms or not a complex social and cultural phenomenon. Intimacy and gender roles within SWs' non-paying partnerships may influence sexual decision-making power, including negotiating condom use (Bourgois et al., 2004; El-Bassel et al., 2005; Shannon et al., 2008). For example, in a study among Cambodian SWs, the main reason cited for why clients did not use condoms was because the SW could not persuade clients to; with intimate partners the main reason cited was love (Wong et al., 2003). Qualitative research conducted in India and Cambodia revealed that some SWs' intimate partners refused to use condoms, suggesting that the male partner perceived condoms as symbolically preventing intimacy and that a woman's request to use condoms with her intimate partner violates traditional gender roles, potentially leading to experiences of physical violence (Argento et al., 2011; Maher et al., 2013). Emerging evidence highlights sexual relationship power and intimate partner violence (IPV) as key dyad-level factors associated with unprotected sex among SWs with their intimate partners (Ulibarri et al., 2015), and dual drug and sexual risk behaviors may significantly enhance risks for HIV transmission among drug-using couples (El-Bassel et al., 2011). Therefore, an understanding of the socio-structural determinants of HIV risk pathways for SWs, with special consideration of the ways in which dyad-level dynamics shape risks with intimate partners, is essential to inform evidence-based interventions for HIV.

To facilitate a better understanding of the sexual and drug-related HIV/STI risk pathways of intimate partnerships, this study aimed to investigate partner/dyad-level factors associated with inconsistent condom use among street- and off-street SWs with intimate partners in Metro Vancouver, Canada.

2. METHODS

2.1 Study Design and Sample

This study is nested within a large, community-based open prospective cohort of women SWs, known as AESHA (An Evaluation of Sex Workers Health Access). AESHA was initiated in 2010 and consists of over 800 street and off-street SWs across Metro Vancouver. AESHA is based on substantial collaborations with community members and service providers since 2004 and is continuously monitored by a Community Advisory Board of over 15 sex work, women's health and HIV service agencies, as well as representatives from the health authority and policy experts.

In the context of hard-to-reach populations, participants were recruited through day and late-night outreach to both outdoor sex work locations (i.e., streets, alleyways) and indoor sex

work venues (i.e., massage parlors, micro-brothels, and in-call locations) across Vancouver, using time-location sampling and community mapping strategies. Online recruitment was also used to reach SWs working through online solicitation spaces. Outdoor, indoor, and online venues were identified through participatory mapping strategies conducted with current and former SWs, continuously updated by the outreach team to identify sex work locations. AESHA participants are initially invited to participate by weekly outreach by van to the sex work spaces: two late night street outreach shifts and three daytime outreach shifts per week by interview and nursing teams to over 100 off-street venues. Regular contact with outreach and nursing teams as well as encouraging participant drop-in to women-only spaces at the research office have helped support high rates of retention with AESHA (>90% annually). The research team works closely in partnership with the affected community and a diversity of stakeholders, including legal/human rights experts, community-based organizations, service providers, health authorities, government officials, and international policy bodies, and regularly engages in knowledge exchange efforts.

At enrollment and bi-annually, consenting SWs complete an interviewer-administered questionnaire by a trained interviewer and HIV/STI/HCV serology testing by a project nurse. Interview, outreach and nursing staff include both experiential (SWs) and non-experiential staff with substantial community experience. Participants have the option to complete the questionnaire and clinical component at one of two study offices or at a safe location identified by them, including work or home locations. The main interview questionnaire elicits responses related to socio-demographics (e.g. sexual identity, ethnicity, housing), the sex industry (e.g., work environment, solicitation, access to services, violence/safety, incarceration), clients (e.g., number/type of clients, types of services, condom use), intimate partners (e.g., sexual history, cohabitation, financial support), trauma and violence (e.g., lifetime and childhood trauma, exposure to intimate partner and workplace violence), and drug use patterns (injection and non-injection). In addition, a clinical questionnaire is administered relating to overall physical, mental and emotional health, sexual and reproductive health, and HIV testing and treatment experiences, to support education, referral and linkages with care.

Eligibility criteria for participants in this study is a cis-gender or trans*-gender woman, 14 years of age or older, who exchanged sex for money within the last 30 days. Baseline data were drawn from the AESHA cohort between January, 2010 and August, 2013. The AESHA study holds ethical approval through Providence Health Care/University of British Columbia Research Ethics Board. As in previous studies (Shannon et al., 2007; Wood et al., 2006), we have held ethical approval since 2004 to include self-supporting youth aged 14–18 years who are not living with a parent or guardian under the emancipated minor clause, given the critical importance of understanding the needs of vulnerable youth. All participants receive an honorarium of \$40 CAD at each bi-annual visit for their time, expertise and travel.

2.2 Study Variables

Our dependent variable of interest was inconsistent condom use at the partner/dyad-level elicited separately for each intimate non-paying partnership. Inconsistent condom use was categorized as less than 100% condom use (i.e., responses of ‘usually,’ ‘sometimes,’

‘occasionally,’ or ‘never’ for condom use for either vaginal or/both of anal sex versus ‘always’ for condom use for both vaginal and anal sex) at the baseline visit using the last six months as a reference point.

Primary explanatory variables were selected based on the literature and available data collected at baseline for the AESHA cohort. The individual and interpersonal level socio-demographic variables are summarized in Tables 1 and 2, stratified by whether or not SWs experienced inconsistent condom use with intimate partners in the last six months. Individual-level socio-demographic variables included age (continuous), gender/sexual minority (lesbian, gay, bisexual, trans*, or two-spirit), Aboriginal/Indigenous ancestry (inclusive of First Nations, Metis, and Inuit), being a migrant/new immigrant worker (versus Canadian born), injection drug use (heroin, crack, cocaine, “speedballs”, street Methadone, Morphine, crystal meth, prescription drugs/painkillers) and non-injection drug use (heroin, crack, cocaine, street Methadone, Morphine, crystal meth, prescription drugs/painkillers, hallucinogens, inhalants), primary place to solicit clients, and IPV (moderate or severe physical, sexual, or emotional violence), which was measured using an abridged version of the WHO Standardized IPV Scale Version 9.9 (Garcia-Moreno et al., 2006, 2005). Given their role as potential confounders, access to contraceptives and general pregnancy intentions (hoping/planning to have children in the future) were also examined.

At the partner/dyad-level, explanatory variables included type of male sexual intimate partner (co-habiting, non-cohabiting, casual), number of years with intimate partner (continuous), knowledge of intimate partner’s HIV status, whether or not intimate partners had other SW or non-SW partners, and a number of other factors pertaining to drug use and financial interdependence within SWs’ non-paying partnerships.

2.3 Statistical Analyses

Analyses were restricted to AESHA study participants who reported having at least one male intimate non-paying partner (i.e., responded ‘yes’ to any of ‘intimate cohabiting partners’, ‘intimate non-cohabiting partners’ or ‘casual partners’, excluding regular and one-time clients). Since analyses of factors potentially associated with inconsistent condom use could include multiple measures (i.e., more than one intimate partner) for each participant, bivariate and multivariable generalized estimating equations (GEE) with a logit link function were used to determine which factors were independently associated with the binary outcome variable of interest. Therefore, data with every intimate partner was considered in this analysis, taking into account repeated measures for the same participant, with each of their reported intimate partners being the repeated measure variable. To adjust the standard error and account for correlations arising from repeated measurements for the same participant, an exchangeable correlation matrix was applied. GEE accounts for missing data using the *all available pairs* method, which uses data from non-missing pairs into the estimators of the correlation matrix.

Variables significantly correlated with inconsistent condom use at the $p < 0.10$ level in bivariate analyses were subsequently fitted into a multivariable GEE model to adjust for potential confounding. Backward model selection was used to build the final multivariable model with the best overall fit, as indicated by the lowest quasilielihood under the

independence model criterion (QIC) value (Pan, 2001). Two-sided p-values, and unadjusted and adjusted odds ratios (OR and AOR) with 95% confidence intervals (95%CI) are reported. All statistical analyses were performed using SAS software version 9.3 (SAS Institute, Cary, NC, USA).

3. RESULTS

3.1 Descriptive Results

Overall, 369 SWs reported having at least one intimate partner in the last six months, with a mean of 2.2 intimate partners per SW (standard deviation=7.5). Of the 448 total observations used in the analysis, the majority (n=314, 70.1%) reported inconsistent condom use by their intimate partners. The median age of all participants was 33 (interquartile range [IQR]=26–40) and three quarters (73.7%) were born in Canada, with 36.6% identifying as being of Aboriginal ancestry. Overall, one quarter of participants (24.9%) self-identified as a gender/sexual minority.

The median number of years reported for being in the relationship with intimate partners was 1.8 years (IQR=0.5 years–5 years), and those who reported inconsistent condom use were with their intimate partners for a longer duration of time: 2.5 years (IQR=0.8–6) vs. 0.9 years (IQR=0.3–2) (p=0.005). Overall, 61.4% of the sample knew their intimate partner's HIV status. Women in the sample reported that 11.2% and 14.3% of their intimate partners had sexual relationships with other SWs or non-SWs partners, respectively, in the last six months.

In terms of drug use, the majority of participants (67.2%) reported non-injection drug use, and 36.3% used injection drugs in the last six months. Intimate partners' drug use was reported to be slightly lower: 65.4% and 16.3% used non-injection and injection drugs, respectively. About a third (31.0%) of the women reported providing drugs to their intimate partners.

Overall, nearly one-third of participants (31.4%) reported experiencing any form of violence by an intimate partner in the last six months, with emotional violence being most prevalent (27.9%) followed by physical violence (22.5%) and sexual violence (8.1%).

3.2 Bivariate and Multivariable GEE Analyses

Unadjusted and adjusted odds ratios for correlates of inconsistent condom use with intimate partners are reported in Table 3. In the bivariate GEE analyses, factors significantly correlated with inconsistent condom use at p<0.10 included: having a cohabiting intimate partner (OR 8.34 [95%CI: 4.07–17.10]) or a non-cohabiting intimate partner (OR 3.06 [95%CI: 1.69–5.55]) (versus casual intimate partner); providing financial support (OR 5.42 [95%CI: 2.88–10.21]), drugs (OR 5.70 [95%CI: 2.97–10.94]), food (OR 3.53 [95%CI: 2.00–6.23]), or shelter (OR 3.47 [95%CI: 1.78–6.79]) to an intimate partner; having an intimate partner provide physical safety (OR 3.20 [95%CI: 1.84–5.57]), food (OR 2.66 [95%CI: 1.71–4.14]), shelter (OR 2.29 [95%CI: 1.38–3.79]), or drugs (OR 2.02 [95%CI: 1.20–3.40]); recent physical violence by an intimate partner (OR 1.99 [95%CI: 1.12–3.53]); and recent emotional violence by an intimate partner reached marginal statistical significance (OR 1.66

[95%CI: 0.98–2.81]). Knowing a partner's HIV status (OR 1.94 [95%CI: 1.29–2.90]) and being with an intimate partner longer (OR 1.12 per year increase [95%CI: 1.03–1.22]) were also positively correlated with inconsistent condom use. Having an intimate partner who had other non-SW partners was correlated with a 55% reduced odds of recent inconsistent condom use (OR 0.45 [95%CI: 0.24–0.83]).

In the final multivariable analysis, factors independently correlated with increased odds of inconsistent condom use in the last six months included: having a cohabiting intimate partner (AOR 5.43 [95%CI: 2.53–11.66]) or a non-cohabiting intimate partner (AOR 2.15 [95%CI: 1.11–4.19]) (versus casual intimate partner), providing drugs to an intimate partner (AOR 3.04 [95%CI: 1.47–6.30]), providing financial support to an intimate partner (AOR 2.46 [95%CI: 1.05–5.74]), physical violence by an intimate partner (AOR 2.20 [95%CI: 1.17–4.12]), and having an intimate partner provide physical safety (AOR 2.08 [95%CI: 1.11–3.91]). Non-injection drug use was significantly associated with reduced odds of inconsistent condom use (AOR 0.32 [95%CI: 0.17–0.60]).

4. DISCUSSION

Almost three-quarters of SWs reported inconsistent condom use with intimate partners in the last six months, similar to estimates in the general Canadian population (Black et al., 2009). Dyad-level factors independently correlated with inconsistent condom use with intimate partners among SWs in this setting included having a cohabiting or non-cohabiting intimate partner, providing drugs or financial support to an intimate partner, having an intimate partner provide physical safety, physical IPV, and non-injection drug use.

It is critical to acknowledge that intimate partnerships may play a key role in shaping SWs' health and well-being, including shaping risk for HIV and other STIs. Analogous to intimate partnerships in other contexts, unprotected sex by SWs' intimate partners is common relative to by clients (Deering et al., 2011; Murray et al., 2007; Travasso et al., 2014), even when SWs are aware of their intimate partner's drug use and sexual risk behaviors for HIV/STIs (El-Bassel and Wechsberg, 2012; El-Bassel et al., 2010; Pequegnat and Bray, 2012). Moreover, SWs in our study reported that 11.2% of intimate partners had sexual relationships with other SWs and 14.3% had sexual relationships with other non-SW female partners, suggesting complex pathways through which HIV and STIs could potentially be contracted. This is likely an underestimate, given that some participants may be unaware of their intimate partner's other sexual partners and reports from SWs in other settings are much higher: ranging from 41% to 70% reported by SWs in India (Deering et al., 2011) and three-quarters (74%) of SWs in northern Mexico reported having unprotected sex with their non-paying partners despite half of the SWs believing that their partners had other sexual partners (Robertson et al., 2014).

The psychological component of SWs' intimate partnerships, similarly for women who are not SWs, involves feelings of intimacy and trust that influence sexual decision-making power and unprotected sex (Syvertsen et al., 2013). As demonstrated in our study – where having a cohabiting intimate partner versus a casual intimate partner was associated with five-fold increased odds of inconsistent condom use – the literature conveys that having a

more regular partner may be indicative of higher levels of trust or intimacy in the relationship, which is associated with lower prevalence of condom use (Kerrigan and Moreno, 2001; Nishigaya, 2002; Sherman and Latkin, 2001; Warr and Pyett, 1999). Intimate partnerships are a source of significant emotional support and some SWs have described their intimate relationships as representing a “safe haven,” enhancing feelings of inclusion and wellbeing (Benoit et al., 2013; Jackson et al., 2009). Intimate partners can thus both increase health risks and enhance well-being for SWs; in addition to often making considerable financial contributions to the SW’s household, intimate partners provide SWs with significant emotional support (Benoit et al., 2013; Deering et al., 2011), and although SWs with intimate partners report more inconsistent condom use, they tend to have lower prevalence and risk of HIV, fewer clients per week, and increased condom use with clients (Ngugi et al., 2012; Somanath et al., 2013; Thuong et al., 2005). HIV disclosure has also been shown to be higher among SWs currently in intimate partner relationships (Benoit et al., 2013); in our study, the majority of participants knew their partner’s HIV status. As such, it is important to understand SWs’ non-paying partnerships as driving complex social dynamics, implicated by emotional and transactional elements that have the potential to be both positive and negative.

Qualitative research elucidates the complex gendered power, trust, and intimacy factors that shape negotiation and decisions on male condom use in intimate partnerships among SWs (Benoit et al., 2013; Shannon et al., 2008; Syvertsen et al., 2013). Nonuse of condoms can be an important way for individuals to establish trust and intimacy with their partners and differentiate a primary relationship from more casual relationships (Corbett et al., 2009). A recent quantitative study demonstrates that feelings of love and trust are significantly associated with sexual risk and drug use patterns among SWs and their intimate partners (Syvertsen et al., 2015). Thus, the intersection of feelings of love/intimacy/trust, drug use, financial dependence, and IPV considerably influences, and is influenced by, unprotected sex among SWs and their intimate partners (Robertson Bazzi et al., 2015; Syvertsen et al., 2015; Ulibarri et al., 2015). Among drug-using women in the U.S., inconsistent condom use and requesting partners to use condoms were significantly associated with IPV (El-Bassel et al., 2005). Non-injection and injection drug use is associated with other dyad-level and structural risks for HIV and can compromise a SW’s ability to negotiate consistent condom use with their partner (Argento et al., 2015; Munoz et al., 2010; Robertson et al., 2014). Moreover, as our study suggests, providing drugs or financial support to an intimate partner increases the odds of inconsistent condom use and may be fairly common among SWs; similar prevalence of condom use by intimate partners has been demonstrated among other drug-using couples in North America (Sherman and Latkin, 2001).

Our study found significant correlations between inconsistent condom use and physical IPV and having a partner provide physical safety, which is emblematic of the physical vulnerability of SWs and the influence that violence, including the fear or threat of violence, has on HIV risk. While our study suggests that reciprocity in the relationship (as conveyed by drug and financial interdependence between partners) could be related to feelings of intimacy and trust, it is also possible that SWs feel obliged to have unprotected sex in exchange for physical protection. In a recent study, SWs with non-paying partners were more likely to experience interpersonal violence and have STIs (Robertson et al., 2014).

Dyad-level power dynamics and highly gendered norms within SWs' intimate relationships amplify risks for HIV, particularly where traditional gender roles are favored and men exert considerable control over the relationship (Shannon et al., 2012). Male dominance and gender inequality is more likely among drug-using couples, as is IPV, leading to elevated sexual risks for HIV/STI (El-Bassel et al., 2005; Shannon et al., 2011). IPV is a pervasive issue and public health concern among women globally, and in the context of HIV, SWs who experience violence from their partners are especially vulnerable (Argento et al., 2014; Deering et al., 2014; Stockman et al., 2013). Among marginalized or drug-using women, having an abusive partner signifies power imbalances and unequal gender roles within the relationship that influence a woman's ability to safeguard against risky behaviors, including negotiating condom use with intimate partners (Bourgois et al., 2004; Maher, 1997; Shannon et al., 2008).

Some of the most efficacious intervention approaches to reduce HIV transmission and mitigate risks among SWs have been conducted in LMICs, focusing on mobilizing and empowering SWs to take control over their own health (Argento et al., 2011; Blankenship et al., 2008; Jana et al., 2004; Kerrigan et al., 2013), and demonstrating significant inverse associations between community empowerment and unprotected sex (Blankenship et al., 2008; Erausquin et al., 2012; Fonner et al., 2014; Kerrigan et al., 2006; Lippman et al., 2010). Such community empowerment-based approaches to HIV prevention have not only been successful in significantly increasing condom use and improving health outcomes for SWs, but they have also been shown to be cost-effective, particularly in high prevalence settings (Kerrigan et al., 2013). Social cohesion, a key component and marker of community empowerment, has significantly reduced unprotected sex among SWs with both their paying and non-paying partners in Brazil, Swaziland, and the Dominican Republic (Fonner et al., 2014; Kerrigan et al., 2006; Lippman et al., 2010) and emerging research in Canada suggests that social cohesion has a direct protective effect on client condom refusal (Argento et al., in press). These findings suggest that interventions that increase community connectedness and agency may enhance communication and negotiation skills with partners, leading to higher condom use and overall better health outcomes for SWs and their intimate partners (Fonner et al., 2014; Lippman et al., 2010; Robertson et al., 2014). As intimate partnerships often provide a sense of stability and emotional support for SWs, promoting condom use may not be all that desirable or realistic, even where planning to have children is not a factor. HIV prevention programs for drug-using couples should rather focus on the benefits of intimate partnerships (e.g., social support, security, trust) while promoting discussion around the risks of unprotected sex (Sherman and Latkin, 2001). Emerging studies advocate for more couple-based and gender-focused HIV interventions alongside community empowerment efforts; a recent mixed-methods study investigated the acceptability of a couples-based HIV intervention for SWs and their intimate partners in Mexico and found that 67% of participants (SWs and intimate partners) preferred couples-based programs over individual ones (Palinkas et al., 2014). In a prospective randomized control trial with low-income drug users, a couples-based intervention that focused on both sexual and drug risks successfully reduced the incidence rate (by 30%) of unprotected sex acts between partners over follow-up (El-Bassel et al., 2011). Actively involving male partners in HIV prevention programs may help to support SWs' empowerment and facilitate communication and negotiation skills

between partners around sexual and drug use-related risks (Robertson Bazzi et al., 2015). Future research that seeks to include male intimate partners should ensure that couples-based interventions are situated within a context of offering services tailored to the unique needs of both SWs and their intimate partners, free of discrimination, and where service providers can build trust with their patients and improve consistency of care (El-Bassel et al., 2011; Palinkas et al., 2014). Couples-based interventions that focus on reducing conflict and improving communication between partners will be especially important for future HIV prevention efforts (Robertson Bazzi et al., 2015). Taken together with our study's findings, couples-based and gender-focused interventions that include male partners are needed to reduce potential HIV/STI risks to SWs through nonpaying partnerships, including discussions of the complex pathways of intimacy, trust, and power in shaping condom use dynamics within intimate partner dyads.

4.1 Limitations

There are a number of strengths and limitations that should be considered when interpreting the results of this study. Although our study does not allow for inferring causality, the analyses using GEE increased the number of observations and accounted for repeated measurements for the same respondents across multiple partners. All data were self-reported and information relating to intimate partners was provided by study participants, as the partners themselves were not interviewed, which introduces the potential for social desirability and reporting bias. However, interviews were conducted in safe and comfortable spaces by experienced interviewers (including current/former SWs) with strong rapport, and as such, the community-based nature of our study reduces the likelihood of these biases. Questions pertaining to events that occurred within the past six months of the interview may be subject to recall bias. Condom use dynamics between SWs and their intimate partners are influenced by complex individual, interpersonal and structural variables, some of which were not measured in our study. Although our findings may not be fully generalizable to other SW populations/settings, our study population included SWs from a wide-ranging representation of sex work environments. The mapping of working areas and time–location sampling helped to ensure a representative sample and to minimize selection bias; however more higher-income earning and independent SWs (e.g. escorts; online) are likely underrepresented. Although our eligibility criteria for participants included sex workers 14 years of age or older, our sample included few participants under the age of 18; therefore, younger sex workers may also be underrepresented.

4.2 Conclusions

Our study highlights the complex role of dyad-level factors in shaping HIV/STI risk pathways for SWs from intimate partners, particularly through dual sexual and drug-related interpersonal risks. Findings suggest that the reasons for inconsistent condom use among SWs and their intimate partners are complex and involve intersecting emotional, physical and economic dimensions of the relationship such as intimacy/trust, drug use, violence, and financial dependence. Efforts to reduce HIV/STI risks to SWs through non-paying intimate partnerships should incorporate gender-focused and empowerment-based strategies, as well as couples-based interventions for SWs that actively involve male partners. This research

also supports further calls for integrated violence and HIV prevention within broader sexual and reproductive health efforts for SWs to realize positive sexual and reproductive health.

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Highlights

- The majority of sex workers reported inconsistent condom use with intimate partners
- Providing drugs or money were independently correlated with inconsistent condom use
- Intimate partner violence was independently correlated with inconsistent condom use
- Dyad-level factors shape sexual and drug-related HIV/STI risks for sex workers
- Couple and gender-focused interventions efforts are needed to reduce HIV/STI risks

Table 1

Individual-level characteristics of sex workers in Vancouver who experienced inconsistent condom use with any of their intimate partners compared to those who did not.

Characteristic	Inconsistent Condom Use		Total (%) (N=369)
	Yes (%) (n=279)	No (%) (n=90)	
Age (<i>med, IQR</i>)	32 (26–40)	33 (26–40)	33 (26–40)
Canadian-born	204 (73.1)	272 (73.7)	272 (73.7)
Aboriginal ancestry	104 (37.3)	135 (36.6)	135 (36.6)
Sexual minority	66 (23.7)	92 (24.9)	92 (24.9)
Injection drug use [†]	96 (34.4)	134 (36.3)	134 (36.3)
Non-injection drug use [†]	184 (66.0)	248 (67.2)	248 (67.2)
Difficulty accessing contraceptives [†]	7 (2.5)	12 (3.3)	12 (3.3)
Had plans to have children [†]	116 (41.6)	144 (39.0)	144 (39.0)
<i>Violence by intimate partner</i>			
Physical violence [†]	72 (25.8)	83 (22.5)	83 (22.5)
Sexual violence [†]	26 (9.3)	30 (8.1)	30 (8.1)
Emotional violence [†]	84 (30.1)	103 (27.9)	103 (27.9)
All physical/sexual/emotional violence [†]	94 (33.7)	116 (31.4)	116 (31.4)
<i>Primary place to solicit clients</i>			
Indoor establishment [†]	90 (32.3)	115 (31.2)	115 (31.2)
Street/public [†]	143 (51.3)	189 (51.2)	189 (51.2)
Independent [†]	46 (16.5)	65 (17.6)	65 (17.6)

[†] Last six months

Table 2

Interpersonal-level characteristics of sex workers in Vancouver who experienced inconsistent condom use with their intimate partners compared to those who did not.

Characteristic	Inconsistent Condom Use		Total (%) (N=448)
	Yes (%) (n=314)	No (%) (n=134)	
Years with intimate partner (<i>med, IQR</i>)	2.5 (0.8–6)	0.9 (0.3–2)	1.8 (0.5–5)
Knew partner's HIV status	207 (65.9)	68 (50.8)	275 (61.4)
Provided financial support to partner [†]	120 (38.2)	14 (10.5)	134 (29.9)
Provided drugs to partner [†]	124 (39.5)	15 (11.2)	139 (31.0)
Provided shelter for partner [†]	81 (25.8)	10 (7.5)	91 (20.3)
Provided food for partner [†]	118 (37.6)	18 (13.4)	136 (30.4)
Partner provided financial support [†]	190 (60.5)	66 (49.3)	256 (57.1)
Partner provided drugs [†]	134 (42.7)	36 (26.9)	170 (38.0)
Partner provided food [†]	186 (59.2)	44 (32.8)	230 (51.3)
Partner provided shelter [†]	135 (43.0)	32 (23.9)	167 (37.3)
Partner provided physical safety [†]	114 (36.3)	20 (14.9)	134 (29.9)
Partner provided child support [†]	35 (11.2)	8 (6.0)	43 (9.6)
Partner used injection drugs [†]	59 (18.8)	14 (10.5)	73 (16.3)
Partner used non-injection drugs [†]	211 (67.2)	82 (61.2)	293 (65.4)
Partner had other sex worker partner [†]	31 (9.9)	19 (14.2)	50 (11.2)
Partner had other non-sex worker partner [†]	37 (11.8)	27 (20.2)	64 (14.3)
<i>Type of male sexual partner</i>			
Intimate cohabiting [†]	149 (47.5)	24 (17.9)	173 (38.6)
Intimate non-cohabiting [†]	125 (39.8)	56 (41.8)	181 (40.4)
Casual [†]	39 (12.4)	53 (39.6)	92 (20.5)

[†]Last six months

Table 3

Bivariate and multivariable generalized estimating equations analyses for correlates of inconsistent condom use with intimate partners among sex workers in Metro Vancouver, 2010–2013.

Characteristic	Odds Ratio (OR)	
	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Individual Variables		
Age (per year older)	1.00 (0.97 – 1.02)	
Canadian-born	0.79 (0.47 – 1.32)	
Aboriginal ancestry	1.02 (0.65 – 1.60)	
Sexual minority	0.57 (0.36 – 0.91) **	
Injection drug use [†]	0.73 (0.46 – 1.14)	
Non-injection drug use [†]	0.64 (0.39 – 1.05) *	0.32 (0.17 – 0.60) **
Had difficulty accessing contraceptives [†]	0.52 (0.16 – 1.67)	
Had plans to have children [†]	1.35 (0.84 – 2.17)	
Dyad-Level Variables		
Time with intimate partner (per year longer)	1.12 (1.03 – 1.22) **	
Knew partner's HIV status	1.94 (1.29 – 2.90) **	
Provided financial support to partner [†]	5.42 (2.88 – 10.21) **	2.46 (1.05 – 5.74) **
Provided drugs to partner [†]	5.70 (2.97 – 10.94) **	3.04 (1.47 – 6.30) **
Provided shelter for partner [†]	3.47 (1.78 – 6.79) **	
Provided food for partner [†]	3.53 (2.00 – 6.23) **	
Partner provided financial support [†]	1.56 (1.00 – 2.44) **	0.61 (0.36 – 1.05) *
Partner provided drugs [†]	2.02 (1.20 – 3.40) **	
Partner provided shelter [†]	2.29 (1.38 – 3.79) **	
Partner provided physical safety [†]	3.20 (1.84 – 5.57) **	2.08 (1.11 – 3.91) **
Partner provided food [†]	2.66 (1.71 – 4.14) **	
Partner provided child support [†]	1.76 (0.76 – 4.07)	
Partner used injection drugs [†]	1.71 (0.94 – 3.09) *	
Partner used non-injection drugs [†]	1.02 (0.61 – 1.72)	
Partner had other sex worker partner [†]	0.59 (0.32 – 1.08) *	
Partner had other non-sex worker partner [†]	0.45 (0.24 – 0.83) **	
<i>Type of male sexual partner</i>		
Intimate cohabiting (vs. casual) [†]	8.34 (4.07 – 17.10) **	5.43 (2.53 – 11.66) **
Intimate non-cohabiting (vs. casual) [†]	3.06 (1.69 – 5.55) **	2.15 (1.11 – 4.19) **
<i>Violence by intimate partner</i>		
Physical violence [†]	1.99 (1.12 – 3.53) **	2.20 (1.17 – 4.12) **
Sexual violence [†]	2.26 (0.83 – 6.20)	

Characteristic	Odds Ratio (OR)	
	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Emotional violence [†]	1.66 (0.98 – 2.81) *	
All physical/sexual/emotional violence [†]	1.47 (0.90 – 2.40)	
<i>Primary place to solicit clients</i>		
Street/public (vs. indoor) [†]	0.81 (0.48 – 1.36)	
Independent (vs. indoor) [†]	0.61 (0.33 – 1.15)	

*
p<0.10

**
p<0.05

[†]
Last six months