



HHS Public Access

Author manuscript

AIDS Behav. Author manuscript; available in PMC 2017 June 01.

Published in final edited form as:

AIDS Behav. 2016 June ; 20(6): 1275–1283. doi:10.1007/s10461-015-1230-8.

Social Cohesion Among Sex Workers and Client Condom Refusal in a Canadian Setting: Implications for Structural and Community-Led Interventions

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Abstract

Community empowerment can be a powerful determinant of HIV risk among sex workers (SWs). This study modeled the impact of social cohesion on client condom refusal among SWs in Vancouver. Longitudinal data were drawn from a prospective cohort of SWs (2010–2013). Lippman and colleagues' *Social Cohesion Scale* measured SWs' connectedness (i.e., perception of mutual aid, trust, support). Multivariable logistic regression examined the independent effect of social cohesion on client condom refusal. Of 654 SWs, 22 % reported baseline client condom refusal and 34 % over 3 years. The baseline median social cohesion score was 24 (IQR 20–29, range 4–45). In the final confounding model, for every one-point increase in the social cohesion score, average odds of condom refusal decreased by 3 % (AOR 0.97; 95 % CI 0.95–0.99). Community empowerment can have a direct protective effect on HIV risk. These findings highlight the need for a legal framework that enables collectivization and SW-led efforts in the HIV response.

Keywords

Sex work; Community empowerment; Social cohesion; HIV prevention; Condom use

Introduction

Sex workers (SWs) have been amongst the most heavily affected by the HIV/AIDS epidemic and continue to face disproportionately high levels of HIV-related risk and harms, with

sex among SW populations in Brazil, Swaziland, and the Dominican Republic [18, 21, 22]. A number of studies from India have demonstrated similar results where interventions focusing on community solidarity and collectivization have been successful in increasing consistent condom use among SWs [20, 23, 24]. One of the most notable examples of a comprehensive structural approach to HIV prevention, after which many others have been modeled, is the Sonagachi project in Kolkata, India. The SW-led Songachi project is renowned for its success in increasing condom use between SWs and their clients and significantly decreasing sexually transmitted infection (STI) transmission through community awareness and empowerment [25]. There has been substantial evidence from LMICs demonstrating that social cohesion can be a powerful determinant of successful HIV prevention and a recent mathematical modeling analysis estimates that up to 10,800 new HIV infections (between 8 and 12 %) in Brazil, Kenya, Thailand, and Ukraine could be averted in a 5-year time span by expanding community empowerment-based interventions among SWs [14].

Despite more than two decades of grassroots organizing and community empowerment among SWs in many settings in the global north, and Canada in particular [26], criminalization, stigma and lack of funding continue to hamper large-scale implementation of community empowerment efforts [17]. The Canadian federal government recently moved to implement new legislation (C-36), passed in December 2014, criminalizing clients and anyone who materially benefits from sex work, which threatens to perpetuate the risks and harms to SWs [27]. Both in Canada and globally, criminalization of sex work and enforcement-based efforts have been linked to poor health and social outcomes, including violence, mortality and HIV vulnerability, and yet we know little about how community empowerment and the ability of SWs to work together may buffer against HIV risks. Furthermore, recent systematic reviews of structural determinants and HIV among SWs [28] and community empowerment [17] have shown the complete dearth of data on and components of community empowerment processes (e.g., social cohesion) outside of a few settings globally, most notably India, Brazil and the Dominican Republic. The objective of this study was therefore to longitudinally examine the impact of social cohesion among SWs on risk of client condom refusal in a Canadian setting.

Methods

Study Design and Sample

Data were drawn from an open prospective cohort of female SWs, known as AESHA (An Evaluation of Sex Workers Health Access), between January 2010 and February 2013. As described previously [29], the AESHA study is based on substantial collaborations between sex work agencies and community service providers since 2004, when SWs and health providers/staff at WISH (Women's Information Safe Haven)—a local drop-in centre for SWs—collectively identified key gaps in service access, HIV prevention, and harm reduction for SWs. Since 2009, the AESHA project has expanded to include both street and hidden off-street women (trans* inclusive) SWs across Metro Vancouver with the goal to examine the impact of social and structural factors (including policy, physical, social, and work environment features) on sexual health and HIV/STI vulnerability. The AESHA

Project is monitored by a Community Advisory board with over 15 sex work, women's health and HIV service agencies, as well as representatives from the health authority and policy experts. 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. The AESHA interview, outreach and nursing staff include current/former SWs and individuals with substantial community experience in sex work support services.

Eligibility criteria for participants at baseline included women (trans*-inclusive) older than 14 years of age, and having exchanged sex for money within the last 30 days. In the context of hard-to-reach populations, SWs were recruited through community mapping and time-location sampling. Outdoor, indoor and online venues were identified through participatory mapping strategies conducted with current and former SWs (and continuously updated by the outreach team) to identify sex work locations [29]. Using systematic time-location sampling, considered a useful method of recruitment for mobile/hidden populations [30], SWs were recruited through day and late-night outreach to both outdoor (i.e. streets, alleys) and indoor sex work venues (i.e. massage parlors, micro-brothels, and in-call locations) across Metro Vancouver. Online recruitment was used to reach SWs working through online solicitation spaces (sex work websites and craigslist), and a combination of outreach methods and contact by mobile phone and Internet were used for follow-up.

At enrollment and bi-annually, consenting SWs complete an interviewer-administered questionnaire by a trained interviewer and voluntary HIV/STI/HCV serology testing by a project nurse. 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, social cohesion, 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.

The AESHA study holds ethical approval through Providence Health Care/University of British Columbia Research Ethics Board. All participants receive an honorarium of \$40 CAD at each bi-annual visit for their time, expertise and travel.

Study Variables

Primary Outcome Variable

Our dependent outcome of interest was a time-updated client condom refusal variable, defined as responding 'yes' to coerced into not using a condom for vaginal, anal or oral sex

(i.e. responded ‘yes’ to ‘always,’ ‘usually,’ ‘sometimes,’ or ‘occasionally’ versus ‘never’ for one-time or regular clients) in the last 6 months.

Primary Explanatory Variable

Our main independent variable of interest was perception of social cohesion, first assessed among SWs in LMICs using Lippman, Kerrigan and colleagues’ *Social Cohesion Scale*, a multi-item index that measures levels of perceived mutual aid, trust, solidarity and support within the community [21]. The Social Cohesion Scale has been previously adapted and validated with SWs in LMIC settings, [22, 31], as well as among indoor SWs by our group in Canada, where a high level of internal consistency was indicated (Cronbach $\alpha = 0.919$) [32]. The level of social cohesion among study participants in Vancouver was based on a response to 12 items on a five point scale ranging from strongly agree to strongly disagree, with a score of 4 assigned to ‘strongly agree’ and 0 for ‘strongly disagree’. Measures of social cohesion included items relating to being able to rely on other SWs for money, advice, and when needing a place to stay; social support when visiting a doctor; help with finding clients; help with violent or difficult clients; and the level of integration among the community, including a sense that workers get along well with each other. The 12 item scores were summed to create a continuous measure for social cohesion, with a lowest possible score of 0, and a maximum possible score of 48. The confounder variables were selected based on significance testing at the $p < 0.05$ level, as well the literature and available data collected for the AESHA cohort between 2010 and 2013. All data were self-reported and time-updated based on the last 6 months at each follow-up, with the exception of fixed demographic variables considered at baseline such as: age (continuous), sexual minority (lesbian, gay, bisexual, transgender, transsexual, or two-spirit), self-identification of Aboriginal/Indigenous ancestry (inclusive of First Nations, Metis, and Inuit), and being a migrant/new immigrant worker (versus Canadian born). The term ‘two-spirit’ has a fluid, non-binary meaning and is used by some indigenous people to refer to a person who has both feminine and masculine spirits [33]. Time-updated variables included individual-level factors and those that reflect the social environment: homelessness, education level, drug and sex work-related variables (e.g., injection and non-injection drug use, primary place to solicit and service clients), and partner-related variables (e.g., physical/sexual violence by clients, having a regular non-commercial sex partner).

Statistical Analyses

Correlates of client condom refusal were examined using bivariate and multivariable generalized estimating equations (GEE) with a logit link for the dichotomous outcome. To adjust the standard error and account for correlations arising from repeated measurements on the same participant over the follow-up, an exchangeable correlation matrix was used. 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. To assess if social cohesion was independently associated with client condom refusal, a multivariable confounding model was constructed, using an approach by Rothman and Greenland [34]. Potential confounders were chosen based on their a priori knowledge as confounders from the LMIC literature and bivariate associations with client condom refusal (at $p < 0.05$). A full model included all potential confounders and was subjected to a manual stepwise approach, where variables

that altered the association of interest by <5 % were systematically removed from the model. Remaining variables were considered confounders in the multivariable model. Two-sided p-values and unadjusted and adjusted odds ratios with 95 % confidence intervals for the association between social cohesion and client condom refusal were generated. All statistical analyses were performed using the SAS software version 9.3 (SAS Institute, Cary, NC, USA).

Results

Descriptive Results

Due to missing values in the Social Cohesion Scale, there were 654 participants and 1681 observations used in the analysis, or 95 % of the full AESHA sample (692 participants; 2109 observations) between January 2010 and February 2013. Of note, there were no differences in key demographics between participants included in the study and those lost due to missing values. The mean number of study visits for participants is 2.6 (range 1–6). Baseline socio-demographic and structural-environmental characteristics of SWs are displayed in Table 1.

At baseline, over one-fifth (21.7 %; $n = 142$) of study participants reported client condom refusal in the last 6 months (33.8 %; $n = 221$ over the three-year study period). The sample had a median social cohesion score of 24 [interquartile range (IQR) 20–29, range 4–45]. Given that the maximum possible score for social cohesion is 48, respondents on average reported a medium level of social cohesion. The median age was 34 years (IQR 28–42). The study sample included 238 (36.4 %) individuals who self-identified as having Aboriginal ancestry. Overall, 166 (25.4 %) reported being a sexual minority (e.g., lesbian, gay, bisexual, transgender, two spirit) and 271 (41.4 %) reported injection drug use in the last 6 months.

In terms of work environment, of the 654 respondents, 357 (54.6 %) solicited for clients in outdoor/public spaces, 187 (28.6 %) in indoor venues, and 110 (16.8 %) independently. In terms of primary location for sexual transactions, 283 (43.3 %) serviced clients in outdoor locations, with 198 (30.3 %) having serviced clients in brothels/ quasi-brothels and 173 (26.5 %) in informal indoor venues in the last 6 months. Overall, 11.5 % of SWs were HIV seropositive, and 21.4 % HIV/STI seropositive.

Bivariate and Multivariable GEE Analyses

Table 2 displays unadjusted and adjusted odds ratios for the association between perceived social cohesion and condom client refusal. In the bivariate GEE analysis, injection drug use was associated with increased odds of experiencing recent client condom refusal [odds ratio (OR) 1.60, 95 % confidence interval (95 % CI) 1.21–2.10]. Decreased odds of recent client condom refusal at a $p < 0.01$ level were associated with soliciting for clients indoors (OR 0.57, 95 % CI 0.40–0.81) and independently (OR 0.60, 95 % CI 0.44–0.83) compared to street/public spaces, age (OR 0.96, 95 % CI 0.94–0.97), and higher social cohesion (OR 0.97, 95 % CI 0.95–0.99). In the final multivariable model, higher levels of perceived social cohesion among SWs retained a direct and independent effect on reduced client condom

refusal [adjusted odds ratio (aOR) 0.97 per unit increase in social cohesion score, 95 % CI 0.95 to 0.99], after adjusting for place of soliciting clients and age.

Discussion

In the present longitudinal study of street and off-street SWs in Vancouver, over one-fifth of SWs reported client condom refusal at baseline and over one-third reported this during the three-years of study period. Social cohesion among workers retained an independent protective effect in reducing client condom refusal. Specifically, with every one point decrease in the social cohesion score, the average odds of client condom refusal increased by 3 %, even after adjustment for potential confounders. Data on the ways in which structural and environmental factors shape HIV risk among SWs have only begun to emerge, particularly in higher-income settings. Our study is the first to examine the independent effect of social cohesion on client condom refusal among SWs in the global north and underscores the importance of community empowerment-based approaches in preventing HIV and reducing health risks among SWs.

Empowerment is a community-level process that not only challenges structural inequalities and barriers to health and wellbeing, but also shapes interpersonal- and individual-level behaviors that determine HIV-related outcomes for SWs [10]. Social cohesion plays a key role in this process and contributes to the overall level of connectedness within a community, allowing SWs to build networks that place value on social relationships, trust and mutual benefit [22]. Our study supports existing research from LMICs documenting that increased social cohesion increases SWs' capacity to better control their risks for HIV/STI transmission, including their ability to negotiate consistent condom use: among a sample of 324 female SWs in Swaziland, having high levels social cohesion was independently correlated with consistent condom use in the past week with all partners (aOR 2.25, 95 % CI 1.30–3.90) and fewer reports of acts of social discrimination [22]. In a Brazilian study with 420 SWs, both higher social cohesion and increased participation in social networks among female participants were inversely associated with the number of unprotected sexual acts in the past week (adjusted incidence rate ratio 0.80, $p < 0.01$ and 0.83, $p < 0.04$, respectively) [21]. Other research conducted with 68 sex work establishments in the Dominican Republic implemented an environmental-structural intervention model that included workshops to encourage and strengthen a sense of community solidarity and collective commitment to HIV prevention; the study observed a statistically significant increase in consistent condom use with all sex partners in the past month among SWs exposed to the intervention, compared to those without such exposure (aOR 1.90, 95 % CI 1.12–3.21) [18].

Occupational health hazards, including transmission of HIV/STI, experienced by SWs are largely due to unsafe working conditions and the inability to negotiate condom use, which are perpetuated by considerable social and environmental barriers [1, 3, 23, 25, 35]. Certain physical work environment factors, such as access to safer indoor venues and condom availability, are known to reduce risks by enabling SWs to take control over their own working conditions [4, 19, 36]. Our findings are consistent with well-established research documenting higher rates of condom use and reduced risk of HIV transmission among SWs

who operate in off-street supportive sex work environments and where safer management policies and security measures have been implemented [4, 37–40].

Condom use and negotiation of condom use with clients and other sexual partners is entrenched in complex gendered power dynamics, including violence, operating at the structural and interpersonal levels, which can then have serious implications for SWs at the individual level [36, 37]. Recent modeling of structural determinants of HIV in Canada and Kenya, where sexual violence has a sustained and direct effect on non-condom use, estimates that 17–20 % of HIV infections among SWs and their clients could be averted over the next decade by eliminating occupation violence (i.e., by clients, police, strangers) [28]. It is not uncommon for clients to offer financial incentives to SWs for sex without a condom [41–43], and equally pervasive is the use of force: according to a recent global systematic review, between 32 and 55 % of SWs report workplace violence in the past year [5], placing SWs at considerably elevated risk for unprotected sex and transmission of HIV/STI [44, 45]. Similar estimates have been reported for SWs in Vancouver; for example, 73 % of SWs reported being offered more money for sex without a condom in the last 6 months, with 38 % reporting physical or sexual violence by clients [41]. In the contexts of financial dependence on sex work and occupational violence, SWs who use drugs are especially vulnerable to socio-structural determinants of their health and risk behaviors [46–48]. Across the globe, drug use behaviors have been significantly associated with elevated rates of violence [5]. In a Canadian study, SWs' inability to access drug treatment was linked to elevated risk for physical and sexual violence by clients [49]. The result of our study's bivariate analysis shows a positive association between injection drug use and client condom refusal, which supports existing literature documenting drug-related vulnerabilities among SWs that mediate negotiations with their clients to use condoms [41, 46, 47, 50].

SWs have little control over their vulnerability to HIV-related risks driven by social marginalization and criminalized work environments [21, 51, 52]. In Canada, enforcement-based federal and local policies guide the criminalized sex work environment, and in Vancouver policing practices have been shown to undermine harm reduction initiatives, exacerbating drug and sexual health risks among street populations, including among SWs who use drugs [47, 53–55]. The independent links between policing practices and both elevated rates of violence and HIV among SWs globally have been found consistently in the literature [5, 44]. Fear of arrest or violence forces SWs to forego attempts to use condoms with their clients, and in some settings carrying condoms has been used as evidence of sex work and therefore grounds for arrest [19, 35, 56].

In settings where sex work is criminalized, SWs have a reduced ability to negotiate safer sex transactions with clients and are at higher risk for violence and transmission of HIV/STI [45, 57, 58]. In December 2013, the Supreme Court of Canada made the decision to strike down three of Canada's core prostitution laws on the basis that they were in violation of SWs' constitutional rights [59]. Following this decision, the Vancouver Police Department implemented a new enforcement policy targeting sex buyers (clients) instead of SWs [60]. Also known as the "Nordic Model", demand criminalization (criminalization of purchasing rather than selling sex with the goal of eradicating prostitution) in higher income countries such as Sweden, Norway, Iceland and France has not succeeded in preventing sex work from

taking place and, on the contrary, is evidenced to have adverse consequences for SWs and their clients [61, 62]. Our study builds on qualitative research among SWs in Vancouver, Canada: findings demonstrated that despite some reports by SWs of more positive experiences with police and less arrests, enforcement targeting clients continues to reproduce the harms created by criminalizing SWs, profoundly limiting their ability to negotiate safer working conditions and sexual transactions (i.e., condom use) [52]. Further, in unsanctioned indoor venues with supportive women's only housing, SWs expressed having increased control over their risk environment, such as the ability to negotiate condom use with clients and avoid violent perpetrators [4]. The environmental-structural supports afforded by these safer sex work venues (with supportive policies, management, and access to condoms and other harm reduction resources) fosters peer safety mechanisms among SWs, such as sharing information about violent clients and calling for help from each other. As such, these findings are emblematic of the ways in which criminalization hinders collectivization among SWs and exacerbates the harms on SWs' health and safety, and violates human rights [51]. New legislation (as of December 2014) introduces a "made in Canada" model that further perpetuates risks and harms against SWs in Canada, as the amended legislation (C-36) includes criminalizing the purchase of sexual services, communicating for the purpose of selling sex, receiving material benefit from sex work, and advertising sexual services [27]. Such criminal sanctions prevent collectivization of SWs, severely limiting their ability to work together and protect themselves from HIV-related risks and harms. Conversely, decriminalization of sex work and establishing occupational health and safety standards in consultation with SW communities facilitates access to and development of integrated social support and health interventions for SWs, as evidenced by decriminalized models in New Zealand and Australia [63, 64].

The ability of SWs to work together and create their own social community networks is critical for mitigating their risk environment for HIV and related harms. Community collectivization and SW-led organizations are necessary for facilitating such enabling environments, which increase social cohesion and enhance SWs' capacity to negotiate their own safety and advocate for their right to health and health services access. Human rights violations against SWs at all levels must be addressed (including physical/sexual violence from police and clients and discrimination in accessing HIV prevention and treatment services) to ensure and achieve public health goals in the HIV response [51]. As demonstrated by our study and previous research globally, increased social cohesion and collectivization among SWs is inversely associated with reductions in HIV-related risk factors, such as unprotected sex, low access to HIV testing, social discrimination, and violence [18, 21, 22]. Policing practices and legal environments that prevent SWs from organizing are of grave concern, and represent serious violations to SWs' human and labor rights, potentiating the devastating harms and risks for HIV.

Limitations

There are a number of strengths and limitations to be considered in the interpretation of this study. Although causality cannot be inferred, some potential temporal bias may have been reduced due to the use of GEE analyses, which increased the number of observations and accounts for repeated measurements on the same respondents over the three-year period.

The variables examined in this study came from self-reported data that include sensitive behavioral topics, such as condom use and drug use, which introduces potential for social desirability and reporting bias. However, interviews were conducted in safe and comfortable spaces by experienced interviewers (including current/former SWs) and we believe the community-based nature of our study reduces the likelihood of these forms of biases. Questions pertaining to events that occurred within the past 6 months of the interview may be subject to recall bias. Although our findings may not be fully generalizable to other sex worker 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 likely 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. Our study is the first to use the Social Cohesion Scale in a Canadian setting among street and off-street SWs who face similarly high levels of HIV and socio-structural barriers to health as with SWs globally.

Conclusions

In the context of disproportionately elevated rates of HIV and vulnerability to health risks among SWs, including widespread violence and discrimination, our findings demonstrate the importance of enhancing community empowerment-based approaches within structural interventions to HIV (e.g., supportive laws and policies), as demonstrated by the direct and independent effect of social cohesion on reduced client condom refusal in our study. These results provide further evidence and support for the efficacy of community-led structural approaches to address SW vulnerability to HIV, particularly the role of collectivization and social cohesion in determining behavioral and interpersonal risks for SWs in higher income settings. Given the recent decision by the Canadian Supreme Court to strike down three key provisions of prostitution laws, followed by new legislation (C-36) on sex work in Canada that restricts SWs' ability to work together, these findings highlight the need for a legal and structural framework that promotes SWs' ability to more formally collectivize, including SW-led efforts in the HIV response.

Acknowledgments

We thank all those who contributed their time and expertise to this project, including participants, partner agencies and the AESHA Community Advisory Board. We wish to acknowledge Peter Vann, Gina Willis, Sarah Allan, Annick Simo, Sabina Dobrer, Ofer Amram, Jill Chettiar, Jennifer Morris, and Kathleen Deering for their research and administrative support. This work is supported by operating grants from the US National Institutes of Health (R01DA028648) and Canadian Institutes of Health Research (HHP-98835). KS is supported by US National Institutes of Health (R01DA028648), Canadian Institutes of Health Research and Michael Smith Foundation for Health Research. SAS is supported by a NIDA MERIT award (R37DA019829).

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Table 1

Socio-demographic and structural-environmental factors among sex workers in Metro Vancouver who experienced client condom refusal in the last 6 months compared to those who did not, at baseline (n = 654)

Characteristics	Client condom refusal (n = 142) N (%)	No client condom refusal (n = 512) N (%)	p value
Social cohesion score ^a (<i>median, IQR</i>)	24 (20–27)	25 (20–30)	0.015
Age (<i>median, IQR</i>)	30 (25–39)	35 (29–42)	< 0.001
Sexual minority	42 (29.6)	124 (24.2)	0.194
Immigrated to Canada	28 (19.7)	147 (28.7)	0.032
Aboriginal ethnicity	50 (35.2)	188 (36.7)	0.741
Family member attended residential school	32 (22.5)	112 (21.9)	0.867
Education, high school or greater	68 (47.9)	267 (52.2)	0.369
HIV seropositivity	15 (10.6)	60 (11.7)	0.702
HIV/STI seropositivity	33 (23.2)	107 (20.9)	0.547
Homeless ^a	54 (38.0)	138 (27.0)	0.010
Injection drug use ^a	75 (52.8)	196 (38.3)	0.002
Non-injection drug use ^a	113 (79.6)	348 (68.0)	0.007
Physical/sexual violence by client ^a	59 (41.6)	96 (18.8)	< 0.001
Inconsistent condom use with client ^a	55 (38.7)	62 (12.1)	< 0.001
Had a regular non-commercial sex partner ^a	65 (45.8)	223 (43.6)	0.637
Primary place to solicit clients ^a			
Street/public space	92 (64.8)	265 (51.8)	REF
Indoor/in-call venue	29 (20.4)	158 (30.9)	0.007
Independent/self-advertising (e.g., newspapers, online)	21 (14.8)	89 (17.4)	0.154
Primary place to service clients ^a			
Street/public space	64 (45.1)	219 (42.8)	REF
Informal indoor venue (e.g., bars, hotels, saunas, client's place)	45 (31.7)	128 (25.0)	0.409
Formal SW 'in-call' venue (e.g., brothel, massage parlour)	33 (23.2)	165 (32.2)	0.111

^aIn the last 6 months

Table 2

Longitudinal bivariate and multivariable GEE analyses for the relationship between social cohesion and client condom refusal among a cohort of sex workers in Metro Vancouver (n = 654)

Characteristic	Unadjusted Odds ratio (95 % CI)	Adjusted Odds ratio (95 % CI)
Social cohesion score ^a	0.97 (0.95–0.99) *	0.97 (0.95–0.99) *
Age (per year older)	0.96 (0.94–0.97) *	0.96 (0.94–0.97) *
Injection drug use ^a	1.60 (1.21–2.10) *	–
Aboriginal ancestry	0.80 (0.59–1.09)	–
Primary place to solicit clients ^a		
Indoor venue (vs. street/public)	0.57 (0.40–0.81) *	0.63 (0.44–0.91) **
Independent (vs. street/public)	0.60 (0.44–0.83) *	0.62 (0.45–0.85) *

* p < 0.01;

** p < 0.05

^a In the last 6 months