



Published in final edited form as:

AIDS Behav. 2016 January ; 20(1): 215–224. doi:10.1007/s10461-015-1111-1.

Structural determinants of client perpetrated violence among female sex workers in two Mexican-U.S. border cities

Erin E. Conners^{1,2}, Jay G. Silverman¹, Monica Ulibarri³, Carlos Magis-Rodriguez⁴, Steffanie A. Strathdee¹, Hugo Staines-Orozco⁵, Thomas L. Patterson³, and Kimberly C. Brouwer¹

¹Department of Medicine, University of California San Diego San Diego, CA

²Joint Doctoral Program in Public Health, University of California San Diego and San Diego State University, San Diego, CA

³Department of Psychiatry, University of California San Diego, San Diego, CA

⁴Centro Nacional para la Prevención y el Control del VIH y el SIDA (CENSIDA), Mexico City, Mexico

⁵Facultad de Medicina, Universidad Autónoma de Ciudad Juárez, Ciudad Juárez , Mexico

Abstract

Female sex workers (FSW) are disproportionately affected by both HIV and gender-based violence, such as that perpetrated by clients (CPV). We used a structural determinants framework to assess correlates of physical or sexual CPV in the past 6 months among FSW in the Mexico/ U.S. border cities of Ciudad Juárez and Tijuana. Bivariate and multivariate logistic regression analysis identified individual, client, interpersonal, work environment and macrostructural factors associated with recent CPV. Among 496 FSW, 5% experienced recent CPV. Witnessing violence towards other FSW in one's neighborhood (aOR:5.6, 95% CI:1.8-17.2), having a majority of foreign (aOR:3.5, 95% CI:1.4-8.4) or substance using (aOR:4.0, 95% CI:1.5-10.4) clients, and being a street worker (aOR:3.0, 95% CI:1.1-7.7) were independently associated with recent CPV. Our findings underscore the vulnerability of FSWs and the need to design policies and interventions addressing macro-level influences on CPV rather than exclusively targeting individual behaviors.

Introduction

Gender-based violence, including intimate partner violence (IPV) and client perpetrated violence (CPV), can be both a cause and a consequence of HIV infection (1-4). Female sex workers (FSW) represent a particularly vulnerable group because of their disproportionate rates of both gender-based violence and sexually transmitted infections (STIs), including HIV (5). Among FSWs worldwide, 45%-75% reported experiencing physical or sexual violence within the context of sex work over their lifetime and 32%-55% experienced such violence in the past year (6). Modeling estimates predict that when physical or sexual

violence is reduced, HIV incidence drops as much as 25%, making the understanding of causes of violence a critical piece to HIV prevention programs among FSW (7).

The current literature on the risk of CPV has primarily focused on individual behaviors of FSW. These studies have found associations between violence and binge drinking(8-10), general drug use(11), and injection drug use(9, 12). Data on behaviors of clients associated with CPV are sparse. A September 2013 literature review on correlates of violence against FSW found no studies looking at client alcohol or drug use(6). Since that time we identified only one study in Mexico that found having drug-using clients was associated with a 4-fold increase in odds of experiencing CPV (13).

Even less has been investigated in regards to potential structural or workplace correlates of CPV, although some work has explored sex work venues (i.e., where sex is solicited or transacted). Across different contexts, working in an outdoor venue increased the odds of violence by a factor of 1.5 to 8 (9, 14, 15). However descriptions of these venues were limited to their general type (e.g., bar, street, home), and it is unclear what contextual characteristics of neighborhoods or venues (e.g., social disorder, cartel violence) may engender violence from clients.

Research on other types of gender-based violence, such as IPV, has found that neighborhoods with greater social disorder (16, 17) or those that were perceived as more dangerous (18) were associated with higher rates of IPV, suggesting individual behaviors are insufficient to characterize violence risk. More research is needed to characterize the venues and neighborhoods where FSWs are at highest risk in order to develop context-specific interventions for CPV and its potential downstream consequences, including HIV.

In the two largest US/Mexico border cities of Ciudad Juárez, Chihuahua and Tijuana, Baja California, Mexico, FSWs have an estimated HIV prevalence of 6% (19), 30 times that of the national prevalence (20, 21). In Tijuana, sex work is concentrated in the Zona Roja (or red light district) near the border with the US, and is legal for women who obtain a work permit from the Municipal Health Department. The permit requires regular testing for HIV and STIs and monthly registration fees. In Ciudad Juárez, there is no such registration system and after the disbandment of the official red light district in recent years, sex work is more underground. Regardless of the legality of sex work, FSWs in both cities often face police harassment (14, 22-25), social stigmatization, and violence (13). In both cities, FSW work in a wide variety of work venues including bars, hotels, the street, private homes and massage parlors.

Shannon et al. have proposed a Structural HIV Determinants Framework to conceptualize the relationship between macrostructural (e.g., criminalization, geography, cultural norms), work environment (e.g., physical, social or economic features of venues), individual (e.g., substance use, STI status), client (e.g., substance use, biology) and interpersonal factors (e.g., condom use, types of sexual exchange) on the risk of HIV acquisition among FSW (26). This model relies on work from social epidemiology to describe how structural determinants operate at macrostructural, community organization, and work environment

levels and interact with interpersonal and individual factors to protect against or increase HIV risk.

Because of the overlap in the mechanisms of gender-based violence and HIV risk, we set out to identify individual, client, interpersonal, work environment and macrostructural correlates of CPV among FSWs, using data from a venue-based sample of FSWs in the two Mexican border cities of Tijuana and Ciudad Juárez. We used the framework to guide selection of measures that may increase a FSW's risk of CPV. While structural determinants can and do interact with individual behavior, we hypothesized that regardless of the characteristics and behaviors of the FSW, certain venue, neighborhood, or client factors would place one at greater risk of CPV. The identification of risks in all domains of the framework are necessary to understand the broader context of violence as well as identify potential violence intervention targets.

Methods

Study Population

From March 2013-March 2014, 603 FSWs from Tijuana and Ciudad Juárez were enrolled into a longitudinal study examining social, spatial and physical factors affecting HIV/STI transmission, drug use, and access to healthcare (*Mapa de Salud* study). The present analysis is from the baseline data. Women were excluded from the present analysis if they changed their primary venue in the past 6 months, because of the inability to link reports of violence to characteristics of the venue.

Participants were selected through modified time-location sampling within both indoor and street venues. In Tijuana, women were sampled from both the Zona Roja, a concentrated red light district downtown, and from sex work venues dispersed throughout the city. In Ciudad Juárez, promotoras recruited women citywide, with interviews taking place at a centrally located clinic. No more than 15 women were recruited from any particular work venue. In both cities, recruiters were trained local Mexican field staff with previous experience working with FSWs and other vulnerable populations or who were former sex workers themselves. Eligibility criteria included being 18 years or older, biologically female, reporting having exchanged sex for money or goods in the past month, agreeing to treatment for any STIs detected, and residing in Tijuana or Ciudad Juárez with no plans to move out of these cities in the next 18 months.

Data Collection

The baseline quantitative survey elicited information on sociodemographics, community and personal violence experiences, current and former substance use, sexual behaviors and experiences, sex work history, HIV knowledge, incarceration history and other interactions with police. In addition to the survey, HIV (SURE CHECK HIV ½ Assay, Chembio) and syphilis (SD BIOLINE Syphilis 3.0, Standard Diagnostics, Inc.) rapid tests were performed by a study nurse during the visit and vaginal swabs for gonorrhea and chlamydia (Aptima Combo 2, Gen-probe) were sent to the San Diego County laboratory for testing. HIV preliminary positive or indeterminate samples were sent to the county laboratory for a

confirmatory BioRad Multispot HIV-1/HIV-2 assay and syphilis positivity was assessed with a rapid plasma reagin (RPR) and *Treponema pallidum* hemagglutinin assay (TPHA) to both confirm diagnosis and determine active versus past infection. Counseling before testing and upon release of results was provided to all participants. Those with active syphilis, chlamydia or gonorrhea were given free treatment on-site by study nurses. Those testing positive for HIV were actively referred to local public health care providers, including offering transportation and assistance with setting up an appointment.

All study activities were approved by the Institutional Review Boards of the University of California, San Diego; El Colegio de la Frontera Norte in Tijuana; and the Universidad Autónoma de Ciudad Juárez.

Measures

Recent CPV—The outcome of interest, “recent CPV”, was created from four questions about CPV: “Have you ever been forced or coerced into having sex or engaging in a sexual activity against your will with a client?” (yes or no) and “Have you ever been physically abused (i.e., hit or assaulted) by a client?” (yes or no). Participants reporting either type of abuse were then asked the most recent time this happened: past 30 days, 1 month but <6months, 6 months but less than one year, a year or more ago. “Recent CPV” was any participant who experienced sexual or physical violence within the last 6 months. These measures were the same as those previously used in studies of FSW in these cities (27).

Individual factors—Included basic demographics: age, years of education completed, rating of financial situation (bad/very bad vs. neutral/good/extremely good), having a spouse or steady partner, homelessness in the past 6 months, working in more than one venue in the past 30 days (yes/no) and years in sex work. Based on past qualitative work that found that street workers may potentially be a high-risk group of FSWs, we dichotomized a categorical variable asking for occupation (e.g., dancer, barmaid, call girl, street worker) into street worker vs. other (28).

“Any illicit drug use in the past 6 months” was coded from report of using any of the following drugs during the past 6 months: marijuana/hash, heroin, methamphetamine, amphetamine, cocaine, crack, inhalants, tranquilizers, or any combination of these drugs. “Any injection drug use in the past 6 months” was coded as “yes” if the participant reported injecting any of the drugs mentioned above in the past 6 months. We also assessed alcohol or drug use before sex in the past 30 days (often or always vs. half the time/sometimes/never),

The variable *any active STI* was coded ‘yes’ if the participant received at least one positive diagnosis from STI laboratory testing (chlamydia, gonorrhea, active syphilis or HIV). Active syphilis was classified as a titer 1:8.

Client and interpersonal factors—For clarity, we transformed “how many of your clients in the past 30 days live in Mexico” to a foreign vs. local client variable (coded none/a few/some/half vs. most/all). Similar coding was used for “how many of your clients in the past 30 days live in the US” (coded none/a few/some vs. half/most/all). While these

questions were similar, it was thought there may be differences since Tijuana is known to attract foreign clientele from a number of countries. Participants were also asked if they saw police or military as clients in the venue.

Participants reported how many male clients were drunk/high at time of sex in the last 30 days (none/few/some/half vs. most/all) and if they injected drugs with clients (always/often vs. half/sometimes/never). Client and interpersonal sexual risk included the number of male clients in the past 30 days and whether they use condoms with [regular, new/irregular] clients (coded as inconsistent condom use if they did not report almost always using a condom).

Work environment factors—Questions were asked about the venue the women worked in most often in the past 30 days. They included characteristics of the venue, such as the type, payment to management/pimps, free condoms or syringes available, number of other FSWs at venue, illicit drug sale and use; social disorder variables (rats/pets, dark or hard to see, crowded); and indicators of community violence (including witnessing of a fight or drug trade violence in the past 6 months).

Macrostructural factors—Macrostructural items were external to individuals or venues and were considered to be a product of social, economic or legal factors. Items were assessed with a series of questions about what participants witnessed in the neighborhood where sex work takes place: violence towards sex workers from clients, street violence, members of mafia/cartels/narcos, sex workers arrested, and torn down buildings. Response choices were coded never vs. rarely/sometimes/half/very often.

Yes or no questions regarding police activities included: presence of police/military checkpoints in the colonia [larger neighborhood] the sex work venue is in and whether there were regular police/military patrols in the venue neighborhood.

Data Analysis

Descriptive statistics and Chi-square or Fischer's exact tests were used to compare individual, client, interpersonal, work environment, and macrostructural factors of FSWs who did or did not experience CPV in the past six months. Non-normally distributed continuous correlates were examined using the Wilcoxon Rank Sum test.

We used univariate logistic regression to identify factors associated with CPV. Variables associated with the outcome at a p -value <0.2 were considered for further analysis. We constructed multivariate models using a manual procedure where all variables that had reached a significance level of $p <0.2$ were considered for inclusion. No variables were included a-priori. Two-sided p -values <0.05 were considered statistically significant. The likelihood ratio test was used to evaluate model fit. Confounding was assessed by determining changes in the odds ratio of greater than 10%. All analyses were run using PASW 9.0.

Results

Sample characteristics

Out of 603 participants, 1 was missing data on sexual abuse and 106 moved their primary venue in the past 6 months, therefore a total of 496 were included in the final analysis. The median age was 33 years (interquartile range (IQR): 26-42) and the median years of education completed was 8 (IQR:6-9) (in Mexico 9 years of school is compulsory and is equivalent to a middle school education). Approximately a third of the women (29%) reported their financial situation as being 'bad' or 'very bad', 12% reported being homeless in the past 6 months, and the median number of years in sex work was 9 (IQR: 4-18). Less than half of the sample had a steady partner or spouse (40%).

Among the participants, 5% reported a recent experience of CPV, either physical or sexual, in the past 6 months; 2% reported recent sexual abuse and 4% reported recent physical abuse. Participants who had and had not experienced recent CPV did not statistically significantly differ (at $\alpha=0.05$) on basic demographic characteristics, including median age, years of education, years in sex work, or marital status (Table I). Reporting a bad or very bad financial situation was marginally higher among those experiencing recent CPV (46% vs. 28%, $p=0.05$).

From the original cohort, we excluded 106 women who had changed their primary venue in the past 6 months. There were no statistically significant differences (at $p<0.05$) in individual demographics or behaviors between movers and non-movers women or any statistically significant differences in rates of recent CPV (9% vs. 5%, $p=0.1$).

Univariate associations with CPV

Individual correlates of recent CPV—Women who experienced recent CPV in the past 6 months were more likely to be homeless (uOR: 3.1, 95% CI: 1.2-7.7) or work as a “street worker” (uOR: 4.2, 95% CI: 1.8-9.9) (Table I). FSWs who reported using drugs always or often before sex had higher odds of recent CPV than women who did not (uOR: 3.6, 95% CI: 1.5-8.4); however, personal use of alcohol before sex, any drug use in the past 6 months, and injection drug use in the past 6 months were not statistically significantly associated with recent CPV. FSWs who had and had not experienced recent CPV in the past 6 months did not differ on active STI status (46% vs. 28%, $p=0.1$) or HIV status (4% vs. 3%, $p=0.6$).

Client and interpersonal correlates of recent CPV—Client factors associated with higher CPV included having a majority of foreign clients (uOR: 4.4, 95% CI: 2.0-9.9), having a majority of clients from the US (uOR: 3.0, 95% CI: 1.3-6.8), or seeing police or military as clients (uOR: 2.8, 95% CI: 1.1-6.5) (Table II). Reporting more than half of clients were high at the time of sex in the past 30 days (uOR: 5.4, 95% CI: 2.2-13.0) was associated with higher odds of CPV, but this relationship was not found for drunk clients.

For interpersonal factors with clients, participants who reported inconsistently using condoms (ICU) with new/irregular clients had higher odds of recent CPV compared to those who consistently used condoms (uOR: 2.7, 95% CI: 1.2-6.5). However, this relationship between ICU and recent CPV was not statistically significant for regular clients. There was

no significant relationship between median number of clients or injecting drugs with clients and CPV.

Work environment correlates of recent CPV—The three primary venues where women in the sample worked were bars (38%), hotels (27%) and the street (19%) and reporting the street as a primary venue (uOR: 2.8, 95% CI: 1.2-6.4) was associated with higher odds of CPV (Table III). Witnessing a fight or violence at the work venue (uOR: 3.0, 95% CI: 1.3-7.0) and the sale of illicit drugs (uOR: 2.6, 95% CI: 1.1-5.7) were associated with recent CPV. The number of other FSW in the venue was marginally significant (uOR: 1.01, 95% CI: 0.99-1.02). There was no significant relationship between recent CPV and the use of drugs, availability of free condoms or syringes, use of a pimp, or witnessing recent drug trade violence. There was also no significant relationship between recent CPV and the other social disorder variables including working in a dark, crowded, or pest-infested venues.

Macrostructural correlates of recent CPV—Women who experienced CPV were more likely to be from the Zona Norte (red light district) area of Tijuana (uOR: 2.8, 95% CI: 1.3-6.2) and were marginally less likely to be from Ciudad Juárez (uOR: 0.4, 95% CI: 0.2-1.0) (Table IV). Participants who reported torn-down buildings in the neighborhood of their sex work venue were more likely to report recent CPV (uOR: 2.4, 95% CI: 1.1-5.4). Seeing other sex workers arrested (OR: 2.9, 95% CI: 1.1-7.3) was associated with CPV, but police patrols in the neighborhood or colonia were not. Finally, witnessing violence towards other sex workers (uOR: 7.8, 95% CI: 2.6-22.9), street violence (uOR: 4.1, 95% CI: 1.4-12.0), and visibility of cartel members (uOR: 2.8, 95% CI: 1.2-6.2) were all associated with higher odds of recent CPV.

Multivariate analysis

Seeing other FSWs experiencing CPV was a macrostructural correlate independently associated with greater odds of recent CPV (aOR: 5.6, 95% CI: 1.8-17.2) (Table V). Women who experienced recent CPV were also significantly more likely to report the client correlates of having a majority of clients in the past month who used drugs (aOR: 4.0, 95% CI: 1.5-10.4) or who were foreigners (aOR: 3.5, 95% CI: 1.4-8.4) (Table V). Finally, identifying as a street worker was independently associated with higher odds of recent CPV (aOR: 3.0, 95% CI: 1.2-7.7). There were no confounders (including city of recruitment) retained in the final model.

Discussion

We found microstructural and client correlates associated with CPV in the past 6 months, independent of individual behaviors.

In our study, witnessing community violence towards other FSWs was associated with 6 times higher odds of personal experience of recent CPV (95% CI: 1.8-17.2). This finding is similar to studies of IPV in a non-sex worker population, which found that neighborhoods that were perceived as dangerous (18) or had greater social disorder (16, 17) were associated with higher rates of IPV. We did not find a relationship between social disorder items and

recent CPV in the final model. Past studies suggest social disorder may be related to violence via its relationship to community violence, however the current analysis was not designed to test for mediating effects (16). To our knowledge, this is the first study to investigate the associations of social disorder and community violence with CPV (6).

Our study also found that compared to FSWs whose clients were primarily Mexican, FSWs who reported that over half of their clients were foreign had 3.5 times the odds of recent CPV (95% CI: 1.4-8.4). These findings suggest that there is likely to be higher levels of CPV among women that cater to sex tourists. However, this may represent a selection bias where men who travel to Mexico for sex are a generally riskier population. In addition, FSWs who reported that over half of their clients use drugs had 4-fold odds of recent CPV (95% CI: 1.5-10.4). Drug-using clients have been associated with CPV in other studies (13, 29), but it is a new finding that foreign clients increase risk of CPV.

While the body of FSW client-based research is growing for the study of HIV, more work is needed to understand the structural influences that are facilitating violence from these clients.

Participants who self-identified as street workers had 3-fold higher odds of recent CPV (95% CI: 1.2-7.7). Note that “street workers” is an occupational designation, rather than a location. In our sample, many women self-identified as being “street workers” but listed a hotel as their primary venue (likely because they solicit on the street and engage in sex in hotels). We found that women who reported their primary venue was the street had similar odds of recent CPV compared to non-street venues. While qualitative work has uncovered a similar distinction between “street workers” and street-based women (28), the majority of studies of FSWs merely dichotomize women as either working indoors or outdoors, thus potentially clouding the study of risk of CPV in this group.

The HIV research community has recognized the importance of including violence prevention strategies as HIV prevention (23, 30). Prevalence of HIV in this sample (3%) was much higher than the national adult average in Mexico of 0.2% (21). However, we did not have sufficient power to test a relationship between HIV and CPV in this analysis. Also, while there was not a statistically significant difference in current STI diagnosis between the recent CPV and no CPV groups (42% vs. 28%), these high rates indicate that this population is engaging in risky sexual behaviors and are at heightened risk for HIV.

The power to detect significant associations was reduced by the small sample of women reporting recent CPV. The prevalence of recent CPV in this sample (5%) was about 4-times lower than a previous study in this population conducted from 2004 to 2006 (31). However, this prior work primarily focused on sampling from red light districts of both cities. Since that study, the sex work environment in Ciudad Juárez has been transformed from that of a visible red light district to one of dispersed venues embedded in residential neighborhoods and shopping centers. In this sample FSWs in the Zona Roja reported 3 times higher odds of recent CPV than women sampled elsewhere (2.81, 95% CI: 1.3-6.2), suggesting that red light districts may be associated with greater risk of CPV. While this analysis was designed

to explore correlates of recent CPV, future work could focus directly on comparing the contextual differences between the cities.

Women in our sample may have also underreported CPV because they do not view lesser acts of violence (e.g., slapping, pushing, hitting) as a ‘violent’ incident, but rather as a behavioral norm (32). A peak violent crime period occurred in Tijuana and Ciudad Juárez from 2007 to about 2010, which may have contributed to this desensitization to violence as compared to studies conducted prior to the period. Asking about specific behaviors that indicate sexual or physical abuse may have yielded a higher rate of recent CPV, but the length of the baseline interview precluded the inclusion of multiple behavior-based measures of violence. However, the small sample size and possible under-reporting of violence would tend to bias our results towards the null, making our current findings likely conservative in the estimation of factors associated with CPV.

Our analyses were limited because the data were cross-sectional and precluded us from making any causal inferences. Additionally, frequent correlates were based on reports of the last 30 days in order to improve recall, but CPV was measured over the last 6 months. In order to link recent CPV to a particular venue environment, we necessarily excluded women who had changed venues in the past 6 months. Studies conducted in India have reported an association between moving between venues and greater risk of violence (2, 33). However, in our cohort there were no significant differences in reports of recent CPV between movers and non-movers and no excluded participants reported that they moved venues because of violence.

A final limitation is that we only collected and analyzed work environment and neighborhood data on participant's primary sex work venue, even though 22% of the sample also reported working at a different venue. There is the potential that the reported violence occurred at a venue not analyzed. However, the risk of this is minimized, as most women reported spending a significant amount of time (5-7 days a week) at their primary venue (data not shown). Additionally, in this cohort we did not find a significant association between having multiple venues and recent CPV.

Our findings identified profiles of clients that may be more likely to perpetrate violence, pointing to the importance of engaging clients and venue management in the creation of safer work environments (35, 36). Next steps would include linking the structural and client factors found in this study to specific venue profiles or geographical areas to identify intervention targets. An ongoing HIV risk reduction intervention with the clients of FSW in the Tijuana border region could be adapted or expanded to include an anti-violence component (27, 37).

Finally, as they have been shown in this study and others to be at heightened risk, “street workers” in particular should be further engaged in order to clarify what it means to be a street worker and determine specific structural and interpersonal aspects of this work that places them at greater risk for violence. Creation of safe drop-in centers and the community mobilization of FSWs has shown to be effective in reducing violence (34, 36) and may be one strategy to assist women who lack the security a venue may provide. These programs

could benefit from the existing HIV prevention public health infrastructure already in place in the border cities.

To our knowledge, this is the first study in Mexican border cities to include multiple levels of factors to study recent CPV in one model. These findings lend further support that interventions to reduce CPV among FSWs should adopt a structural determinants framework.

Acknowledgements

The authors respectfully acknowledge the participation of all the women in this study for making this work possible. We also thank the project coordinator, Kristen Meckel-Parker and the U.S.-Mexico bi-national study staff. Research reported in this publication was supported by the National Institute on Drug Abuse of the National Institutes of Health under award number R01DA029899. Dr. Strathdee is supported by a NIDA MERIT Award R37 DA019829. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

References

1. Tounkara FK, Diabate S, Guedou FA, Ahoussinou C, Kintin F, Zannou DM, et al. Violence, Condom Breakage, and HIV Infection Among Female Sex Workers in Benin, West Africa. *Sex Transm Dis.* 2014; 41(5):312–8. [PubMed: 24722385]
2. Ramesh S, Ganju D, Mahapatra B, Mishra RM, Saggurti N. Relationship between mobility, violence and HIV/STI among female sex workers in Andhra Pradesh, India. *BMC public health.* 2012; 12:764. Epub 2012/09/13. [PubMed: 22967276]
3. Jewkes RK, Dunkle K, Nduna M, Shai N. Intimate partner violence, relationship power inequity, and incidence of HIV infection in young women in South Africa: a cohort study. *Lancet.* 2010; 376(9734):41–8. [PubMed: 20557928]
4. Decker MR, Wirtz AL, Moguilnyi V, Peryshkina A, Ostrovskaya M, Nikita M, et al. Female Sex Workers in Three Cities in Russia: HIV Prevalence, Risk Factors and Experience with Targeted HIV Prevention. *AIDS and behavior.* 2014; 18(3):562–72. [PubMed: 23929034]
5. Baral S, Beyrer K, Muessig K, Poteat T, Wirtz AL, Decker MR, et al. Burden of HIV among female sex workers in low-income and middle-income countries: a systematic review and meta-analysis. *The Lancet infectious diseases.* 2012; 12(7):538–49. Epub 2012/03/20. [PubMed: 22424777]
6. Deering KN, Amin A, Shoveller J, Nesbitt A, Garcia-Moreno C, Duff P, et al. A Systematic Review of the Correlates of Violence Against Sex Workers. *American journal of public health.* 2014
7. Decker MR, Wirtz AL, Pretorius C, Sherman SG, Sweat MD, Baral SD, et al. Estimating the impact of reducing violence against female sex workers on HIV epidemics in Kenya and Ukraine: a policy modeling exercise. *American journal of reproductive immunology.* 2013; 69(Suppl 1):122–32. [PubMed: 23387931]
8. Chersich MF, Luchters SM, Malonza IM, Mwarogo P, King'ola N, Temmerman M. Heavy episodic drinking among Kenyan female sex workers is associated with unsafe sex, sexual violence and sexually transmitted infections. *International journal of STD & AIDS.* 2007; 18(11):764–9. [PubMed: 18005511]
9. Odnokova V, Rusakova M, Urada LA, Silverman JG, Raj A. Police sexual coercion and its association with risky sex work and substance use behaviors among female sex workers in St. Petersburg and Orenburg, Russia. *The International journal on drug policy.* 2014; 25(1):96–104. [PubMed: 23916802]
10. Zhang C, Li XM, Stanton B, Hong Y, Chen YY, Shan Q, et al. Alcohol use and client-perpetrated sexual violence against female sex workers in China. *Psychol Health Med.* 2013; 18(3):330–42. [PubMed: 22882121]
11. Hong Y, Zhang C, Li X, Liu W, Zhou Y. Partner violence and psychosocial distress among female sex workers in China. *PloS one.* 2013; 8(4):e62290. [PubMed: 23626798]

12. El-Bassel N, Witte SS, Wada T, Gilbert L, Wallace J. Correlates of partner violence among female street-based sex workers: substance abuse, history of childhood abuse, and HIV risks. *AIDS patient care and STDs*. 2001; 15(1):41–51. [PubMed: 11177587]
13. Ulibarri MDS SA, Lozada R, Magis-Rodriguez C, Amaro H, O'Campo P, Patterson TL. Prevalence and correlates of client-perpetrated abuse among female sex workers in two Mexico-U.S. border cities. *Violence against women*. 2014; 20(4):427–45. [PubMed: 24686125]
14. Shannon K, Kerr T, Strathdee SA, Shoveller J, Montaner JS, Tyndall MW. Prevalence and structural correlates of gender based violence among a prospective cohort of female sex workers. *Bmj*. 2009; 339:b2939. [PubMed: 19671935]
15. Schwitters A, Swaminathan M, Serwadda D, Muyonga M, Shiraiishi RW, Benech I, et al. Prevalence of Rape and Client-Initiated Gender-Based Violence Among Female Sex Workers: Kampala, Uganda, 2012. *AIDS and behavior*. 2014
16. Raghavan C, Mennerich A, Sexton E, James SE. Community violence and its direct, indirect, and mediating effects on intimate partner violence. *Violence against women*. 2006; 12(12):1132–49. [PubMed: 17090690]
17. Cunradi CB. Intimate Partner Violence Among Hispanic Men and Women: The Role of Drinking, Neighborhood Disorder, and Acculturation-Related Factors. *Violence and Victims*. 2009; 24(1): 83–97. [PubMed: 19297887]
18. Reed E, Silverman JG, Welles SL, Santana MC, Missmer SA, Raj A. Associations between perceptions and involvement in neighborhood violence and intimate partner violence perpetration among urban, African American men. *Journal of community health*. 2009; 34(4):328–35. [PubMed: 19343487]
19. Strathdee SA, Lozada R, Semple SJ, Orozovich P, Pu M, Staines-Orozco H, et al. Characteristics of female sex workers with US clients in two Mexico-US border cities. *Sex Transm Dis*. 2008; 35(3):263–8. [PubMed: 18032996]
20. UNAIDS. UNAIDS. 2012.. Human development report. 2012. [February 28, 2014]; Available from: <http://www.unaids.org/en/regionscountries/countries/mexico/>
21. CENSIDA. La epidemia del VIH y el sida en Mexico. 2013
22. Beletsky L, Martinez G, Gaines T, Nguyen L, Lozada R, Rangel G, et al. Mexico's northern border conflict: collateral damage to health and human rights of vulnerable groups. *Revista panamericana de salud publica = Pan American journal of public health*. 2012; 31(5):403–10. [PubMed: 22767041]
23. Deering KN, Bhattacharjee P, Mohan HL, Bradley J, Shannon K, Boily M-C, et al. Violence and HIV Risk Among Female Sex Workers in Southern India. *Sexually Transmitted Diseases*. 2013;1. [PubMed: 23250296]
24. Earausquin JT, Reed E, Blankenship KM. Police-Related Experiences and HIV Risk Among Female Sex Workers in Andhra Pradesh, India. *Journal of Infectious Diseases*. 2011; 204:S1223–S8. [PubMed: 22043036]
25. Platt L, Grenfell P, Bonell C, Creighton S, Wellings K, Parry J, et al. Risk of sexually transmitted infections and violence among indoor-working female sex workers in London: the effect of migration from Eastern Europe. *Sexually transmitted infections*. 2011; 87(5):377–84. [PubMed: 21572111]
26. Shannon K, Goldenberg SM, Deering KN, Strathdee SA. HIV infection among female sex workers in concentrated and high prevalence epidemics: why a structural determinants framework is needed. *Current opinion in HIV and AIDS*. 2014; 9(2):174–82. Epub 2014/01/28. [PubMed: 24464089]
27. Pitpitan EV, Chavarin CV, Semple SJ, Magis-Rodriguez C, Strathdee SA, Patterson TL. Hombre Seguro (Safe Men): a sexual risk reduction intervention for male clients of female sex workers. *BMC public health*. 2014; 14:475. Epub 2014/06/03. [PubMed: 24885949]
28. Goldenberg SM, Strathdee SA, Gallardo M, Nguyen L, Lozada R, Semple SJ, et al. How important are venue-based HIV risks among male clients of female sex workers? A mixed methods analysis of the risk environment in nightlife venues in Tijuana, Mexico. *Health & place*. 2011; 17(3):748–56. Epub 2011/03/15. [PubMed: 21396875]

29. Wechsberg WM, Luseno WK, Lam WK. Violence against substance-abusing South African sex workers: intersection with culture and HIV risk. *AIDS care*. 2005; 17(Suppl 1):S55–64. [PubMed: 16096118]
30. Shannon K, Csete J. Violence, condom negotiation, and HIV/STI risk among sex workers. *JAMA : the journal of the American Medical Association*. 2010; 304(5):573–4. [PubMed: 20682941]
31. Ulibarri MD, Strathdee SA, Ulloa EC, Lozada R, Fraga MA, Magis-Rodriguez C, et al. Injection drug use as a mediator between client-perpetrated abuse and HIV status among female sex workers in two Mexico-US border cities. *AIDS and behavior*. 2011; 15(1):179–85. Epub 2009/07/29. [PubMed: 19636697]
32. Cepeda A, Nowotny KM. A Border Context of Violence: Mexican Female Sex Workers on the U.S.-Mexico Border. *Violence against women*. 2014
33. Saggurti N, Jain AK, Sebastian MP, Singh R, Modugu HR, Halli SS, et al. Indicators of Mobility, Socio-Economic Vulnerabilities and HIV Risk Behaviours Among Mobile Female Sex Workers in India. *AIDS and behavior*. 2012; 16(4):952–9. [PubMed: 22186960]
34. Beattie TS, Bhattacharjee P, Ramesh BM, Gurnani V, Anthony J, Isac S, et al. Violence against female sex workers in Karnataka state, south India: impact on health, and reductions in violence following an intervention program. *BMC public health*. 2010; 10:476. [PubMed: 20701791]
35. Reza-Paul S, Lorway R, O'Brien N, Lazarus L, Jain J, Bhagya M, et al. Sex worker-led structural interventions in India: a case study on addressing violence in HIV prevention through the Ashodaya Samithi collective in Mysore. *The Indian journal of medical research*. 2012; 135:98–106. [PubMed: 22382190]
36. Argento E, Reza-Paul S, Lorway R, Jain J, Bhagya M, Fathima M, et al. Confronting structural violence in sex work: lessons from a community-led HIV prevention project in Mysore, India. *AIDS care*. 2011; 23(1):69–74. Epub 2011/01/11. [PubMed: 21218278]
37. Pitpitan EV, Strathdee SA, Semple SJ, Chavarin CV, Magis-Rodriguez C, Patterson TL. Buffering Syndemic Effects in a Sexual Risk-Reduction Intervention for Male Clients of Female Sex Workers: Results From a Randomized Controlled Trial. *American journal of public health*. 2015:e1–e6. Epub 2015/02/26.

Table 1

Individual factors of female sex workers by experience of client perpetrated violence (CPV) in the past 6 months

Variable	Total (N=496)	No recent CPV (n=470)	Recent CPV (n=26)	X ² , p-value	uOR [95% CI]
Demographics					
Median age (IQR)	33 (26-42)	33 (26-42)	32 (30-39)	-0.19, 0.85 ^a	0.99 [0.95-1.03]
Median years of education completed (IQR)	8 (6-9)	8 (6-9)	8 (6-9)	-0.06, 0.95 ^a	1.03 [0.89-1.20]
Financial situation-bad/very bad	144 (29%)	132 (28%)	12 (46%)	3.90, 0.05	2.20 [0.99-4.87]
Has spouse or steady partner	198 (40%)	184 (39%)	14 (54%)	2.22, 0.14	1.81 [0.82-4.01]
Homeless past 6mo	57 (12%)	50 (11%)	7 (27%)	0.02 ^b	3.10 [1.24-7.73]
Median years in sex work (IQR)	9 (4-18)	9 (4-18)	10.5 (6-18)	-0.88, 0.38 ^a	1.01 [0.97-1.05]
Street worker (vs. other sex work occupation)	181 (37%)	163 (35%)	18 (68%)	12.62, <0.01	4.22 [1.80-9.92]
Work at multiple venues past 30 days	107 (22%)	100 (21%)	7 (27%)	0.46, 0.50	1.36 [0.56-3.33]
Substance use					
Use alcohol often or always before sex	117 (24%)	111 (24%)	6 (23%)	0.01, 0.93	0.96 [0.38-2.45]
Use drugs often or always before sex past 30 days	69 (14%)	60 (13%)	9 (35%)	0.01 ^b	3.57 [1.52-8.38]
Any illicit drug use past 6mo	292 (59%)	273 (58%)	19 (73%)	2.29, 0.13	1.96 [0.81-4.75]
Any injection drug use past 6mo	79 (15%)	72 (15%)	7 (27%)	0.16 ^b	2.04 [0.83-5.02]
Sexual Risk					
Any active STI	139 (28%)	128 (28%)	11 (42%)	2.60, 0.11	1.92 [0.86-4.29]
HIV positive	15 (3%)	14 (3%)	1 (4%)	0.56 ^b	1.29 [0.16-10.20]

IQR=interquartile range

^aWilcoxon Rank Sum

^bFischer's exact

Table II

Client and interpersonal factors associated with client perpetrated violence (CPV) in the past 6 months

Variable	Total (N=496)	No recent CPV (n=470)	Recent CPV (n=26)	χ^2 , p-value	uOR [95% CI]
More than half of clients past 30 days are foreign	122 (25%)	107 (24%)	15 (58%)	15.11, <0.01	4.42 [1.97-9.92]
More than half of clients past 30 days from US	106 (22%)	95 (21%)	11 (44%)	7.45, 0.01	2.99 [1.31-6.81]
Seeing police or military as clients	228 (46%)	210 (45%)	18 (69%)	5.98, 0.01	2.79 [1.12-6.53]
Substance use					
More than half clients in past 30 days drunk	218 (44%)	202 (43%)	16 (62%)	3.27, 0.07	2.08 [0.93-4.69]
More than half clients in past 30 days high	53 (11%)	44 (10%)	9 (38%)	<0.01 ^b	5.39 [2.23-13.03]
Inject with client always or often in past 30 days	16 (3%)	15 (3%)	1 (3.8%)	0.59 ^b	1.20 [0.15-9.45]
Sexual risk					
Median number of male clients past 30 days (IQR)	20 (8-40)	20 (8-40)	25 (9-49)	-0.76, 0.45 ^a	1.01 [0.99-1.02]
Inconsistent condom use with regular clients past 30 days	232 (52%)	221 (52%)	11 (48%)	0.18, 0.67	0.83 [0.36-1.93]
Inconsistent condom use with new/irregular clients past 30 days	164 (38%)	150 (36%)	14 (61%)	5.64, 0.02	2.74 [1.16-6.48]

IQR=interquartile range

^aWilcoxon Rank Sum^bFischer's exact

Table III

Work environment factors associated with client perpetrated violence (CPV) in the past 6 months

Variable	Total (N=496)	No Recent CPV (n=470)	Recent CPV (n=26)	X ² , p-value	uOR [95% CI]
Venue characteristics					
Primary venue past 30 days					
Bar	187 (38%)	182 (39%)	5 (19%)	3.99, 0.05	0.38 [0.14-1.02]
Street	96 (19%)	86 (18%)	10 (38%)	6.42, 0.01	2.79 [1.22-6.36]
Hotel	132 (27%)	123 (26%)	9 (35%)	0.90, 0.34	1.49 [0.65-3.44]
Median number of other FSWs at venue (IQR)	10 (5-20)	10 (5-20)	15 (8-23)	-2.12, 0.03 ^a	1.01 [0.99-1.02]
Required to pay a pimp or manager currently	47 (10%)	44 (9%)	3 (12%)	0.73 ^b	1.26 [0.37-4.38]
Free condoms available past 30 days	217 (44%)	204 (44%)	13 (50%)	0.41, 0.52	1.29 [0.59-2.85]
Substance use					
Illicit drugs sold at venue past 30 days	140 (31%)	127 (30%)	13 (52%)	5.43, 0.02	2.55 [1.13-5.74]
Illicit drugs used at venue past 30 days	299 (65%)	281 (65%)	18 (78%)	1.76, 0.18	1.96 [0.71-5.38]
Free syringes available at venue past 30 days	47 (11%)	44 (11%)	3 (12%)	0.74 ^b	1.17 [0.34-4.08]
Social disorder					
Has rats or pests at venue past 30 days	170 (35%)	158 (34%)	12 (48%)	2.08, 0.15	1.80 [0.80-4.04]
Is dark or hard to see at venue past 30 days	147 (30%)	139 (30%)	8 (31%)	0.02, 0.90	1.06 [0.45-2.48]
Is often crowded at venue past 30 days	379 (77%)	360 (77%)	19 (73%)	0.19, 0.67	0.82 [0.84-2.01]
Community violence					
Witnessed a fight or violence in this location past 6mo	197 (40%)	180 (38%)	17 (65%)	7.55, 0.01	3.04 [1.33-6.97]
Witness drug trade violence past 6mo (n=182)	37 (20%)	32 (19%)	5 (33%)	0.19 ^b	2.11 [0.67-6.60]

IQR=interquartile range

^aWilcoxon Rank Sum^bFischer's exact

Table IV

Macrostructural factors associated with client perpetrated violence (CPV) in the past 6 months

Variable	Total (N=496)	No recent CPV (n=470)	Recent CPV (n=26)	χ^2 , p-value	uOR [95% CI]
Interview site					
Ciudad Juárez	268 (54%)	259 (55%)	9 (35%)	4.17, 0.04	0.43 [0.19-0.99]
Tijuana-Zona Roja	152 (31%)	138 (29%)	14 (54%)	6.95, 0.01	2.81 [1.27-6.22]
Tijuana-Outside Zona Roja	76 (15%)	73 (16%)	3 (12%)	0.78 ^b	0.71 [0.21-2.42]
<i>Social disorder</i>					
Seeing torn down buildings	185 (37%)	170 (36%)	15 (58%)	4.88, 0.03	2.41 [1.08-5.36]
<i>Policing</i>					
Police/military checkpoints in the colonia/ area	255 (52%)	240 (51%)	15 (58%)	0.42, 0.52	1.30 [0.59-2.89]
Regular police/military patrols in the neighborhood	440 (89%)	415 (89%)	25 (96%)	0.34 ^b	3.13 [0.42-23.60]
Seeing sex workers arrested	271 (55%)	253 (54%)	20 (77%)	5.31, 0.02	2.86 [1.13-7.25]
<i>Community violence</i>					
Seeing violence towards sex workers from clients	217 (44%)	195 (42%)	22 (85%)	18.62, <0.01	7.76 [2.63-22.86]
Seeing street violence	292 (59%)	270 (57%)	22 (85%)	7.51, 0.01	4.07 [1.38-12.01]
Seeing members of the mafia/cartels/narcos	188 (38%)	172 (37%)	16 (62%)	6.51, 0.01	2.77 [1.23-6.24]

IQR=interquartile range

^a Wilcoxon Rank Sum^b Fischer's exact

Table V

Factors independently associated with client perpetrated violence in the past 6 months

Variable	Level	aOR [95% CI] ^a
Seeing violence towards sex workers from clients	Structural	5.61 [1.83-17.21]
More than half of clients use drugs	Client	3.96 [1.51-10.38]
More than half of clients are foreign	Client	3.47 [1.43-8.44]
Street worker occupation	Individual	2.98 [1.16-7.65]

^aOdds ratios were adjusted for all other variables in the model

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript