

Published in final edited form as:

AIDS Educ Prev. 2010 October ; 22(5): 455–465. doi:10.1521/aeap.2010.22.5.455.

Condom Access: Associations with Consistent Condom Use among Female Sex Workers in Two Northern Border Cities of Mexico

Fátima A. Muñoz, MD¹, Robin A. Pollini, PhD¹, María Luisa Zúñiga, PhD¹, Steffanie A. Strathdee, PhD¹, Remedios Lozada, MD², Gustavo A. Martínez, MD³, Ana M. Valles-Medina, MPH⁴, Nicole Sirotin, MD¹, and Thomas L. Patterson, PhD⁵

¹Division of Global Public Health, School of Medicine, University of California, San Diego

²Patronato Pro-COMUSIDA, Tijuana, Mexico

³Community Health & Development of Ciudad Juarez (SADEC) and Mexican Federation of Private Associations (FEMAP), Ciudad Juarez, Chihuahua, Mexico

⁴Master in Public Health Program, Autonomous University of Baja California, Tijuana, Mexico

⁵Department of Psychiatry University of California, San Diego and MIRECC, VA Medical Center, San Diego, California

Abstract

To determine whether condom access is associated with consistent condom use among FSWs in Tijuana and Ciudad Juarez, between 2004 and 2006 we administered a questionnaire to 924 FSWs who reported unprotected sex with a client in the past two months. Of these women, 43% reported consistent (“often” or “always”) condom use; 74% said condoms were available; and 38% reported having access to free condoms. In a logistic regression, factors positively associated with consistent condom use were condom availability (*AdjOR* = 2.00; 95% *CI*: 1.32–3.03), condom affordability (*AdjOR* = 1.72; 95% *CI*: 1.25–2.38) and self-efficacy (*AdjOR* = 2.16; 95% *CI*: 1.54–3.04). Factors inversely associated with consistent condom use included poor financial status (*AdjOR* = 0.65; 95% *CI*: 0.47–0.90), methamphetamine use (*AdjOR* = 0.58; 95% *CI*: 0.40–0.83), alcohol use (*AdjOR* = 0.68; 95% *CI*: 0.49–0.96), and recent injection drug use (*AdjOR* = 0.62; 95% *CI*: 0.39–0.97). While increased condom availability may improve condom use among FSWs in general, interventions to broaden condom use among lower-income and drug-using FSWs are critically needed.

Keywords

female sex workers; condom use; prevention; HIV/AIDS; behavioral interventions; Mexico

According to the United Nations Program on HIV/AIDS (UNAIDS), unprotected sex is the main vehicle of HIV transmission in Mexico and Latin America (Cohen, 2006; ONUSIDA, 2008). In 2008, the Mexican state of Chihuahua, where Ciudad Juarez is located, ranked fifth nationally with an HIV prevalence of 0.5%, while Baja California, where Tijuana is located, ranked 7th at 0.4%; both rates stand well above Mexico’s national prevalence of 0.3% (CENSIDA, 2008).

The sex work industry thrives in many cities of northern Mexico, with female sex workers (FSWs) frequently servicing clients from both the United States and Mexico. FSWs are considered a high risk group for acquiring and transmitting HIV (Jimenez, Lara, & Rosado, 2001; Patterson, Semple, et al., 2008), and HIV prevalence among FSWs in the Mexico–U.S. border region is increasing. In 1997, only 0.6% of FSWs tested positive for HIV (del Rio & Sepúlveda, 2002); by 2008, 6.0% tested positive (Patterson, Semple, et al., 2008). Factors such as low socioeconomic status, migration, low education levels, drug use, and knowledge and perceptions about HIV and condom use all have been linked to risky sexual behaviors among FSWs (Basuki et al., 2002; Cohen, 2006; Dandona et al., 2005; Jimenez et al., 2001; Patterson et al., 2006b; Rhodes et al., 2007; Strathdee, Lozada, Semple, et al., 2008). However, condom access also plays a role, particularly in developing countries, because FSWs must have access to condoms in order to use them consistently (Morris, Morris, & Ferguson, 2009).

Consistent condom use plays a vital role in preventing sexual transmission of HIV and has consequently become the primary focus of interventions targeting vulnerable groups such as FSWs (Cohen, 1999; Kayembe et al., 2008; ONUSIDA, 2001; Zhao, Wang, Fang, Li, & Stanton, 2008). In Mexico, the Secretariat of Health, through the national HIV/AIDS program, promotes condom use and provides free condoms at community health centers, but these programs cannot ensure access to condoms for sex workers who do not attend these centers. In a recent behavioral intervention to promote condom use among FSWs in Tijuana and Ciudad Juarez, Mexico, of the 924 FSWs who completed the study, the intervention group had a 40% lower cumulative HIV/STI incidence after six months of follow-up, which was significantly lower than the control group. Incidence density for the intervention vs. control was 13.8 vs. 24.92 per 100 person years (*py*) for STIs combined, and 0 vs. 2.01 per 100 *py* for HIV, with concomitant increases in total numbers and percentages of protected sex acts and decreases in total numbers of unprotected sex acts with clients (Patterson, Mausbach, et al., 2008). Another study in Louisiana showed that a condom social marketing intervention improved condom use by increasing condom distribution and availability (Cohen et al., 1999).

Lack of access to condoms has become a significant barrier to safer sexual practices, particularly in developing countries (Cohen, 1999; Little, Myer, & Mathews, 2002; Myer, Mathews, & Little, 2002). Some persons with low income rely upon free condoms and use them to engage in sexual services to fulfill economic needs; for them, limited access leads to high-risk behavior (Little et al., 2002; Rhodes et al., 2007; Sunmola, Adebayo, & Ogungbemi, 2008). Individuals who both purchase condoms and can obtain them free of charge may report more consistent condom use than those who rely on purchase alone (Sunmola et al., 2008); however, in developing countries, low availability of condoms has been associated with unprotected sexual practices (Morris et al., 2009).

Other barriers to condom use that specifically affect FSWs should also be taken into account. Clients' demands; poor condom negotiation skills; higher pay for unprotected sex; lack of knowledge about HIV; and negative attitudes toward condom use may also significantly hinder FSWs' adoption of safer sex practices (Bucardo, Semple, Fraga-Vallejo, Davila, & Patterson, 2004; Eva, Munakata, & Onuoha, 2007; Garcia, Yam, & Firestone, 2006; Ntumbanzondo, Dubrow, Niccolai, Mwandagaliwa, & Merson, 2006). Few studies have examined the association between condom access and condom use while controlling for these factors, particularly in low and middle income countries where there is a close relationship between sex work and HIV transmission (Kayembe et al., 2008). In this study, we examine the association between condom access and consistent condom use among FSWs in Tijuana and Ciudad Juarez, Mexico.

METHODS

STUDY SETTINGS

The data for this analysis were taken from a multi-site, randomized trial of a condom-use intervention (Patterson, Mausbach, et al., 2008). The first phase of the intervention study was conducted in two cities, Tijuana and Ciudad Juárez, between 2004 and 2006. Tijuana is the largest city in the state of Baja California, Mexico, and is situated on the U.S. border adjacent to San Diego, California. Tijuana, one of Mexico's fastest growing cities, had a population of 1,410,700 in 2005; roughly half of Baja California's population lives in Tijuana (INEGI, 2005), although over half of Tijuana's inhabitants were born outside the state. The Tijuana–San Diego border crossing has become one of the busiest in the world, with over 48.6 million people crossing in 2007 (SANDAG, 2007). Sex work is quasi-legal in Tijuana, and researchers estimate that between 4,850 and 9,000 registered sex workers operate in the city (Brouwer et al., 2006). Not surprisingly, Tijuana is also a common destination for sexual tourism, especially among U.S. residents.

Ciudad Juárez is located in the Mexican state of Chihuahua, across the U.S. border from El Paso, Texas. In 2005, it had a population of 1,313,338, with 36% of its residents reporting that they were born outside Chihuahua (INEGI, 2005). In 2007, a reported 32.4 million people crossed the border from Ciudad Juárez to El Paso. In Ciudad Juárez as in Tijuana, sex work is quasi-legal, and an estimated 4,000 FSWs work in the city (Patterson et al., 2006b).

STUDY POPULATION

Between January 2004 and January 2006, 924 FSWs were recruited into a behavioral intervention study intended to increase condom use in Tijuana and Ciudad Juárez (Patterson et al., 2006a). Outreach workers approached women in the *zona roja* (red light district) of each city, and women who expressed interest in participating in a safer-sex study answered a series of screening questions to establish their eligibility. Women could also learn about the study from municipal or community health clinics and present themselves at the study office for screening. A number of “red herring” questions were included in the screener to make the eligibility criteria less easy to guess. The eligibility criteria included being at least 18 years of age; having exchanged sex for drugs, money or other commodities within the past 2 months; and having had unprotected vaginal or anal sex with at least one client within the past four weeks. All study participants provided written informed consent prior to giving data. Women were excluded if they reported that they had previously tested HIV-positive.

DATA COLLECTION

Trained, Spanish-speaking, female counselors administered the baseline survey face-to-face in private clinic rooms or outreach offices (Patterson et al., 2006a). The structured questionnaire took approximately 35 to 40 minutes to complete. Interview variables included sexual risk behaviors, working conditions, financial need, use of alcohol and drugs, social support, social influence, life experiences, social cognitive factors, and sociodemographics. Behavioral outcomes were also assessed, including frequency of unprotected sex with clients, number of clients, number of sex partners who inject drugs, and how much money the participant earned per sex act with and without a condom. Study protocols were reviewed and approved by institutional review boards in San Diego, Tijuana, and Ciudad Juárez. Participants were compensated US\$30 the baseline visit and US\$30 for the six-month follow-up visit.

STATISTICAL ANALYSIS

The primary outcome variable in this study was consistent condom use by FSWs with their clients. Participants used a scale (never, sometimes, often, always) to report how often they used a condom for vaginal sex with clients. These values were collapsed to create a binary outcome for consistent (always or often) vs. inconsistent (never or sometimes) condom use with clients. Because one of the eligibility criteria for the intervention study was having had unprotected sex (either vaginal or anal) with a client at least once in the past four weeks, it was predictable that only a very small number of participants would endorse “always” using a condom with a client for vaginal sex (presumably those women whose eligibility for the study was established by their having had unprotected *anal* rather than *vaginal* sex with a client in the past four weeks). In fact, only 26 participants (3% of the sample) stated that they “always” used a condom for vaginal sex with clients, so that the subsample of “consistent” condom users consisted mainly of women who stated that they use condoms “often” for vaginal sex with clients. Given this binary outcome, we examined the extent to which FSWs with consistent and inconsistent condom use with clients differed in the following five domains: (1) sociodemographics; (2) social environment, including financial situation, working conditions, client characteristics (e.g. nationality, drug use), number of clients, and main work venue (e.g., brothel, street, bar); (3) condom access, including whether they could afford their own condoms or had access to free ones; (4) use of alcohol and illicit drugs, including whether drugs and alcohol were used before or during sex with clients; and (5) perceptions and beliefs about condom use, including a five-item self-efficacy measure for proper use of condoms with clients (e.g. “I can use a condom properly”); and a five-item outcome expectancies measure on the benefits of using condoms (e.g. “I believe that condoms will protect me from catching HIV”). Responses to both of these measures were on a four-point scale ranging from 1 (strongly disagree) to 4 (strongly agree). The alpha for the self-efficacy scale for this sample was 0.85; that for the outcome expectancies scale was 0.79 (Patterson et al., 2006a).

Baseline data were analyzed to compare FSWs who reported consistent condom use with those who did not. Continuous variables were examined using the Wilcoxon rank sum test, while categorical data were examined using Fisher exact tests or chi-square tests. Logistic regression was used to identify factors associated with consistent condom use. Multivariate models were developed by a manual procedure according to which all variables of interest that attained a significance level of <10% were considered stepwise, beginning with those with the highest *p*-value. The likelihood ratio test was used to compare nested models, using a significance level of 5% to select variables for inclusion in the final model. We also explored interactions between variables in the final model, including interactions by site.

RESULTS

The study enrolled a total of 924 FSWs (474 in Tijuana and 450 in Ciudad Juarez). In comparing participants from Tijuana and Ciudad Juarez (Table 1), we found significant site differences for age, marital status, whether they had only Mexican or also some U.S. clients, main work venue, methamphetamine use in the last month, and lifetime use of cocaine.

Median age was 32 years; most participants (87%) were born outside the state in which they participated in the study. About one-fourth (24%) were married or reported living in common-law relationships, and the majority (94%) had children. In terms of work environment, FSWs were most likely to report working on the street (44%) rather than in a bar (35%). The majority (91%) reported sex work as their main source of income; one-third of the FSWs (36%) considered their financial situation “bad,” 55% reported “neither good nor bad,” and a lower percentage (9%) considered their financial situation “good.” Almost all (95%) attributed their involvement in sex work to financial need.

Three-quarters of FSWs (74%) reported having condoms available every time that they had vaginal sex with clients; 69% said they could afford to buy their own condoms (average cost of a condom in Ciudad Juarez and Tijuana is 14–16 pesos (about US\$1). Access to free condoms was limited, with a low percentage (6%) reporting getting free condoms “always,” 4% reporting “often,” 28% “sometimes,” and 62% “never.”

Use of alcohol in the past month was reported by a majority of FSWs (73%). The illicit drug that was most frequently used in the last month was methamphetamine (endorsed by 21% of participants), followed by cocaine (20%), marijuana (19%), and heroin (14%). Significant numbers of participants also reported using alcohol (59%) and illicit drugs (32%) before or during sexual encounters with clients.

Table 1 also compares the characteristics of FSWs who reported consistent condom use with clients (43%) and those who did not (57%). Consistent condom users ($n = 401$) were more likely to be married or living in common-law relationships (29% vs. 20%, $p = 0.004$), report having access to condoms (87% vs. 65%, $p < 0.001$), be able to buy their own condoms (79% vs. 62%, $p < 0.001$), and have U.S. clients (31% vs. 23%, $p = 0.006$). FSWs who reported consistent condom use were also significantly more likely to demonstrate higher self-efficacy regarding condom use with clients, including using condoms properly (93% vs. 85%, $p < 0.001$), using condoms every time they had vaginal or anal sex (97% vs. 83%, $p < 0.001$), and using condoms while under the influence of drugs (80% vs. 66%, $p < 0.001$). FSWs who reported consistent condom use were also significantly less likely to report being in a bad financial situation (28% vs. 41%, $p < 0.001$) (Table 1).

In the final multivariate model (Table 2), after controlling for significant potential confounders among the demographic variables shown in Table 1 (i.e., place of birth, marital status, and education), a number of factors were independently associated with consistent condom use. Those positively associated with consistent condom use were having access to condoms ($AdjOR = 2.12$, 95% CI : 1.38–3.25), being able to afford condoms ($AdjOR = 1.57$, 95% CI : 1.12–2.20), self-efficacy regarding condom use per unit increase in score ($AdjOR = 2.16$, 95% CI : 1.54–3.04) and lifetime use of cocaine ($AdjOR = 1.46$, 95% CI : 1.06–2.02). Factors independently but negatively associated with consistent condom use were being in a bad financial situation ($AdjOR = 0.65$, 95% CI : 0.47–0.89), having used methamphetamine at least once in one's lifetime ($AdjOR = 0.68$, 95% CI : 0.40–0.83), having used alcohol in the past month ($AdjOR = 0.68$, 95% CI : 0.49–0.96), and using injected drugs within the last month ($AdjOR = 0.62$, 95% CI : 0.39–0.97). No significant interactions were observed.

DISCUSSION

Our study of FSWs in Tijuana and Ciudad Juarez indicates that fewer than half of these women used condoms consistently with clients. We found that condom availability, condom affordability, and condom use self-efficacy were independently and positively associated with consistent condom use with clients. One of the most important findings to emerge from these data was the strong link between condom availability and use of condoms with clients. Specifically, we observed that for FSWs in Tijuana and Ciudad Juarez, it was more important to have condoms available than to get them for free. Perhaps for this reason, we also found an association between consistent condom use and being able to afford condoms. From a behavioral intention perspective, it is reasonable to hypothesize that availability serves as a proxy for intention, in that study participants who reported condom availability may have had condoms available precisely because they took measures to ensure that availability prior to need.

These results are consistent with those of studies performed in Indonesia (Basuki et al., 2002), India (Dandona et al., 2005), Republic of Congo (Kayembe et al., 2008), Ghana (Adu-Oppong, Grimes, Ross, Risser, & Kessie, 2007), Kenya (Morris et al., 2009) and Louisiana (Bedimo, Pinkerton, Cohen, Gray, & Farley, 2002; Cohen & Farley, 2004; Cohen et al., 1999). These studies all found that access to condoms was a major predictor of safe sexual practices. These studies also documented an association between low prevalence of condom use and lack of access. According to the literature that supports our findings, even where purchasing condoms is not a problem (Sunmola et al., 2008), affordability is of little help unless FSWs have access to condoms at the moment they are needed. Lack of access to condoms leads FSWs to unprotected sexual practices with their clients, and this predicament is more probable among women who work on the streets (Gu et al., 2008). Larios et al. (2009), in a different study of our sample, found that rates of unprotected sex for FSWs who work in the street (compared to those who work in bars) were disproportionately affected by lack of access to condoms. Our study also shows that FSWs whose main work venue is the streets report slightly less consistency in condom use compared to women who work in bars and hotels. Taken together, these findings indicate that workplace venues are important areas of future research inquiry and that providing greater access to condoms allows for higher rates of protected sex acts (Adu-Oppong et al., 2007; Nai-Ying et al., 2008).

Our findings on ability to afford condoms are consistent with those of other studies that have shown an association of affordability with consistent condom use, an association that is even more important than that between consistent condom use and the availability of free condoms (Sunmola et al., 2008). However, in contrast with studies that found an association between obtaining free condoms and consistent condom use (Adu-Oppong et al., 2007; Cohen, 1999; Drezin, MA, & K, 2006; Kumar et al., 2006; Nai-Ying et al., 2008), we found no such significant association among FSWs in Tijuana and Ciudad Juarez. In Mexico, some prevention programs distribute free condoms; however, our study findings indicate that this is insufficient for ensuring consistent condom use among FSWs in the two cities that we studied.

We found an independent association between higher levels of self-efficacy for using condoms and consistent condom use with clients. This finding is consistent with other studies (Gu et al., 2008; Knipper et al., 2007; Patterson, Mausbach, et al., 2008; Villarruel, Jemmott, Jemmott, & Ronis, 2004) that have demonstrated that self-efficacy to use a condom is correlated with lower sexual risk and is particularly predictive of condom use. Increasing condom self-efficacy through motivational interventions appears to be effective as well in increasing consistent condom use among FSWs.

Our study also found that the self-perception of being in a bad financial situation, having ever used methamphetamine, having used alcohol in the past month, and injecting illegal drugs in the past month were all independently and negatively associated with consistent condom use in the FSWs in our sample. Previous studies in Tijuana and Ciudad Juarez (Bucardo et al., 2004) and other cities (Dandona et al., 2005; Gu et al., 2008; Gutierrez, Molina-Yeppez, Morrison, Samuels, & Bertozzi, 2006; Nemoto et al., 2008) have shown that financial difficulty can be a major reason for women to begin sex work, whereas other researchers have reported that some women are pressured by family or by the use of drugs to participate in risky sexual behaviors in exchange for money. FSWs often earn more money for having sex without condoms, as has been mentioned in previous studies targeting the same population (Strathdee, Philbin, et al., 2008).

Numerous studies have demonstrated an association between substance use and risky sexual behavior (Eldemire-Shearer & Bailey, 2008; Morgenstern et al., 2009; Patterson, Semple, et al., 2008). In accordance with previous findings, the use of illicit drugs is associated with

inconsistent condom use (Gu et al., 2008; Morgenstern et al., 2009; Strathdee, Philbin, et al., 2008). In our study, use of injected drugs and use of methamphetamine were both negatively associated with consistent condom use. Methamphetamine use is very common among FSWs in Tijuana (Patterson, Semple, et al., 2008), and it can affect the central nervous system, causing impaired judgment and higher-risk sexual behaviors (Corsi & Booth, 2008; Rusch et al., 2009).

Interestingly, we found a positive association between lifetime cocaine use and consistent condom use. We expect this association is due to the higher association between both lifetime cocaine use and condom use with residence in Ciudad Juarez (vs. Tijuana), an association that persisted even after we controlled for recruitment site. It may also be that past cocaine use is associated with another risk variable that is not sufficiently controlled for in our model.

Limitations of our study include inability to measure sexual behaviors with clients directly, particularly the extent to which FSWs exchanged sex for drugs rather than for money, which has been reported elsewhere (Inciardi, 1995; McMahon, Tortu, Pouget, Hamid, & Neaigus, 2006; Strathdee, Lozada, Ojeda et al., 2008). Another limitation to consider is that condom availability was based on self-report and that “consistent condom use” in this study comprised both “often” and “always.” Certainly “always” using a condom is the desired behavioral outcome for primary prevention of HIV transmission; however, in light of the very high risk behavior reported by our study population, “often” using a condom is a step in the right direction and may be viewed as a success.

Since participants were recruited through convenience sampling and because higher-risk women were selected by design, our findings may not reflect the experience of other FSWs and are likely not representative in each city.

The relationships we observed between drug use behaviors and consistency of condom use among FSWs are important and should be further investigated. Intensified behavioral interventions could be implemented to promote condom use among high risk FSW subgroups, although some aspects, such as FSWs’ poor economic status, would be difficult to alleviate. Greater access to drug and alcohol treatment may help by intervening upon the relationship between drug dependence and lower condom use. Understanding which types of client exert more pressure and are willing to pay more for sex without condoms could uncover avenues for interventions focused on clients. Further, our data emphasize the need to enhance both condom availability and FSWs’ access to condoms. Condoms can be made more readily available in bars, motels, and restrooms, to optimize their use. Moreover, our findings add to the existing evidence of the value of motivational interventions for enhancing FSWs’ self-efficacy, since self-efficacy is associated with consistent condom use in this population.

Acknowledgments

Funding Sources

The study that yielded the data for this paper was supported by NIH R01 MH065849 (Patterson). Certain individual co-authors were also supported by the following NIH grants: R25 DA025571 (Muñoz); K01 DA022923 (Pollini); R01 DA023877 (Strathdee); K01 MH072353-05 (Zúñiga).

REFERENCES

- Adu-Oppong A, Grimes RM, Ross MW, Risser J, Kessie G. Social and behavioral determinants of consistent condom use among female commercial sex workers in Ghana. *AIDS Education & Prevention*. 2007; 19(2):160–172. [PubMed: 17411418]

- Basuki E, Wolffers I, Devillé W, Erlaini N, Luhpuri D, Hargono R, et al. Reasons for not using condoms among female sex workers in Indonesia. *AIDS Education & Prevention*. 2002; 14(2):102–116. [PubMed: 12000229]
- Bedimo AL, Pinkerton SD, Cohen DA, Gray B, Farley TA. Condom distribution: a cost-utility analysis. *International Journal of STD & AIDS*. 2002; 13:384–392. [PubMed: 12015012]
- Brouwer KC, Strathdee SA, Magis-Rodriguez C, Bravo-Garcia E, Gayet C, Patterson TL, et al. Estimated numbers of men and women infected with HIV/AIDS in Tijuana, Mexico. *Journal of Urban Health*. 2006; 83(2):299–307. [PubMed: 16736378]
- Bucardo J, Semple SJ, Fraga-Vallejo M, Davila W, Patterson TL. A qualitative exploration of female sex work in Tijuana, Mexico. *Archives of Sexual Behavior*. 2004; 33(4):343–351. [PubMed: 15162080]
- CENSIDA. Registro Nacional de los casos de SIDA. Datos al 14 de Noviembre del 2008. National Registry of AIDS cases. Data of November 14, 2008. 2008 [Retrieved July 9, 2009]. from <http://www.censida.salud.gob.mx/descargas/2008/persoentidadnov.pdf>
- Cohen DA. Condom availability for HIV/STD prevention. *AIDS Patient Care and STD*. 1999; 13(12):731–737.
- Cohen DA, Farley TA. Social marketing of condoms is great, but we need more free condoms. *Lancet*. 2004; 364(9428):13–14. [PubMed: 15234839]
- Cohen DA, Farley TA, Bedimo E, Scribner R, Ward W, Kendall C, et al. Implementation of condom social marketing in Louisiana, 1993 to 1996. *American Journal of Public Health*. 1999; 89:204–208. [PubMed: 9949750]
- Cohen MS. Amplified transmission of HIV-1: missing link in the HIV pandemic. *Transactions of the American Clinical and Climatological Association*. 2006; 117:213–225. [PubMed: 18528475]
- Corsi KF, Booth RE. HIV sex risk behaviors among heterosexual methamphetamine users: literature review from 2000 to present. *Current Drug Abuse Reviews*. 2008; 1(3):292–296. [PubMed: 19630727]
- Dandona R, Dandona L, Gutierrez JP, Kumar AG, McPherson S, Samuels F, et al. High risk of HIV in non-brothel based female sex workers in India. *BMC Public Health*. 2005; 5:87. [PubMed: 16111497]
- del Rio C, Sepúlveda J. AIDS in Mexico: lessons learned and implications for developing countries. *AIDS*. 2002; 16(11):1445–1457. [PubMed: 12131182]
- Drezin, J.; Torres, MA.; Daly, K. Barreras que impiden el acceso a los condones: Estableciendo una agenda para la incidencia política. (Barriers to condom access: Setting an agenda for advocacy). Informational pamphlet of the International Council of AIDS Service Organizations (ICASO). 2006 [Retrieved February 26, 2010]. from www.icaso.org/publications/condom_access2007_spa.pdf
- Eldemire-Shearer D, Bailey A. Determinants of risk behaviour of sex-workers in Jamaica. A qualitative approach. *West Indian Medical Journal*. 2008; 57(5):450–455. [PubMed: 19565974]
- Eva NA, Munakata T, Onuoha FN. Demographic correlates of constant condom use among sex workers in Tangail, Dhaka, Bangladesh. *Adolescence*. 2007; 42(168):795–804. [PubMed: 18229512]
- Garcia SG, Yam EA, Firestone M. "No party hat, no party": successful condom use in sex work in Mexico and the Dominican Republic. *Reproductive Health Matters*. 2006; 14(28):53–62. [PubMed: 17101422]
- Gu J, Chen H, Chen X, Lau JT, Wang R, Liu C, et al. Severity of drug dependence, economic pressure and HIV-related risk behaviors among non-institutionalized female injecting drug users who are also sex workers in China. *Drug and Alcohol Dependence*. 2008; 97(3):257–267. [PubMed: 18482804]
- Gutierrez JP, Molina-Yepes D, Morrison K, Samuels F, Bertozzi SM. Correlates of condom use in a sample of MSM in Ecuador. *BMC Public Health*. 2006; 6:152. [PubMed: 16768794]
- Inciardi JA. Crack, crack house sex, and HIV risk. *Archives of Sexual Behavior*. 1995; 24(3):249–269. [PubMed: 7611845]

- INEGI. XII Censo General de Población y Vivienda, 2005. [Twelfth general census of population and housing, 2005.]. 2005 [Retrieved December 3, 2008]. from <http://www.inegi.gob.mx/est/default.aspx?c=701>
- Jimenez L, Lara M, Rosado T. Prevalencia enfermedades de transmisión sexual y uso del condon en sexoservidoras. (Prevalence of sexually transmitted diseases and condom use in female sex workers). *Ginecología y Obstetricia de Mexico*. 2001; 69(8):310–314. [PubMed: 11599316]
- Kayembe PK, Mapatano MA, Busangu AF, Nyandwe JK, Musema GM, Kibungu JP, et al. Determinants of consistent condom use among female commercial sex workers in the Democratic Republic of Congo: implications for interventions. *Sexually Transmitted Infections*. 2008; 84(3): 202–206. [PubMed: 18055581]
- Knipper E, Rhodes SD, Lindstrom K, Bloom FR, Leichter JS, Montalvo J. Condom use among heterosexual immigrant Latino men in the southeastern United States. *AIDS Education & Prevention*. 2007; 19(5):436–447. [PubMed: 17967113]
- Kumar AG, Dandona R, Gutierrez JP, McPherson S, Bertozzi SM, Dandona L. Access to condoms for female sex workers in Andhra Pradesh. *National Medical Journal of India*. 2006; 19(6):306–312. [PubMed: 17343014]
- Larios SE, Lozada R, Semple SJ, Roesch S, Orozovich P, Fraga M, et al. An exploration of contextual factors that influence HIV risk in female sex workers in México: the Social Ecological Model applied to HIV risk behaviors. *AIDS care*. 2009; 21(10):1335–1342. [PubMed: 19370470]
- Little F, Myer L, Mathews C. Barriers to accessing free condoms at public health facilities across South Africa. *South African Medical Journal*. 2002; 92(3):218–220. [PubMed: 12040950]
- McMahon JM, Tortu S, Pouget ER, Hamid R, Neaigus A. Contextual determinants of condom use among female sex exchangers in East Harlem, NYC: an event analysis. *AIDS and Behavior*. 2006; 10(6):731–741. [PubMed: 16779657]
- Morgenstern J, Bux DA, Parsons J, Hagman BT, Wainberg M, Irwin T. Randomized trial to reduce club drug use and HIV risk behaviors among men who have sex with men. *Journal of Consulting and Clinical Psychology*. 2009; 77(4):645–656. [PubMed: 19634958]
- Morris CN, Morris SR, Ferguson AG. Sexual behavior of female sex workers and access to condoms in Kenya and Uganda on the Trans-Africa Highway. *AIDS and Behavior*. 2009; 13(5):860–865. [PubMed: 18665445]
- Myer L, Mathews C, Little F. Improving the accessibility of condoms in South Africa: the role of informal distribution. *AIDS Care*. 2002; 14(6):773–778. [PubMed: 12511210]
- Nai-Ying K, Hsin-Chun L, Jui-Ling C, Nan-Yao L, Chia-Ming C, Meng-Ping L, et al. Condom availability in Taiwanese gay bathhouses: the right things in the wrong places. *AIDS Education & Prevention*. 2008; 20(4):338–346. [PubMed: 18673066]
- Nemoto T, Iwamoto M, Colby D, Witt S, Pishori A, Mai Nhung L, et al. HIV-related risk behaviors among female sex workers in Ho Chi Minh City, Vietnam. *AIDS Education & Prevention*. 2008; 20(5) 735–453.
- Ntumbanzondo M, Dubrow R, Niccolai LM, Mwandagaliwa K, Merson MH. Unprotected intercourse for extra money among commercial sex workers in Kinshasa, Democratic Republic of Congo. *AIDS Care*. 2006; 18(7):777–785. [PubMed: 16971288]
- ONUSIDA. Programa Conjunto de las Naciones Unidas para el VIH/SIDA. Informe sobre la epidemia mundial de SIDA 2008. 2008 [Retrieved December 3, 2008]. from http://www.unaids.org/es/KnowledgeCentre/HIVData/GlobalReport/2008/2008_Global_report.asp
- ONUSIDA. Situación de la Epidemia de SIDA 2007. America Latina. Situation of the AIDS Epidemic 2007. Latin America. 2007 [Retrieved July 9, 2009]. from http://data.unaids.org/pub/EPISlides/2007/2007_epiupdate_es.pdf
- Patterson TL, Mausebach B, Lozada R, Staines-Orozco H, Semple SJ, Fraga-Vallejo M, et al. Efficacy of a brief behavioral intervention to promote condom use among female sex workers in Tijuana and Ciudad Juarez, Mexico. *American Journal of Public Health*. 2008; 98(11):2051–2057. [PubMed: 18799768]
- Patterson TL, Semple SJ, Fraga M, Bucardo J, De la Torre A, Salazar J, et al. Comparison of sexual and drug use behaviors between female sex workers in Tijuana and Ciudad Juarez, Mexico. *Substance Use and Misuse*. 2006b; 41(10–12):1535–1549. [PubMed: 17002992]

- Patterson TL, Semple SJ, Fraga M, Bucardo J, Delatorre A, Salazar-Reyna J, et al. A sexual risk reduction intervention for female sex workers in Mexico: design and baseline characteristics. *Journal of HIV/AIDS & Social Services*. 2006a; 5(2):115–137.
- Patterson TL, Semple SJ, Staines H, Lozada R, Orozovich P, Bucardo J, et al. Prevalence and correlates of HIV infection among female sex workers in 2 Mexico-US border cities. *Journal of Infectious Diseases*. 2008; 197(5):728–732. [PubMed: 18260766]
- Rhodes SD, Hergenrather KC, Yee LJ, Wilkin AM, Clarke TL, Wooldredge R, et al. Condom acquisition and preferences within a sample of sexually active gay and bisexual men in the southern United States. *AIDS Patient Care and STDS*. 2007; 21(11):861–870. [PubMed: 18240895]
- Rusch ML, Lozada R, Pollini RA, Vera A, Patterson TL, Case P, et al. Polydrug use among IDUs in Tijuana, Mexico: correlates of methamphetamine use and route of administration by gender. *Journal of Urban Health*. 2009; 86(5):760–775. [PubMed: 19521780]
- SANDAG. Border crossing data. Informational pamphlet of the San Diego County Association of Governments. 2007 [Retrieved July 9, 2009]. from http://www.sandag.org/uploads/publicationid/publicationid_1424_9306.pdf
- Strathdee SA, Lozada R, Ojeda VD, Pollini RA, Brouwer KC, Vera A, et al. Differential effects of migration and deportation on HIV infection among male and female injection drug users in Tijuana, Mexico. *PLoS One*. 2008; 3(7):e2690. [PubMed: 18665250]
- Strathdee SA, Lozada R, Semple SJ, Orozovich P, Staines-Orozco H, Fraga-Vallejo M, et al. Characteristics of female sex workers with US clients in two Mexico-US border cities. *Sexually Transmitted Diseases*. 2008; 35(3):263–268. [PubMed: 18032996]
- Strathdee SA, Philbin MM, Semple SJ, Pu M, Orozovich P, Martinez G, et al. Correlates of injection drug use among female sex workers in two Mexico-U.S. border cities. *Drug and Alcohol Dependence*. 2008; 92(1–3):132–140. [PubMed: 17714888]
- Sunmola AM, Adebayo DO, Ogungbemi KO. Patterns of condom acquisition and its association with consistent use among young men in Nigeria. *AIDS Care*. 2008; 20(7):791–795. [PubMed: 18728986]
- Villarruel AM, Jemmott JB 3rd, Jemmott LS, Ronis DL. Predictors of sexual intercourse and condom use intentions among Spanish-dominant Latino youth: a test of the planned behavior theory. *Nursing Research*. 2004; 53(3):172–181. [PubMed: 15167505]
- Zhao R, Wang B, Fang X, Li X, Stanton B. Condom use and self-efficacy among female sex workers with steady partners in China. *AIDS Care*. 2008; 20(7):782–790. [PubMed: 18728985]

Table 1

Participant sociodemographic and risk characteristics

Baseline Characteristics	Total (n = 924)	Always or often use condom (n = 401)	Never or sometimes use condom (n = 523)	p-value
Demographics				
Median age (years) (IQR)	32 (26,39)	32 (26,38)	33 (27,40)	0.056
Born in study location:				
Tijuana	54 (6%)	14 (4%)	40 (8%)	0.008
Ciudad Juarez	61 (7%)	33 (8%)	28 (5%)	
Years lived in study city (IQR)	13 (5,25)	12 (5,24)	14 (6,27)	0.103
Married or living with common-law spouse	222 (24%)	115 (29%)	107 (20%)	0.004
Educational attainment (Years) (IQR)	6 (4,8)	6 (5,9)	6 (4,8)	0.033
Had children	862 (94%)	370 (92%)	492 (95%)	0.110
Speak English	181 (20%)	85 (21%)	96 (19%)	0.300
Social Environment				
Main workplace				
Street	411 (44%)	170 (42%)	241 (46%)	0.209
Bar or cantina	325 (35%)	131 (33%)	194 (37%)	0.163
Hotel or other	188 (21%)	100 (25%)	88 (17%)	0.002
Bad financial situation	328 (36%)	114 (28%)	214 (41%)	<0.001
Financial need drives sex work	881 (95%)	379 (96%)	502 (96%)	0.372
Condom availability	683 (74%)	347 (87%)	336 (65%)	<0.001
Can afford to buy own condoms	634 (69%)	316 (79%)	318 (62%)	<0.001
Obtain free condoms:				
Never	570 (62%)	244 (61%)	326 (63%)	0.001
Sometimes	258 (28%)	100 (25%)	158 (30%)	
Often	40 (4%)	20 (5%)	20 (4%)	
Always	55 (6%)	37 (9%)	18 (3%)	
Had Mexican Clients	810 (88%)	341 (86%)	469 (90%)	0.034
Had US Clients	248 (27%)	126 (31%)	122 (23%)	0.006
Had clients who used drugs	676 (73%)	294 (73%)	382 (73%)	0.925
Had clients who injected drugs	292 (32%)	118 (30%)	174 (33%)	0.208
Drug and alcohol use				
Smoked marijuana in the last month	173 (19%)	79 (20%)	94 (18%)	0.502
Used heroin in the last month	130 (14%)	49 (12%)	81 (16%)	0.158

Baseline Characteristics	Total (n = 924)	Always or often use condom (n = 401)	Never or sometimes use condom (n = 523)	p-value
Used cocaine in the last month	181 (20%)	104 (26%)	77 (15%)	< 0.001
Ever used methamphetamine	282 (31%)	104 (26%)	178 (34%)	0.008
Used methamphetamine in the last month	197 (21%)	73 (18%)	124 (24%)	0.043
Used alcohol in the last month	673 (73%)	280 (71%)	393 (76%)	0.072
Injected illegal drugs in the past month	114 (12%)	52 (12%)	62 (12%)	0.167
Used alcohol during or before sex	546 (59%)	225 (56%)	321 (61%)	0.116
Used illegal drugs during or before sex	297 (32%)	135 (34%)	162 (31%)	0.393
FSW beliefs about condom use				
I can use condom properly	817 (89%)	372 (93%)	445 (85%)	< 0.001
I can use condom every time I have vaginal or anal sex	819 (89%)	387 (97%)	432 (83%)	< 0.001
I can use condoms under influence of drugs	664 (72%)	319 (80%)	345 (66%)	< 0.001
Condoms protect me against HIV	807 (88%)	359 (90%)	448 (86%)	0.099
Condoms interfere with sexual pleasure	518 (56%)	243 (61%)	275 (53%)	0.016

Table 2

Factors independently associated with consistent condom use among female sex workers in two Northern Cities in Mexico

Variable *	Adjusted Odds Ratio	95% Confidence Interval
Availability of condoms (yes vs. no)	2.12	1.38–3.25
Can afford their own condoms	1.57	1.12–2.20
Self-efficacy to use of condom (per unit increase)	2.16	1.54–3.04
Bad financial situation (yes vs. no)	0.65	0.47–0.89
Had ever used cocaine	1.46	1.06–2.02
Had ever used methamphetamine	0.68	0.40–0.83
Used alcohol in the past month	0.68	0.49–0.96
Injected illegal drugs in the past month	0.62	0.39–0.97

* The following variables that were significant in univariate analyses were controlled for in the multivariate analyses: birthplace (inside or outside of the study city), marital status, and years of education.