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Injecting Drug Use among Mexican Female Sex Workers on the U.S.-Mexico Border

Alice Cepeda, PhD,

University of Southern California, School of Social Work

Kathryn M. Nowotny, MA, and

University of Colorado at Boulder, Department of Sociology & Population Program

Avelardo Valdez, PhD

University of Southern California, School of Social Work

Abstract

Both injecting drug users (IDU) and sex workers are at great risk of contracting and transmitting HIV. Therefore, IDU sex workers could be at especially high risk. The recent increase of HIV infection in Mexico has caused increased attention to sex work. We identify the correlates of injecting drug use including socio-demographic, work history, and sexual and non-injecting drug use risk behaviors among Mexican female sex workers. There is a high risk profile for IDUs compared to never injectors including a high prevalence of lifetime STI infection (54.2%). Revealed is an environment composed of high-risk networks that may have serious binational public health implications.

Keywords

female sex workers; injecting drug use; HIV risk behaviors; Mexico

Among female sex workers, the use of alcohol or drugs in conjunction with sexual activity has been found to be strongly related to unsafe sex placing women at high risk for HIV infection (Booth, Watters, & Chitwood, 1993; Cook & Clark, 2005; Leigh, 1990; B. Wang, Li, & Fang, 2010) and other poor health outcomes (Li, Li, & Stanton, 2010). Crack cocaine use in particular has been widely documented as a risk factor for the sexual transmission of HIV (Booth et al., 1993; Jones et al., 1997; Kopetz, Reynolds, Hart, Kruglanski, & Lejuez, 2010). Confounding this sexual risk is the use of coercion and violence by the client in condom use negotiations (Cepeda & Nowotny, 2014; Shannon et al., 2008). Even though non-condom use with clients is a major concern, research has shown that female sex workers have higher rates on non-condom use with their regular partners than with clients (Voeten, Egesah, Varkevisser, & Habbema, 2007; Wang et al., 2007)

For sex workers who inject drugs, there are documented increases in HIV (Strathdee et al., 2011; Strathdee et al., 2008). For example, a survey of female sex workers in 14 cities in

Iran documented a HIV prevalence of 4.5 percent overall and 11.2 percent for women with a history of injecting drug use (Mirzazadeh et al., 2013). Research has documented that female injecting drug users (IDU) have not only increased risk of HIV transmission associated with injecting drug use such as sharing needles, but also increased risk for sexual transmission of HIV including having recently acquired a sexually transmitted infection (STI) and having an IDU sex partner (Kral et al., 2001; Spittal et al., 2002). Kral and colleagues (2001) note that as needle sharing declines due to increased syringe availability, sexual transmission of HIV can be expected to increase among IDUs, especially heterosexual women. Unfortunately, our knowledge of these risks for female IDU sex workers in distinct cultural populations and social settings is limited.

The recent increase of HIV infection in Mexico, especially in the US border region, has caused heightened concern and increased attention to sex work as a potential source for the binational spread of HIV (Brouwer et al., 2006; Bucardo, Semple, Fraga-Vallejo, Davilla, & Patterson, 2004; Magis-Rodriguez et al., 2005; Maxwell et al., 2006). Mexico's *Consejo Nacional para la Prevención y Control del VIH/SIDA CENSIDA* (National Center for the Prevention and Control of HIV/AIDS), reported that as of 2011 there were 36,714 people living with HIV and 151,614 cumulative AIDS cases in the country (Consejo Nacional para la Prevención y Control del VIH/SIDA, 2006; Registro Nacional de Casos de SIDA, 2007). This is up from 71,153 AIDS cases reported in 2003 (Centro Nacional para la Prevención y Control del VIH/SIDA, 2003). Adult women account for 18 percent of the infected population with over 87 percent of the cumulative AIDS cases attributed to heterosexual contact. Of the Mexican border states, Chihuahua and Tamaulipas (the sites of the current study) had the fourth and ninth highest rates of HIV cases as of 2011 (Consejo Nacional para la Prevención y Control del VIH/SIDA, 2006). While much attention has focused on sex work and the high rates of HIV infection in the Mexican state of Baja California (Brouwer et al., 2006; Bucardo et al., 2004), little is known of the risks for HIV transmission that are associated with injecting drug use among sex workers in other Mexican border states. Finally, an important limitation of the previous studies is the focus on clinically based behavioral intervention populations rather than non-clinical sex worker samples. This is an important consideration since there are different risk factors for drug use for treatment and community based users (Bowser, Lewis, Dogan, & Word, 2010).

In the U.S.-Mexico border region, financial need is a major motivation for women to initiate sex work (Bucardo et al., 2004; Cepeda & Valdez, 2002). In addition to their low economic status, female sex workers have other poverty-related risk factors such as low educational attainment, multiple financial dependents, low literacy, and inconsistent knowledge of HIV and STI (Bucardo et al., 2004; Patterson et al., 2008). Many of these women have migrated from the interior of Mexico in hopes of crossing the border into the U.S. (Cepeda & Valdez, 2002). When they are unable to do so, women find themselves with few options for employment and financial support with limited job opportunities, low levels of education, and untenable working conditions in the skilled labor sector (Bucardo et al., 2004; Cepeda & Valdez, 2002) so some women turn to sex work. Mexico has developed zones where sex work is tolerated and even regulated by the Municipal Health Department. Despite its quasi-legal status, sex work remains highly stigmatizing because of the rigid gender expectations for women, and the contextual and social structural constraints associated with living in the

tumultuous border region shape sex workers experiences with clients and others sex industry employees (Cepeda & Nowotny, 2014). This environment in Mexican border cities attracts large numbers of “sexual tourists” from the U.S. and other foreign countries (Cepeda & Nowotny, 2014; Strathdee et al. 2008). Thus, sex workers along the U.S.-Mexico border have the potential to act as “bridging groups” (Alary & Iowndes, 2004; Hesketh, Zhang, & Qiang, 2005; Plummer, Coutinho, Ngugi, & Moses, 1999) for the international spread of HIV through their contact with tourists and long-haul truck drivers that cross the border daily. Identifying the characteristics of female sex workers that are associated with injecting drug use is imperative for understanding HIV risk among this population.

The purpose of the present study is to identify the correlates of injecting drug use (ever vs. never) among a community (non-clinical/treatment) recruited sample of Mexican female sex workers living in two Mexican border cities: Nuevo Laredo and Ciudad Juarez. A variety of factors are considered including demographic characteristics (e.g., age, education, parent status, marital status) and sex work history (e.g., age of initiation, number of years worked, number of days worked in the past month, number of clients in the past week). Detailed sexual risk behaviors are examined including sexual behaviors (e.g., unprotected vaginal and anal sex) with both sex work clients and non-client partners. Associations with IDU are assessed for lifetime infection with an STI, sex with an IDU client and or partner, unprotected vaginal sex with a client and or partner, and unprotected anal sex with a client and or partner. Non-injecting drug use risk behaviors are examined including having initiated drug use before sex work, using drugs during sex work, and current use of crack and or cocaine. Finally, cumulative sex and drug risk behavior scores are tested. We assert that IDU sex workers will be associated with riskier work patterns and sexual and non-injecting drug use behaviors.

Methods

Data Collection

Data for this analysis are from structured interviews with 109 Mexican female sex workers living in Nuevo Laredo, Tamaulipas and Ciudad Juarez, Chihuahua Mexico. For this research, a cluster approach to adaptive sampling was developed and implemented in a multistage fashion consisting of six phases and described in detail elsewhere (see Cepeda, 2011; Cepeda & Nowotny, 2014). Eligibility includes women over the age of 18 and engaging in exchanging sex for money in one of the previously identified venues in each respective city. Interviews were conducted face-to-face in Spanish in a private location in the field. Rapport was established and informed consent was obtained from all respondents before participating in the study. Recruitment was carried out by native Spanish-speaking women indigenous to the respective communities who were already working as community health outreach specialists. Respondents were compensated \$15 USD as well as provided with condoms for their time and effort. Each interview lasted approximately 60–90 minutes in duration.

Measures

Injection drug use history was obtained by asking subjects to report if they had ever injected drugs in their lifetime. As a preface to this question, subjects were informed that injecting included intravenous (injecting into the veins), intramuscular (injecting into muscles) and subcutaneous (skin popping) injecting by themselves or by someone else. The injection of legally prescribed drugs was excluded. Two groups representing injecting drug use were developed and coded as 0 = never injecting (NIDU) and 1 = injecting (IDU).

Differences between NIDU and IDU were compared on four categories of variables of interest: demographics, sex work history characteristics, sexual risk behaviors, and non-injecting drug use risk behaviors. Demographic variables included in the analysis are age, highest level of education, having children (no and yes), marital status (single and married), and city in which the interview took place (Ciudad Juarez and Nuevo Laredo). Cohabitation is included in the “single” marital status. Four variables are used to assess a respondent’s sex work history: age of initiation into sex work; number of years working in sex work; number of days worked in the past month from the time of interview; and number of clients in the past week from the time of interview. Sexual risk behaviors include a life time history of STIs (no and yes), having an IDU sex partner during the past year (no and yes), and having sex with an IDU client in the past year (no and yes). Women were able to identify IDU sex partners by injecting with them, by witnessing their partners inject drugs, or by seeing “track marks” on their partners bodies. Finally, unprotected sex was measured by asking the respondent whether they had engaged in vaginal or anal sex with a client or partner without using condoms during the past month (no and yes). A sex risk summative score was calculated to measure cumulative risk (0–8) and assess differences in combined risk for HIV. This additive scale tests whether the accumulation of risk factors impacts risk for IDU (see Appleyard, Egeland, van Dulmen, & Sroufe, 2005). Non-injecting drug use risk behaviors beyond injecting were also assessed. Respondents were asked whether they had initiated drug use before entering the sex work industry (no and yes) and whether they used drugs while working (no and yes). Finally, respondents were asked if they had used any crack or cocaine in the past month (no and yes). A drug risk summative score was calculated to measure cumulative risk (0–4).

Data Analysis

Frequencies were calculated to compare demographics, sex work history characteristics, sexual risk behaviors and non-injecting drug use risk behaviors stratified by ever injecting and never injecting drug use status. Significant associations between injecting drug use and selected categorical variables of interest were determined by Pearson chi square test. A Fisher’s exact test was used when an expected count was less than 5. A two-tailed t-test is used to compare continuous variables. Multivariate logistic regressions determine the independent correlates of injecting drug use. Finally, the Hosmer-Lemeshow goodness-of-fit test was used to assess model fit.

Results

Twenty-two percent ($n = 24$) of female sex workers reported injecting drug use and 78 percent ($n = 85$) reported non-injecting drug use. There are no significant differences in terms of demographic characteristics (Table 1). IDU sex workers were more likely to have worked more days in the past month and are marginally ($p < 0.10$) more likely to have more clients in the past week than non-IDU sex workers. A supplementary analysis (not shown) created dichotomized variables using percentile cutoffs. The 75th percentile for the length of time women have worked as a sex worker (12 years), the number of days worked in the past month (30 days), and the number of clients in the past week (9 clients) indicated high risk and the 25th percentile for age the woman initiated sex work (17 years) indicated high risk. The bivariate analysis revealed that IDUs are more likely to have worked 30 days in the past month compared to NIDUs (45.8% vs. 20.0%, $p < 0.05$). No statistically significant associations were observed for the other variables.

In regards to sexual behaviors, IDU sex workers were significantly more likely to have been infected with an STI, have a steady partner that was an IDU, and have sex with an IDU client. While there are no differences in the proportions who had vaginal sex without a condom, IDU sex workers are marginally ($p < 0.10$) more likely to have unprotected anal sex with a client and partner. A supplementary chi-square test revealed that in general women who have unprotected anal sex with their partners are more likely to have unprotected anal sex with clients (60.0% vs. 11.9%, $p < 0.001$). That is, 60 percent of women have unprotected anal sex with both their partners and clients while 19.3 percent have unprotected anal sex with clients but not their partners. Similarly, compared to NIDUs, IDU sex workers initiated drug use before entering the sex work profession, are more likely to engage in drug use during sex work, and more likely to report current use of non-injection cocaine and crack. Finally, IDU sex workers have a significantly higher mean sexual risk score (3.5 vs. 2.2) and mean drug risk score (2.6 vs. 0.99).

Table 2 shows the four multivariate logistic regression models corresponding to sex work history (model 1), sexual risk behaviors (model 2) and other drug use risk behaviors (model 3) as well as a final comprehensive model (4) that considered each variable that significantly contributed to each of the first three models. A number of factors were found to be independently associated with being an IDU. In model 1, IDU is independently associated with working more days in the past month (Odds Ratio [OR] = 1.08, 95% Confidence Interval [CI] = 1.01, 1.115) and marginally ($p < 0.10$) associated with having more clients in the past week (OR = 1.05, CI = 0.98, 1.13). Model 2 shows that having sex with an IDU client (OR = 3.38, CI = 1.06, 10.81) and having sex with an IDU partner (OR = 9.02, CI = 2.38, 34.14) are independently associated with higher odds of being an IDU. The drug use risk measures in model 3 demonstrate that being a current user of non-injection crack (OR = 7.90, CI = 1.25, 50.17) and cocaine (OR = 6.29, CI = 1.78, 22.30) are independently associated with increased odds of being an injecting drug user while having initiated drug use before initiating sex work is marginally ($p < 0.10$) associated (OR = 2.61, CI = 0.89, 7.61). Finally, model 4 shows that being a current user of non-injection cocaine (OR = 4.13, CI = 1.14, 15.00) is independently associated with increased odds of being an injection drug user and having sex with an IDU partner (OR = 4.03, CI = 0.94, 17.38) is marginally ($p <$

0.10) associated. Including the marginally significant measures of number of clients in the past week and initiated drug use before initiating sex work finds similar results (not shown). All four models show adequate goodness of fit according to the Hosmer-Lemeshow statistic (see Table 2).

Discussion

This research is important given that it is one of the few studies to examine the correlates of injecting drug use among a non-clinical, street-recruited sample of female sex workers in a developing country such as Mexico. There are several important implications that can be drawn from the findings presented in this paper. First, the results indicate that in general there is a high risk profile for injecting drug users compared to never injectors. That is, sex work characteristics such as working more days and having more clients were reported more frequently among IDU sex workers. This finding highlights a heightened risk for HIV infection and transmission for the sub-group of IDU sex workers given recurring occupational exposure in terms of days and client contacts. Second, we documented a riskier pattern of sexual behaviors among IDU sex workers compared to their non-injecting counterparts. Sexual risk factors included having an STI history, having sex with IDU partners and clients, and having unprotected anal sex with partners and clients (only having sex with IDU partners and clients persisted after adjusting for other confounders). This finding is similar to other research documenting that IDU sex workers engage in riskier sexual practices than their non-injecting counterparts (Alantes, Fraile, & Page, 2002), although, some research has found no difference in reductions in unprotected sex between injecting and non-injecting drug users (Bowen, 1996). The high prevalence of lifetime infection with an STI especially among IDU sex workers (54.2%) is particularly alarming given that STIs are known cofactors of HIV transmission (Laga et al., 1993). Overall, IDU sex workers reported a higher number of cumulative sexual risk behaviors than non-IDUs (3.5 vs. 2.2).

Confounding the heightened risk profile for IDU sex workers is the documented sexual behaviors these women are engaged with IDU partners and clients. This is particularly important given the risk nexus of networks of injecting drug users (sex workers, partners and clients) which pose a public health concern in that they may function in varying degrees as transmission bridges (of possible pathogen transmission) between the injecting heroin subculture and sex worker population in this community. In this sense, the findings are similar to previous research that found female sex workers who injected drugs were more likely to have social networks that consisted of other IDUs (Strathdee et al., 2007; Strathdee et al., 2008). Also similar to previous research (Voeten et al., 2007; Wang et al., 2007), this study found that, overall, female sex workers have higher rates of non-condom use during vaginal sex with their partners compared to their clients. However, IDU sex workers in the current study reported *higher* rates of condom use during vaginal sex with both partners and clients compared to never injectors, which is at odds with previous research (Strathdee et al., 2008). The opposite was found for condom use during anal sex: IDU sex workers reported *lower* rates of condom use during anal sex with both clients and partners compared to never injectors.

Finally, we observed that IDU sex workers have a higher prevalence of non-injecting use of crack and cocaine, are more likely to have initiated drug use before initiating sex work, and using drugs while working. Additionally IDU sex workers engage in a higher number of cumulative drug use risk behaviors compared to never injectors (2.6 vs. 0.99). The finding that IDU sex workers are more likely than never injectors to report using drugs while working are similar to other studies (Strathdee et al., 2008). Nonetheless, this is of particular concern given that existing research has established engaging in sex work while under the influence of drugs to be related to low rates of condom use (Plant, Plant, Peck, & Setters, 1989; Strathdee et al., 2008) and crack cocaine use in particular is a high risk factor for the sexual transmission of HIV (Booth et al., 1993; Jones et al., 1997; Kopetz et al., 2010) especially crack smokers who are also injecting drug users (Booth, Kwaitkowski, & Chitwood, 2008). Therefore, the use of crack and cocaine further propagates the risk behaviors observed among the IDU sex workers in this study. This finding is different from previous research that found no difference in current noninjecting cocaine use among IDU and never injecting female sex workers recruited from a clinical setting in Baja California (Strathdee et al., 2008).

There are methodological limitations in this study that need to be considered. Socially desirable responding might have led to underreporting of behaviors. However, all efforts were made to build trust and rapport with respondents, which enhanced the researcher's ability to convey empathy and understanding without judgment, thus eliciting more truthful responses. Also, the relatively small sample was recruited at selected venues identified through a field intensive outreach methodology. Therefore, findings cannot be generalized to other sex work populations and might be limited by the characteristics of the population from which the sample was drawn.

The data presented here reveal an environment composed of a high-risk network of sex workers, partners, and clients that may have serious binational public health implications for the United States and Mexico. These results are critical in that they demonstrate that sex workers who inject drugs engage in risk behaviors that exposes them to a heightened risk for contracting and transmitting HIV compared to non-injecting sex workers. IDU sex workers in this international context may act as "bridging groups" that can lead to more generalized HIV epidemics through sexual transmission of HIV with partners and clients. Moreover, findings from this research may be used to inform specific intervention strategies to prevent or reduce HIV associated risk behaviors among IDU sex workers. A comprehensive and integrated approach that focuses on safer sex with clients *and* partners and injection drug use *and* non-injection drug use may be necessary for this vulnerable and select population of IDU female sex workers in Mexico. Findings from this study can also be used to inform potential clients (e.g., tourists, long-haul truck drivers) about risks associated with non-condom use with female sex workers in this region.

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Table 1
Factors Associated with Injection Drug Use among Mexican Female Sex Workers (n=109)

	Total		Non IDU (n=85)		IDU (n=25)		p
Demographics	n	%	n	%	n	%	
Age		29.0 (7.10)		29.4 (0.79)		27.8 (1.31)	0.350 ^a
Years of Education Completed		6.9 (2.52)		6.8 (0.28)		7.2 (0.48)	0.525 ^a
Parent	84	77.1%	66	77.7%	18	75.0%	0.785 ^b
Married	42	39.6%	33	40.2%	9	37.5%	0.809 ^b
Ciudad Juarez (vs. Nuevo Laredo)	64	58.7%	34	40.0%	11	45.8%	0.608 ^b
Sex Work History							
Age of Initiation		20.7 (5.34)		20.9 (0.60)		20.0 (0.92)	0.451 ^a
Years Working		8.4 (6.21)		8.5 (0.70)		7.9 (1.09)	0.674 ^a
Days Worked (past month)		19.9 (8.80)		18.8 (0.96)		23.5 (1.58)	0.020 ^a
Clients (past week)		6.8 (6.24)		6.3 (0.70)		8.6 (1.16)	0.106 ^a
Sexual Risk Behaviors							
Ever Infected with STD	37	33.9%	24	28.2%	13	54.2%	0.018 ^b
Sex with an IDU Client	32	31.1%	17	21.5%	15	60.5%	0.000 ^b
Sex with IDU Partner	16	14.7%	5	5.8%	11	45.8%	0.000 ^c
Unprotected Vaginal Sex with Client	57	52.3%	45	52.9%	12	50.0%	0.799 ^b
Unprotected Anal Sex with Client	25	22.9%	16	18.8%	9	37.5%	0.055 ^b
Unprotected Vaginal Sex with Partner	73	67.0%	59	69.4%	14	58.3%	0.308 ^b
Unprotected Anal Sex with Partner	25	22.9%	16	18.8%	9	37.5%	0.055 ^b
Sexual Risk Score		2.5 (1.7)		2.2 (0.15)		3.5 (0.45)	0.001 ^a
Drug Use Risk Behaviors							
Initiated Drug Use before Sex Work	36	33.0%	21	24.7%	15	62.5%	0.001 ^b
Drug Use During Sex Work	52	47.7%	29	34.1%	23	95.8%	0.000 ^b
Current Use of Crack	7	6.4%	2	2.4%	5	20.8%	0.001 ^c

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	IDU (n=25)		Non IDU (n=85)		Total		
	n	%	n	%	n	%	p
Current Use of Non-Injection Cocaine	20	83.3%	32	37.7%	52	47.7%	0.000 ^b
Drug Risk Score							0.000 ^a
					1.4 (1.34)	1.0 (0.13)	

^a two-tailed t-test,
^b chi-square test,
^c Fisher's exact test

Table 2

Factors Independently Associated with Injection Drug Use among Mexican Female Sex Workers (n=109)

	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)	Model 4 OR (95% CI)
Sex Work History				
Days Worked (past month)	1.08 (1.01, 1.15)			1.04 (0.97, 1.12)
Clients (past week)	1.05 (0.98, 1.13)			
Sexual Risk Behaviors				
Ever Infected with STD		2.01 (0.63, 6.37)		
Sex with an IDU Client		3.38 (1.06, 10.81)		2.61 (0.80, 8.47)
Sex with IDU Partner		9.02 (2.38, 34.14)		4.03 (0.94, 17.38)
Unprotected Anal Sex with Client		2.28 (0.55, 9.51)		
Unprotected Anal Sex with Partner		0.63 (0.13, 3.06)		
Drug Use Risk Behaviors [*]				
Initiated Drug Use before Sex Work			2.61 (0.89, 7.61)	
Current Use of Crack			7.90 (1.25, 50.17)	3.00 (0.26, 35.29)
Current Use of Non-Injection Cocaine			6.29 (1.78, 22.30)	4.13 (1.14, 15.00)
Hosmer-Lemeshow goodness of fit	$\chi^2=9.73$, df=8, p=0.285	$\chi^2=6.19$, df=8, p=0.402	$\chi^2=1.48$, df=3, p=0.688	$\chi^2=7.00$, df=8, p=0.537

* Drug use before sex is excluded because it is not a stable measure.