Sexually Transmitted Diseases, December 2007, Vol. 34, No. 12, p.000–000
DOI: 10.1097/OLQ.0b013e31815b0

Characteristics of Female Sex Workers With US Clients in Two Mexico-US Border Cities

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Background: **HIV prevalence is increasing among female sex workers (FSWs) in Tijuana and Ciudad Juarez, 2 Mexican cities on the US border. Quasilegal prostitution in both cities attracts large numbers of sex tourists. We compared FSWs with and without US clients in both cities.**

Methods: **FSWs aged ≥18 years reporting unprotected sex with ≥1 client within the last 2 months, who were not knowingly HIV-infected, were enrolled in a behavioral intervention study. At baseline, participants underwent interviews, antibody testing for HIV and syphilis, and vaginal swabs for detecting gonorrhea and Chlamydia. Logistic regression identified factors associated with reporting >1 US client.**

Results: **Of 924 FSWs, 69% had US clients. Median age and duration in sex work were 32 and 4 years. Prevalence of HIV, infectious syphilis (titer ≥1:8), gonorrhea, Chlamydia, and any STI was 6%, 14%, 6%, 13%, and 27%, respectively. Compared with other FSWs, FSWs with US clients were more likely to have syphilis titers ≥1:8 (16% vs. 10%, $P = 0.01$), gonorrhea (8% vs. 2%, $P < 0.001$) or any STI, including HIV (30% vs. 20%, $P = 0.002$). Factors independently associated with having US clients were: living in Tijuana, being younger, speaking English, being paid more for having sex without a condom, having >250 clients in the last 6 months, having syphilis titers ≥1:8, and injecting drugs.**

Conclusions: **In these border cities, FSWs reporting US clients were more likely to have current STIs and to engage in higher-risk behaviors. Intensified binational prevention efforts involving both FSWs and their clients are urgently needed.**

OF THE 5.5 MILLION people who live on the Mexican side of the US border, approximately half live in Tijuana or Ciudad (Cd.) Juarez,[1] which are adjacent to San Diego, CA, and El Paso, TX, respectively. Commercial sex work is considered quasilegal in Mexico; female sex workers in Tijuana are required to obtain permits if they wish to work without prosecution in the *Zona Roja* (red light zone), but more than half operate without. In Cd. Juarez, a permit is not required and 2 *Zonas Rojas* exist; FSWs working without permits can be fined, but in practice this is seldom enforced. Since Mexican-US border cities are economically depressed, these cities are home to large numbers of FSWs among whom HIV prevalence is rising.[2,3] Both cities annually attract large numbers of "sex tourists" from the United States and abroad, who range in age from 18 to 80.[4]

Across Mexico, 9 different types of FSWs have been described, ranging from "streetwalkers" to call girls and companions for parties and vacations.[5] In Tijuana and Cd. Juarez, FSWs operate out of cantinas, bars, hotels, nightclubs, and street corners. These venues appear highly differentiated, catering to men of different cultural backgrounds and sexual proclivities, which led us to hypothesize that FSWs catering to men of various nationalities might also differ. If supported, such data may be helpful for informing binational prevention efforts. The current study was conducted to determine whether FSWs who had US clients significantly differed from those who did not in 2 large Mexican-US border cities.

Methods

Study Settings

Tijuana is the largest Mexican-US border city with 1,410,700 persons, and together with adjacent San Diego, CA, it forms the world's largest binational metropolis.[6] Roughly half of Baja California's population lives in Tijuana,[6] although over half of its inhabitants were born outside the state.[7] In 1999, the gross regional product (per capita) in Tijuana was $6800 USD, less than one-quarter that of San Diego.[8] The border crossing between Tijuana and San Diego is the busiest in the world. In 2005, there were 45

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The authors thank the study staff and participants; David Brown, Morgan Philbin, and Brian Kelly for manuscript preparation; and for their cooperation, the Municipal and State Health Departments of Tijuana, Baja California and Ciudad Juárez, Chihuahua; Salud y Desarollo Comunitario de Ciudad Juárez A.C. (SADEC) and Federación Mexicana de Asociaciones Privadas (FEMAP); and the Autonomous Universities of Baja California (UABC) and Ciudad Juárez (UACJ).

Supported by NIMH Grant R01 MH065849 and NIDA Grant R01 DA019829.

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Received for publication May 16, 2007, and accepted September 12, 2007.

million registered northbound crossings from Tijuana to San Diego County.[9] Estimates of the number of FSWs in Tijuana range from 4500 to 9000.[2]

Cd. Juarez is the largest city in the state of Chihuahua and has a population of 1,313,338. In 2000, 36% of Cd. Juarez's inhabitants were born outside Chihuahua.[6] In 2005, there were 29 million northbound border crossings from Cd. Juarez to El Paso.[9] Like Tijuana, the main industry in Cd. Juarez is maquiladora assembly plants. In 1999, the gross per capita regional product of Cd. Juarez was only about 40% that of El Paso, TX, at $7074 USD.[8] In 2000, there were an estimated 4000 FSWs in Cd. Juarez.[3]

Study Population

Between January 2004 and March 2005, FSWs were recruited in Tijuana and Cd. Juarez through outreach and municipal and community health clinics into a behavioral intervention study that aimed to increase condom use. Eligibility requirements included being at least 18 years of age, providing informed consent, and having traded sex for drugs, money, or other material benefit within the previous 2 months. Since this was an intervention study, women were also required to have had unprotected vaginal sex with at least 1 client in the past 2 months, and were excluded if they reported that they had previously tested HIV positive.

Data Collection

A face-to-face interview was conducted as part of a safer sex intervention, which focused on motivational interviewing and increasing self efficacy among FSWs, as previously described.[10] The interview was conducted by trained, Spanish-speaking female counselors before the intervention in private clinic rooms or outreach offices and lasted approximately 40 minutes. The interview covered sexual risk behaviors, working conditions, financial need, victimization and trauma, use of alcohol and illicit drugs, social support, social influence, life experiences, social cognitive factors, sociodemographic characteristics, and physical and psychiatric health. The interview also addressed behavioral outcomes, such as frequency of unprotected sex with clients and spouse or steady partner, number of clients; number and type of other sex partners (nonclients), and number of partners who inject drugs. Women were also asked whether their male sex trade clients were from Mexico, the United States, or other countries, using categories from all, most, some, a few, and none. Participants also provided a blood draw and vaginal swab and were compensated $30 US.

Laboratory Testing

The "Determine" rapid HIV antibody test was initially conducted to determine the presence of HIV antibodies (Abbott Pharmaceuticals, Boston, MA). All reactive samples were then tested using HIV-1 antibody by EIA and Western blot. Syphilis serology was conducted using the rapid plasma reagin test (Macro-Vue, Becton Dickenson, Cockeysville, MD). All rapid plasma reagin-positive samples were subjected to confirmatory testing using the *Treponema pallidum* hemagglutinin assay (Fujirebio, Wilmington, DE). *Neisseria gonorrhoeae* and *Chlamydia trachomatis* were detected from vaginal swabs collected by trained nurses, using the Aptima Combo 2 collection device (Genprobe, San Diego, CA), which allows for a direct target-amplified nucleic acid probe test. Specimen testing and all HIV confirmatory tests were conducted at either the San Diego Health Department laboratory (for Tijuana STI samples) or El Paso Health department (for Cd. Juarez STI samples). HIV and STI test results were provided to participants and women who tested positive were referred to local municipal health clinics for free medical care.

Statistical Analysis

Statistical analyses focused on baseline comparisons between FSWs who reported having at least 1 US client in the last 2 months versus those who did not. The analysis was restricted to baseline data. Continuous data were examined using Wilcoxon tests, whereas categorical data were examined using Fisher exact tests or χ^2 tests.

Univariate and multivariate logistic regression was performed to identify factors associated with having at least 1 US client. Models were developed using a manual procedure where all variables of interest that attained a significance level $<10\%$ were considered in multivariate analyses. 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. Regressions were run overall and by site.

Results

A total of 924 FSWs were enrolled in Tijuana (N = 474) and in Cd. Juarez (N = 450). Median age was 32 years. Most women were relatively uneducated with a median of 6 years of formal education, and a minority (20%) spoke English. One-quarter of women (24%) were married; however, the majority (94%) had children (Table 1). The median number of years spent as a sex worker was 4 years. The median age that women entered sex work was 26 years. More than half (55%) reported they were streetwalkers, whereas the remainder worked in bars, hotels, motels, or other venues.

Of the 924 FSWs enrolled, 634 (69%) reported having at least 1 US client, with 41.8% reporting a few, 12.9% reporting some, 12.7% reporting most, and 1.3% reporting that all their clients were from the United States. A higher proportion of FSWs in Tijuana had 1 or more US clients compared with FSWs in Cd. Juarez (78.1% vs. 58.7%, $P < 0.001$). Compared with FSWs without US clients, those with US clients were significantly younger (median = 31 vs. 36 years of age, $P < 0.001$; OR = 0.95 per year). Those with US clients were more likely to live in Tijuana versus Cd. Juarez (58% vs. 36%, $P < 0.001$; OR = 2.51), speak English (25% vs. 7%, $P < 0.001$; OR = 4.33), be more educated (OR = 1.21), and to have entered sex work at a younger age (25 vs. 28 years; OR = 0.94).

A risky pattern of drug use, and their clients' drug use, was apparent among FSWs with US clients. Overall, 12% of FSWs reported they injected drugs within the last month, 14% often or always used drugs before or during sex, 73% had clients who used drugs, 32% had clients who injected drugs, and 90% reported that other FSWs they worked with used drugs or alcohol with their clients. Compared with those without US clients, FSWs with US clients were more likely to have injected drugs (16% vs. 5%, $P < 0.001$; OR = 3.68), and were more likely to report often or always using drugs before sex with their clients (18% vs. 7%, $P < 0.001$; OR = 3.4). However, they were not more likely to often use alcohol before or during sex with their clients (22% vs. 25%, $P = 0.31$; OR = 0.84). FSWs with US clients were more likely to report that their clients used drugs (81% vs. 55%, $P < 0.001$; OR = 3.55), or injected drugs (36% vs. 21%, $P < 0.001$; OR = 2.20), and were more likely to report that their fellow sex workers often used drugs or alcohol with their clients (92% vs. 86%, $P = 0.006$; OR = 1.88).

A mixed picture of sexual risks emerged (Tables 1 and 2). FSWs with US clients were less likely to primarily work out of a hotel or motel (OR = 0.57) compared with other FSWs. FSWs with US clients reported the same median number of clients in the previous 6 months (i.e., 240), but reported having fewer unprotected vaginal

TABLE 1. Sociodemographic and Behavioral Characteristics of FSWs With and Without US Clients

Variable	Total (N = 924)	FSWs With US Clients (N = 634)	FSWs Without US Clients (N = 290)	*P*
Demographics				
Median age (IQR)	32 (26–39)	31 (25–37)	36 (29–44)	<0.001
Had children	862 (94%)	585 (93%)	277 (96%)	0.14
Born in state where they now live	359 (39%)	247 (39%)	112 (39%)	0.88
Born in Mexico	911 (99.0%)	465 (98.7%)	446 (99.3%)	0.51
Lived in Tijuana (vs. Cd. Juarez)	474 (51%)	370 (58%)	104 (36%)	<0.001
Speaks English	181 (20%)	160 (25%)	21 (7%)	<0.001
Median # of school years completed (IQR)	6 (4–8)	6 (5–9)	6 (3–6)	<0.001
Married/common law	222 (24%)	145 (23%)	77 (27%)	0.28
Median age began sex work (IQR)	26 (21, 32)	25 (20–30)	28 (23–36)	<0.001
Median # yrs in sex trade (IQR)	4 (2,10)	4 (2–10)	4 (1.8–10)	0.96
Drug use behavior				
Injected drugs in the last month	113 (12%)	99 (16%)	14 (5%)	<0.001
Often/always used alcohol before/during sex	207 (22%)	136 (22%)	71 (25%)	0.31
Often/always used drugs before/during sex	131 (14%)	112 (18%)	19 (7%)	<0.001
Had clients who use drugs	676 (73%)	516 (81%)	160 (55%)	<0.001
Had clients who inject drugs	292 (32%)	232 (37%)	60 (21%)	<0.001
Fellow FSWs used drugs/alcohol with their clients	828 (90%)	580 (92%)	248 (86%)	0.006
Sexual behaviors				
Described self as a streetwalker	512 (55%)	350 (55%)	162 (56%)	0.89
Main workplace				0.01
Bar	325 (35%)	220 (35%)	105 (36%)	
Street	407 (44%)	289 (46%)	118 (41%)	
Hotel/motel	125 (14%)	72 (11%)	53 (18%)	
Other places	66 (7%)	52 (8%)	14 (5%)	
Median # clients in past 6 mo	240 (93–480)	240 (72–500)	240 (100–432)	0.43
Median amount received per sex act with a condom (IQR)	$20 (13–30)	$20 (15, 40)	$15 (10, 25)	<0.001
Median amount received per sex act without a condom (IQR)	$30 (20–50)	$30 (20, 60)	$20 (15, 40)	<0.001
Median price difference between vaginal sex with and without a condom (IQR)	$10 (0,20)	$10 (0,20)	$5 (0,10)	<0.001
Median # episodes of unprotected vaginal sex last month (IQR)	16 (7–35)	16 (6–35)	19 (8–37)	0.04
Had unprotected anal sex last month	183 (20%)	134 (21%)	49 (17%)	0.13
Sexually transmitted infections				
Positive gonorrhea result	51 (6%)	46 (8%)	5 (2%)	<0.001
Positive chlamydia result	104 (13%)	79 (14%)	25 (10%)	0.11
Positive HIV-antibody result	55 (6%)	42 (7%)	13 (5%)	0.23
Syphilis titer ≥1:8	130 (14%)	102 (16%)	28 (10%)	0.008
Positive for at least one STI*	249 (27%)	191 (30%)	58 (20%)	0.001

*Gonorrhea, Chlamydia, HIV, syphilis titer ≥1:8.

sex acts in the last month (13 vs. 16 unprotected acts, $P = 0.02$; OR = 0.76 for >15 unprotected sex acts in the previous month). FSWs with US clients were paid more per unprotected vaginal sex act ($30 vs. $20, $P < 0.001$; OR = 2.42 for $30 or more earned on average without a condom) compared with their counterparts without US clients. The odds of being an FSW with US clients were 11% higher for each $10 increase in price paid for unprotected vaginal sex act.

In contrast to their reports of having less unprotected vaginal sex, FSWs with US clients were more likely to test positive for gonorrhea (8% vs. 2%, $P < 0.001$; OR = 4.38) or syphilis with titers ≥1:8 (16% vs. 10% $P = 0.008$; OR = 1.81) compared with FSWs with no US clients. Although the odds of testing positive for chlamydia or HIV did not differ between FSWs with US clients versus those without, FSWs with US clients were significantly more likely to test positive for at least 1 of these 4 STIs (30% vs. 20%, $P = 0.001$).

Seven factors entered into our final multivariate model, controlling for site (Table 3). Overall, the factor most strongly associated with having US clients was speaking English. FSWs who spoke English were 3 times more likely to have US clients. The odds of having US clients were twice as high for women who lived in Tijuana or injected drugs. FSWs with US clients were also more likely to have syphilis titers ≥1:8 (OR = 1.66), to have more than 250 clients in the past 6 months (OR = 1.54), to be paid more money for sex without a condom versus with a condom (OR = 1.07 per $10 USD increase), and to be younger (OR = 0.95 per year increase in age). Factors that were not independently associated with having US clients included having children, being born in state where they now live, education, marital status, age at initiation into sex work, number of years in the sex trade, often or always used alcohol or drugs before or during sex, having clients who use or inject drugs, having fellow FSWs who use drugs or alcohol with their clients, describing oneself as a street worker, main workplace being a bar, streets, or hotel or motel, price earned with and without a condom, having >15 unprotected vaginal sex acts in last month, and testing positive for gonorrhea, Chlamydia, or HIV.

Since FSWs in Tijuana were significantly more likely to report having US clients than those in Cd. Juarez, we reran regression models stratifying by study site (Table 3). In both cities, FSWs who were younger and those who had injected drugs were signif-

TABLE 2. Characteristics of FSWs With US Clients: Univariate Logistic Regression

Variable	Odds Ratio	95% Confidence Interval
Demographics		
Age (per year increase)	0.95	0.93–0.96
Had children	0.61	0.32–1.15
Born in state where they now live	1.03	0.77–1.36
Born in Mexico	1.75	0.47–6.56
Lived in Tijuana (vs. Cd. Juarez)	2.51	1.88–3.34
Speaks English	4.33	2.68–6.99
Highest year of school completed	1.21	1.15–1.27
Married/common law	0.83	0.60–1.14
Age began sex work (per year)	0.94	0.93–0.96
Number of years in sex trade (per year)	0.99	0.97–1.01
Drug use behavior		
Injected drugs in the last month	3.69	2.07–6.58
Often/always used alcohol before/during sex	0.84	0.60–1.16
Often/always used drugs before/during sex	3.04	1.80–4.99
Had clients who use drugs	3.55	2.62–4.82
Had clients who inject drugs	2.20	1.59–3.05
Fellow FSWs used drugs/alcohol with their clients	1.88	1.21–2.91
Sexual behavior		
Describes oneself as a streetworker	0.97	0.74–1.29
Main workplace is a bar	0.94	0.70–1.25
Main workplace is street	1.23	0.92–1.62
Main workplace is hotel/motel	0.57	0.39–0.84
>250 male clients in the past 6 mo	1.06	0.80–1.40
>$30 USD earned on average with a condom	2.21	1.54–3.18
>$30 USD earned on average without a condom	2.42	1.79–3.26
Price difference between vaginal sex with and without a condom (per $10 USD increase)	1.11	1.04–1.17
>15 unprotected vaginal sex acts in last month	0.76	0.56–1.03
Had unprotected anal sex last month	1.33	0.92–1.90
Sexually transmitted infections		
Positive gonorrhea result	4.38	1.72–11.16
Positive chlamydia result	1.48	0.92–2.37
Syphilis titer ≥1:8	1.81	1.16–2.81
Positive HIV-antibody result	1.51	0.80–2.86

icantly more likely to report having US clients. In Tijuana, additional factors independently associated with having US clients included syphilis titers ≥1:8, being paid more money for sex without a condom, and having greater numbers of clients, whereas speaking English was an independent predictor only for Cd. Juarez.

Discussion

We found that more than two-thirds of FSWs in 2 Mexico-US border cities had at least 1 US male client in the prior 2 months. FSWs reporting US clients were more likely to speak English, be younger, inject drugs, have high syphilis titers, and be paid more for sex without a condom, indicating that these women, their clients, and possibly the general population are at high risk of acquiring HIV, and other bloodborne and sexually transmitted infections. Higher risk behaviors were more closely associated with FSWs in Tijuana who had US clients. These data underscore the extent to which the potential for cross-border transmission of HIV, and STIs is a major concern in this border region, which has implications for both countries.

We observed that 30% of the FSWs with US clients tested positive for at least 1 of 4 STIs, compared with 20% among other FSWs. After accounting for other factors, the prevalence of syphilis titers consistent with acute infection was independently associated with having US clients, although this association was driven mostly by FSWs in Tijuana. Although HIV prevalence was similar in both groups, overall HIV prevalence among FSWs was 6% (95% CI: 4.5–7.7), representing a 3-fold increase during the past decade,[3] which signals a recent shift from a low-level to a concentrated HIV epidemic, according to UNAIDS criteria.[11] In particular, HIV prevalence among FSWs who inject drugs in these cities is now 12%.[12] High syphilis titers were independently associated with HIV infection among FSWs in these cities, signaling the need to integrate HIV and STI prevention and treatment in these border cities.[13]

FSWs reporting US clients also had greater numbers of male clients and were more likely to report earning more money for having sex without a condom; this association was more pronounced in Tijuana than in Cd. Juarez. Although we cannot infer that US clients offered these women more money to have unprotected sex, the fact that this practice is occurring in the context of high HIV and STI prevalence is cause for concern. The practice of offering more money for unprotected sex is not unique to our settings, as it has been reported elsewhere.[14–16] Since FSWs in Mexico are primarily engaged in sex work due to economic need,[4] this practice threatens to undermine HIV and STI prevention efforts and should be actively discouraged.

FSWs with US clients were significantly more likely to inject drugs than other FSWs, especially in Cd. Juarez; this poses risks for acquiring blood-borne infections. Tijuana has 1 of the fastest growing IDU populations in Mexico,[17,18] and Cd. Juarez is ranked second only to Tijuana in the number of illicit drug users across the country.[19] Although HIV prevalence among IDUs in both cities has thus far remained low,[20] prevalence of HBV and HCV among IDUs exceeds 80% and 90%, respectively, which may be a harbinger for a future HIV epidemic.[21] Since drug dependent FSWs experiencing acute withdrawal symptoms may be less able to refuse offers of higher pay for unprotected sex, FSWs who inject drugs are especially vulnerable and in need of intensive interventions to simultaneously reduce both their sexual and injection risks.

Since clients and other sexual partners of FSWs may themselves engage in high-risk behaviors, such as sex with other men or injection drug use,[22,23] one should not assume that HIV transmission among FSWs is unidirectional. Indeed, nearly three-quarters of FSWs reported that their male clients used drugs and almost one-third reported that their clients injected drugs. Most women reported that their fellow sex workers used drugs or alcohol with clients, one-fifth shared needles with clients, and reported having a recent sex partner who was an IDU. Beyond the obvious risk of acquiring HIV, other blood borne infections and STIs from their sex partners, FSWs' dependence on a partner or client for drugs, and their use or their partner's use of drugs during sex may compromise their ability to practice or negotiate safer sex.[12,24,25]

This study provides a focused glimpse into characteristics of FSWs' clients in these border cities. Caution must be exercised

TABLE 3. Factors Independently Associated With Having US Clients Among FSWs in Tijuana and Cd. Juarez

Variable	Total Sample (N = 896) Adjusted Odds Ratio (95% CI)	Tijuana (N = 450) Adjusted Odds Ratio (95% CI)	Cd. Juarez (N = 446) Adjusted Odds Ratio (95% CI)
Lived in Tijuana (vs. Cd. Juarez)	2.41 (1.69–3.44)	—	—
Age (per year increase)	0.95 (0.94–0.97)	0.98 (0.95–1.00)	0.93 (0.91–0.95)
Speaks English	3.30 (1.99–5.46)	1.79 (0.96–3.33)	8.22 (3.10–21.78)
Injected drugs in past month	2.33 (1.25–4.35)	1.13 (1.04–1.24)	3.41 (1.27–9.21)
Price difference between vaginal sex with and without a condom (per $10 USD increase)	1.07 (1.01–1.13)	1.13 (1.04–1.24)	1.00 (0.91, 1.10)
>250 male clients in past 6 mo	1.54 (1.09–2.18)	1.82 (1.00–3.31)	1.35 (0.86–2.13)
Syphilis titer ≥1:8	1.66 (1.02–2.70)	4.54 (1.58–13.03)	1.11 (0.60, 2.07)

when drawing inferences, since client characteristics were based on FSWs' self-reports, and impressions of their clients' nationalities may have relied on inaccurate assumptions. It is possible that some US clients may actually live in Mexico rather than in the United States, although this is unlikely to account for our findings since fewer than 5% of males aged 18 and over in each city originated from the United States. This study lacked details on the exact number of US clients and their characteristics. We also lack data on the context of sexual interactions with clients, particularly the extent to which they exchanged sex for drugs rather than for money, which has been reported elsewhere.[26–29] Since women were recruited through convenience sampling and higher risk women were selected for a subsequent intervention study to reduce high-risk behaviors, these FSWs are likely not representative of the FSW populations in either city. However, we did not intentionally recruit women from specific venues nor based on their clients' characteristics.

Our study findings indicate that interventions focused on male clients of FSWs stressing the importance of consistent condom use are clearly needed. In the Mexico-US border context, there is a need to ensure that prevention messages are available in Spanish, English, and possibly other languages, which are culturally appropriate and nonstigmatizing. Interventions should include voluntary testing and counseling for HIV and STIs and appropriate referrals for treatment, regardless of insurance or immigration status. Our study findings underscore the fact that HIV and STI prevention is not merely a shared responsibility between FSWs and their clients—-it is also an issue of accountability for both Mexico and the United States. The lack of an appropriate binational response could set the stage for HIV epidemics that quickly become generalized.

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