

# Mexico's northern border conflict: collateral damage to health and human rights of vulnerable groups

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## ABSTRACT

**Objective.** To compare distributions of human rights violations and disease risk; to juxtapose these patterns against demographic and structural environmental variables, and to formulate implications for structural interventions.

**Methods.** Female sex workers who inject drugs were surveyed in Tijuana and Ciudad Juarez, Mexico. Structured interviews and testing for sexually transmitted infections (STIs) were conducted (October 2008 to October 2009). Frequencies of individual and environmental factors, including police abuse, risk of HIV infection, and protective behaviors, were compared between sites using univariate logistic regression.

**Results.** Of 624 women, almost half reported police syringe confiscation despite syringes being legal; 55.6% reported extortion (past 6 months), with significantly higher proportions in Ciudad Juarez ( $P < 0.001$ ). Reports of recent solicitation of sexual favors (28.5% in Tijuana, 36.5% in Ciudad Juarez,  $P = 0.04$ ) and sexual abuse (15.7% in Tijuana, 18.3% in Ciudad Juarez) by police were commonplace. Prevalence of STIs was significantly lower in Tijuana than in Ciudad Juarez (64.2% and 83.4%,  $P < 0.001$ ), paralleling the lower prevalence of sexual risk behaviors there. Ciudad Juarez respondents reported significantly higher median number of monthly clients (6.8 versus 1.5,  $P < 0.001$ ) and lower median pay per sex act (US\$ 10 versus US\$ 20,  $P < 0.001$ ) (in the past month). Relative to Tijuana, security deployment, especially the army's presence, was perceived to have increased more in Ciudad Juarez in the past year (72.1% versus 59.2%,  $P = 0.001$ ).

**Conclusions.** Collateral damage from police practices in the context of Mexico's drug conflict may affect public health in the Northern Border Region. Itinerant officers may facilitate disease spread beyond the region. The urgency for mounting structural interventions is discussed.

## Key words

Sex workers; substance abuse, intravenous; human rights abuses; violence against women; HIV infections; communicable diseases; vulnerable populations; Mexico.

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In recent decades, public health research has become increasingly concerned with the effect of structural violence and militarized conflict, including violence against women and broader gendered human rights violations on

long-term physical and mental health outcomes (1). Sexual and gender-based violence has been inflicted in war zones and refugee camps throughout the world, with grave implications for physical and mental health outcomes (2, 3). Research from postconflict settings indicates that such violence against women, often perpetrated by military groups, can become normalized in the wake of political unrest and displacement (4, 5). In the context of a global HIV epidemic, injecting drug users (IDUs) and female sex workers (FSWs), as well as FSWs who are also IDUs (FSW-IDUs), are particularly vulnerable to victimization and endure harassment as high-risk groups with few means of recourse. Violence and harassment of these marginalized groups are furthered by entrenched poverty, lack of access to health care services (6), fear of harassment from police (7), and policies and practices of state actors that prevent FSW-IDUs from having control over their risk environment (6, 8–12). The public health consequences of these macro forces have been analyzed to some extent in conflict and transitional settings (5, 11) but have not been considered in the context of Mexico's violent struggle against drug cartels.

At a time when deaths from drug-related violence along the northern Mexico border continue to mount, the deployment and militarization of law enforcement in the region has reached unprecedented levels (13, 14). Composed of federal army and police working alongside state and municipal law enforcement, this force lacks coordination in command and control and has been implicated in a range of human rights abuses, including violence against FSWs (13, 15, 16). Law enforcement officers (especially at the municipal level) have been accused of corruption, including racketeering, extortion, and actually managing drug and sex markets (14). During the study period (2008–2009), violence in Ciudad Juarez was growing precipitously as was the deployment of police, while in Tijuana 2008 served as the height of violence (17) and police deployment there remained relatively steady (14).

A key gateway and a legendary destination for drug and sex tourism, the United States–Mexico border is a nexus for injection drug use and associated infectious diseases. Elevated levels of drug use have resulted from spillover along

the U.S.-bound drug trafficking routes (18). This situation has acutely affected Mexico's northern border states where, as trafficking and migration channels converge, rates of injection drug use and commercial sex activity are estimated to be 10–15 times the national average (18, 19).

Tijuana is home to approximately 6 000 FSWs and 10 000 IDUs; the FSW population in Ciudad Juarez is believed to exceed 4 000 and the IDU population is around 6 500 (15, 19). FSW-IDUs exhibit particular vulnerability because they can acquire communicable infections through both the sexual and the injection routes; this subgroup may also act as a bridge through which HIV and other sexually transmitted infections (STIs) are spread from higher-prevalence to lower-prevalence populations (15, 20, 21). At this time, there are no reliable estimates for the overall number of FSW-IDUs in the two research site cities.

Unlike many other countries, Mexico does not formally prohibit prostitution on a national level, leaving its regulation up to local determination. Sex work in Tijuana formally exists under a permit system, although approximately half of FSWs skirt requirements such as age limitations and periodic testing for STIs (19). In Ciudad Juarez, FSWs do not work under any formal regulatory framework. Mexican laws also permit over-the-counter access to pharmaceuticals, but many IDUs report difficulty purchasing syringes because of arbitrary restrictions and discrimination (22). Past research in the U.S.–Mexico border region suggests that it is common for IDUs to be arrested and detained for carrying syringes (19), even though syringe possession is legal. In one study, reports of police violence, corruption, and extortion were commonplace; of IDUs ever arrested (91%), 57% had been arrested for carrying a syringe (23). Arrest for possessing syringes was also independently associated with a threefold increase in the odds of receptive syringe sharing (23) and use of shooting galleries (24), both which are known risk factors for the spread of HIV and other blood-borne infections.

Given the dynamics of survival and street-based sex work, FSW-IDUs face elevated risk of violence from clients, pimps, and law enforcement (25). Human rights abuses such as physical violence and extortion by uniformed personnel are especially dangerous be-

cause they push commercial sex activity underground, where FSWs are less able to negotiate safer practices (6). Providing free sexual services is a frequent form of extortion by police and the military (25, 26). Widespread abuses of FSWs by police and the army in hotspots like Tijuana and Ciudad Juarez can have public health consequences far beyond the region.

Despite keen interest in the northern border conflict, its public health impact is poorly understood. Our research in the region has identified high levels of police abuse among IDUs and FSWs, but no study has focused specifically on the FSW-IDU population (15, 19, 23, 27, 28). Given the epidemiological importance and heightened vulnerability of FSW-IDUs in the context of massive security personnel deployment, we analyzed responses from Tijuana and Ciudad Juarez FSW-IDUs on perceived changes in levels of law enforcement, experiences of police abuse, and risk of acquiring HIV and other STIs. The study's dual-site design affords the opportunity to compare a city experiencing continued escalation in deployment of law enforcement (Ciudad Juarez) with one where deployment has leveled off (Tijuana). On the basis of our findings, this study provides recommendations for public health and public security research and policy.

## MATERIALS AND METHODS

The study instrument and research methodology have been described in detail elsewhere (15). Between October 2008 and October 2009, participants were recruited in venues frequented by FSWs (bars, street corners, motels) as part of a behavioral intervention study to reduce injection and sexual risks. Eligibility criteria included being at least 18 years old, reporting unprotected sex with a male client in the past month, having injected drugs and shared injection equipment in the past month, and agreeing to accept free treatment for STIs if medically indicated. After informed consent was received, computer-assisted surveys and biological testing for HIV and STIs were administered by outreach staff.

Collected data included sociodemographics and sexual and drug use risk behaviors. Questions included age, marital status, income, and housing. Items related to sexual behavior included age at initiation and reasons for entering sex

work and sexual practices. Questions on drug use included age at first injection, drugs used, and frequency. Key to this analysis was an assessment of FSW-IDUs' personal experiences with the police. These questions included lifetime and past 6 months' experience of syringe confiscation, extortion, and physical and sexual abuse, although respondents were not asked about their experience of unwanted or unplanned pregnancies. Perceptions of changes in the sex work environment, such as levels of police and army deployment, frequency of FSW arrests, cartel visibility, and built environment (e.g., visibility of torn-down buildings), were also recorded. Other components of the physical, social, and economic environments understood to influence disease risk were assessed, in-

cluding migration and deportation experience, homelessness, and earnings from commercial sex activity (11).

Descriptive statistics were used to compare baseline sociodemographic, behavioral, economic, policing, and disease characteristics by city. The Wilcoxon rank sum test was used for all continuous outcomes because these variables tended to have non-normal distributions. Chi-square tests were used to compare binary outcomes, except when expected values were < 5, in which case a Fisher's exact test was used. Univariate logistic regression was used to compare individual and structural HIV risk and protective factors between cities, treating Ciudad Juarez as the reference group. Institutional review boards at the University of California, San Diego, School of

Medicine; Tijuana General Hospital; and the Universidad Autónoma de Ciudad Juárez approved the study.

**RESULTS**

**Sociodemographic characteristics**

By design, the sample of 624 FSW-IDUs was evenly split between the two study sites (312 from each city). Median age was 33 years, median education completed was 6 years, and a slight majority (53%) had a monthly income below 3 500 pesos, equivalent to approximately US\$ 300. The median age of drug initiation was 20 years and median age of sex work initiation was 19 years. FSW-IDUs in the sample spent a median of 10 hours on the street each day (Table 1).

**TABLE 1. Sociodemographic sample characteristics of FSW-IDUs in Tijuana and Ciudad Juarez, 2009–2010, by city of interview**

| Characteristic  | Tijuana (n = 312) |       | Ciudad Juarez (n = 312) |        | Total (n = 624) |       | P value | Odds ratio | 95% CI    |
|---|-------------------|-------|-------------------------|--------|-----------------|-------|---------|------------|-----------|
|   | No.               | % IQR | No.                     | % IQR  | No.             | % IQR |         |            |           |
| <b>Sociodemographics (IQR)</b>                                      |                   |       |                         |        |                 |       |         |            |           |
| Median age (years)  | 33                | 28–41 | 33                      | 27–39  | 33              | 27–40 | 0.347   | 1.01       | 0.99–1.03 |
| Median education completed (years)                                  | 8                 | 6–10  | 6                       | 4–8    | 3               | 5–9   | <0.001  | 1.21       | 1.15–1.28 |
| Speaks English  | 123               | 39.4  | 42                      | 13.5   | 165             | 26.4  | <0.001  | 4.18       | 2.81–6.22 |
| Married/common law partner  | 127               | 40.7  | 109                     | 34.9   | 236             | 37.8  | 0.160   | 1.28       | 0.92–1.77 |
| Any STI (non-HIV) <sup>a</sup>                                      | 199               | 64.2  | 256                     | 83.4   | 455             | 73.7  | <0.001  | 0.36       | 0.24–0.52 |
| HIV+  | 18                | 5.8   | 16                      | 5.1    | 34              | 5.5   | 0.860   | 1.13       | 0.56–2.26 |
| <b>Individual risk behavior (IQR)</b>                               |                   |       |                         |        |                 |       |         |            |           |
| Median age when first trading sex (years)                           | 19                | 15–24 | 18                      | 15–23  | 19              | 15–23 | 0.341   | 1.00       | 0.98–1.03 |
| Median years as FSW   | 11                | 6–17  | 12                      | 6–17.5 | 11              | 6–17  | 0.725   | 1.00       | 0.98–1.02 |
| Median age at first injection                                       | 20                | 17–24 | 20                      | 17–27  | 20              | 17–25 | 0.538   | 0.98       | 0.96–1.00 |
| <b>Disease risk factor (IQR)</b>                                    |                   |       |                         |        |                 |       |         |            |           |
| Any receptive needle sharing <sup>b</sup>                           | 295               | 94.9  | 299                     | 95.8   | 594             | 95.3  | 0.575   | 0.80       | 0.38–1.70 |
| Shared injection paraphernalia ≥ half the time <sup>b</sup>         | 193               | 62.3  | 114                     | 36.5   | 307             | 49.4  | <0.001  | 2.86       | 2.07–3.97 |
| Median no. of male clients <sup>b</sup>                             | 1.5               | 0.6–3 | 6.9                     | 3–10.8 | 3               | 1–8   | <0.001  | 0.72       | 0.68–0.76 |
| Infrequently uses condom with clients                               | 44                | 14.8  | 135                     | 43.8   | 179             | 29.5  | <0.001  | 0.22       | 0.15–0.33 |
| <b>Physical environment (IQR)</b>                                   |                   |       |                         |        |                 |       |         |            |           |
| Lived in Tijuana/Ciudad Juarez whole life                           | 101               | 32.4  | 172                     | 55.1   | 273             | 43.8  | <0.001  | 0.39       | 0.28–0.54 |
| Median time spent on street (hours/day) <sup>c</sup>                | 12                | 8–18  | 10                      | 7–12   | 10              | 7–15  | <0.001  | 1.09       | 1.06–1.13 |
| Mostly homeless <sup>b</sup>  | 26                | 8.3   | 9                       | 2.9    | 35              | 5.6   | 0.005   | 3.06       | 1.41–6.64 |
| Have been incarcerated  | 208               | 66.7  | 252                     | 80.8   | 460             | 73.7  | <0.001  | 0.48       | 0.33–0.69 |
| Ever deported from U.S.   | 45                | 14.4  | 11                      | 3.5    | 56              | 9.0   | <0.001  | 4.61       | 2.34–9.10 |
| Participated in syringe exchange <sup>b</sup>                       | 29                | 9.3   | 38                      | 12.2   | 67              | 10.8  | 0.301   | 0.74       | 0.44–1.24 |
| Ever enrolled in drug treatment                                     | 132               | 42.3  | 188                     | 60.3   | 320             | 51.3  | <0.001  | 0.48       | 0.35–0.67 |
| Ever tested for HIV   | 163               | 52.4  | 160                     | 51.3   | 323             | 51.8  | 0.810   | 1.05       | 0.76–1.43 |
| <b>Social environment (IQR)</b>                                     |                   |       |                         |        |                 |       |         |            |           |
| Median no. of people usually injected with <sup>b</sup>             | 2                 | 1–5   | 3                       | 2–5    | 3               | 1–5   | <0.001  | 1.00       | 0.98–1.02 |
| Injected drugs with a client often/always <sup>b</sup>              | 148               | 47.4  | 60                      | 19.2   | 208             | 33.3  | <0.001  | 3.79       | 2.65–5.43 |
| Injected drugs with intimate sex partner/spouse/family <sup>b</sup> | 87                | 28.3  | 44                      | 14.1   | 131             | 21.2  | <0.001  | 2.41       | 1.61–3.61 |
| <b>Economic environment (IQR)</b>                                   |                   |       |                         |        |                 |       |         |            |           |
| Average monthly income ≥ 3 500 pesos                                | 107               | 34.3  | 187                     | 59.9   | 294             | 47.1  | <0.001  | 0.35       | 0.25–0.48 |
| Earns more for unprotected sex                                      | 996               | 32.5  | 190                     | 61.7   | 286             | 47.4  | <0.001  | 0.30       | 0.21–0.42 |
| Amount earned per vaginal sex act with a condom (US\$)              | 20                | 20–30 | 10                      | 10–15  | 15              | 10–20 | <0.001  | 1.23       | 1.19–1.27 |
| Amount earned per vaginal sex act without a condom (US\$)           | 25                | 20–35 | 15                      | 10–20  | 20              | 15–30 | <0.001  | 1.07       | 1.06–1.09 |

**Note:** FSW-IDUs: female sex workers who are also injection drug users, IQR: interquartile range, CI: confidence interval, STI: sexually transmitted infection. Certain percentages may reflect denominators smaller than the n value given in the column head. These discrepancies are due to missing data.

<sup>a</sup> Includes syphilis, gonorrhea, *Chlamydia*, trichomoniasis, and bacterial vaginosis.

<sup>b</sup> Past month.

<sup>c</sup> Past 6 months.

Demographically, significant differences were observed between the Tijuana and Ciudad Juarez samples for a number of indicators, including the median percent of respondents describing themselves as homeless (8.3% versus 2.9%,  $P = 0.005$ ), median years of education completed [8 (interquartile range (IQR) 6–10) versus 6 (IQR 4–8),  $P < 0.001$ ], median monthly income below 3 500 pesos (34.3% versus 59.9%,  $P < 0.001$ ), and median daily hours spent on the street [12 (IQR 8–18) versus 10 (IQR 7–12),  $P < 0.001$ ]. Compared with women in Ciudad Juarez, a smaller proportion of Tijuana women lived in the city of the interview their entire life (32.4% versus 55.1%,  $P < 0.001$ ), a larger proportion had been deported from the United States (14.4% versus 3.5%,  $P < 0.001$ ), and a larger proportion had English proficiency (39.4% versus 13.5%,  $P < 0.001$ ).

### Health status, risk factors, and program utilization

The prevalence of risk factors for infectious diseases generally differed significantly at the two sites. Data on injection risk behaviors were mixed, with Tijuana respondents reporting smaller median numbers of injecting partners in the past month [2 (IQR 1–5) versus 3 (IQR 2–5),  $P < 0.001$ ]. Relative to Ciudad Juarez, a larger proportion of Tijuana respondents reported syringe sharing more than half the time (62.3% versus 36.5%,  $P < 0.001$ ).

Compared with Ciudad Juarez, more Tijuana respondents reported often or always injecting drugs with sex clients (47.4% versus 19.2%,  $P < 0.001$ ) and intimate sex partners (28.3% versus 14.1%,  $P < 0.001$ ) in the past month. In Ciudad Juarez, sexual risk behaviors were signifi-

cantly more prevalent, including higher median monthly number of clients [6.9 (IQR 3–10.8) versus 1.5 (IQR 0.6–3),  $P < 0.001$ ] and higher levels of inconsistent condom use, with 43.8% versus 14.8% reporting using condoms infrequently during vaginal sex ( $P < 0.001$ ). Relative to Tijuana, substantially larger proportions of Juarez respondents reported earning more for unprotected sex (61.7% versus 32.5%,  $P < 0.001$ ). The elevated prevalence of STIs in Ciudad Juarez (83.4% versus 64.2%,  $P < 0.001$ ) paralleled the higher levels of risk behavior in that city, but HIV prevalence was comparable across sites at an average of 5.5%.

Lifetime experiences with public health services were similar across sites, including the proportion who had attended a syringe exchange program in the past month (10.8% overall) and ever had an HIV test (51.8% overall). However, the sites differed significantly in terms of lifetime prevalence of drug treatment (42.3% in Tijuana versus 60.3% in Ciudad Juarez,  $P < 0.001$ ) and incarceration (66.7% in Tijuana versus 80.8% in Ciudad Juarez,  $P < 0.001$ ).

### Experiences with police and trends in structural environment

In terms of experiences related to criminal justice (Table 2), almost 50% of the study sample reported syringe confiscation within the past 6 months even though syringes are legal. An even larger proportion (55.6%) reported financial extortion during this period, with 42.9% claiming that police forcibly confiscated money; the proportions in Ciudad Juarez were significantly higher for virtually all indicators of the policing risk environment. Across the samples,

32.5% reported police requests for free sexual services and 17.0% reported sexual abuse by police officers in the past 6 months, with Ciudad Juarez demonstrating higher levels (36.5% versus 28.5%,  $P = 0.04$ , and 18.3% versus 15.7%,  $P = 0.46$ , respectively).

As shown in Table 3, across several categories, law enforcement deployment was perceived to have increased more in Ciudad Juarez, including federal police (59.8% versus 57.5%), municipal police (50.3% versus 48.7%), and the federal army showing an especially high and significant increase during this period (72.1% versus 59.2%,  $P = 0.001$ ). There were no significant differences between cities in terms of perceived changes in levels of street violence (53.4% overall), cartel visibility (53.4% overall), and number of sex workers arrested in the past year (44.7% overall). However, Tijuana respondents reported more of an increase in client violence (32.4% versus 14.3%,  $P < 0.001$ ), while Ciudad Juarez experienced a greater increase in visibility of torn-down buildings (57.7% versus 34.2%,  $P < 0.001$ ). In terms of trends in service access, Tijuana respondents reported significantly improved access to health care (37.4% versus 15.2%,  $P < 0.001$ ) as well as better access to condoms (44.8% versus 17.9%,  $P < 0.001$ ) and sterile syringes (44.5% versus 17.7%,  $P < 0.001$ ) over the past year.

### DISCUSSION

This study analyzes FSW-IDUs' experiences relating to the risk environment related to criminal justice in the context of Mexico's northern border conflict.

Relative to Tijuana, respondents from Ciudad Juarez reported significantly higher levels of police abuse across the

**TABLE 2. Descriptive statistics of police encounters (past 6 months) of FSW-IDUs in Tijuana and Ciudad Juarez, 2009–2010, by city of interview**

| Characteristic                                   | Tijuana ( $n = 312$ ) |      | Ciudad Juarez ( $n = 312$ ) |      | Total ( $n = 624$ ) |      | $P$ value | Odds ratio | 95% CI    |
|--|-----------------------|------|-----------------------------|------|---------------------|------|-----------|------------|-----------|
|  | No.                   | %    | No.                         | %    | No.                 | %    |           |            |           |
| Asked for sexual favors by police                | 89                    | 28.5 | 114                         | 36.5 | 203                 | 32.5 | 0.040     | 0.69       | 0.49–0.97 |
| Sexually abused by police                        | 49                    | 15.7 | 57                          | 18.3 | 106                 | 17.0 | 0.456     | 0.83       | 0.55–1.27 |
| Syringes taken by police                         | 118                   | 37.8 | 183                         | 58.7 | 301                 | 48.2 | < 0.001   | 0.43       | 0.31–0.59 |
| Money exchanged for not being arrested by police | 145                   | 46.5 | 202                         | 64.7 | 347                 | 55.6 | < 0.001   | 0.47       | 0.34–0.65 |
| Money taken forcibly by police                   | 117                   | 37.5 | 151                         | 48.4 | 268                 | 42.9 | 0.008     | 0.64       | 0.46–0.88 |

**Note:** FSW-IDUs: female sex workers who are also injection drug users, CI: confidence interval. Certain percentages may reflect denominators smaller than the  $n$  value given in the column head. These discrepancies are due to missing data.

**TABLE 3. Perceived changes in environment among FSW-IDUs in Tijuana and Ciudad Juarez, 2008–2009 (more versus less or no change in past year)**

| Change perceived                       | Tijuana ( <i>n</i> = 312) |      | Ciudad Juarez ( <i>n</i> = 312) |      | Total ( <i>n</i> = 624) |      | <i>P</i> value | Odds ratio | 95% CI    |
|--|---------------------------|------|---------------------------------|------|-------------------------|------|----------------|------------|-----------|
|  | No.                       | %    | No.                             | %    | No.                     | %    |                |            |           |
| Municipal police presence              | 150                       | 48.7 | 157                             | 50.3 | 307                     | 49.5 | 0.689          | 0.94       | 0.68–1.28 |
| Federal police presence                | 176                       | 57.5 | 186                             | 59.8 | 362                     | 58.7 | 0.568          | 0.91       | 0.66–1.25 |
| Federal army presence                  | 183                       | 59.2 | 225                             | 72.1 | 408                     | 65.7 | 0.001          | 0.56       | 0.40–0.79 |
| Violence from clients                  | 97                        | 32.4 | 43                              | 14.3 | 140                     | 23.4 | < 0.001        | 2.87       | 1.92–4.30 |
| Street violence                        | 170                       | 55.0 | 161                             | 51.8 | 331                     | 53.4 | 0.422          | 1.14       | 0.83–1.56 |
| Visibility of mafia/cartels            | 159                       | 52.6 | 160                             | 54.2 | 319                     | 53.4 | 0.743          | 0.94       | 0.68–1.29 |
| Sex workers arrested                   | 141                       | 48.0 | 127                             | 41.5 | 268                     | 44.7 | 0.119          | 1.30       | 0.94–1.79 |
| Access to health care/medical services | 110                       | 37.4 | 43                              | 15.2 | 153                     | 26.5 | < 0.001        | 3.34       | 2.23–4.98 |
| Access to condoms                      | 133                       | 44.8 | 56                              | 17.9 | 189                     | 31.0 | < 0.001        | 3.71       | 2.56–5.36 |
| Access to sterile syringes             | 133                       | 44.5 | 55                              | 17.7 | 188                     | 30.8 | < 0.001        | 3.73       | 2.58–5.40 |
| Visibility of torn-down buildings      | 93                        | 34.2 | 179                             | 57.7 | 272                     | 46.7 | < 0.001        | 0.38       | 0.27–0.53 |
| Number of Mexican clients              | 35                        | 11.4 | 33                              | 10.6 | 68                      | 11.0 | 0.798          | 1.09       | 0.66–1.81 |
| Number of U.S. clients                 | 22                        | 7.3  | 8                               | 2.9  | 30                      | 5.2  | 0.023          | 2.67       | 1.17–6.10 |
| Number of foreign clients              | 13                        | 4.5  | 4                               | 2.1  | 17                      | 3.6  | 0.210          | 2.22       | 0.71–6.91 |

**Note:** FSW-IDUs: female sex workers who are also injection drug users, CI: confidence interval. Certain percentages may reflect denominators smaller than the *n* value given in the column head. These discrepancies are due to missing data.

spectrum of categories assessed, including syringe confiscation, requests for free sexual services, financial extortion, and robbery. FSW-IDUs there also demonstrated greater perceptions of increased police deployment across all categories, with army deployment perceived to have increased by the vast majority of respondents.

As many researchers previously found (15, 19, 23, 27, 28), reported levels of police abuse corresponded to elevated vulnerabilities in a number of risk behavior and health outcome domains. Although causality cannot be determined in this cross-sectional analysis, it is notable that significantly greater prevalence of sexual service extortion and marginally higher prevalence of police sexual abuse in Ciudad Juarez paralleled larger proportions of respondents reporting infrequent condom use with clients and being paid more for unprotected sex. Women in Ciudad Juarez also earned significantly less for sex than women in Tijuana; amounts earned were significantly lower than those found in 2004–2006 (29).

Respondents from Ciudad Juarez were observed to have a significantly higher prevalence of STIs. Given the compounded gender and power imbalance, it is unlikely that FSWs can exert control over their sexual encounters with police, which contributes to the individual and network risk of transmission of STIs, including their abusers. The substantially higher prevalence of STIs in this city and lack of improved access

to prevention and health services further underscores the dire situation of vulnerable populations in this conflict setting. In the face of extreme levels of structural violence and disruption, it may be unrealistic to expect that behavioral interventions that focus on individual responsibility to change HIV/STI risk behavior can be effective without addressing the underlying drivers in the risk environment.

Sexual violence perpetrated by state actors imposes a particularly heavy burden because of low self-efficacy to seek justice in the aftermath and the lack of adequate medical and social services to mitigate the long-term effects of trauma (30, 31). Especially prevalent and acute in conflict settings, forced sexual encounters with uniformed personnel can generate a cascade of detrimental health consequences, including post-traumatic stress, substance abuse, and elevated risk of STIs (32). Violent conflict produces detrimental consequences on community health independent of police and army abuse (3, 32, 33), so contextual levels of structural violence can only aggravate the individual-level risk flowing from the experiences observed in this sample.

Analogous paradigms frame the health consequences of extortion and robbery by police. As FSWs respond to these practices by protecting their financial interests and physical safety, these behavioral pressures can force even legitimized sex markets underground (30).

In the context of furtive sex transactions, FSWs experience decreased ability to negotiate condom use, impaired leverage to demand fair pay, and increased risk of victimization by clients (6).

Experience of extrajudicial syringe confiscation carries a public health detriment through a different set of mechanisms. Removal of injection equipment directly reduces IDUs' access to clean injection equipment, while increasing the likelihood of syringe sharing. Such activity also deters IDUs from carrying syringes to avoid confiscation and extortion practices, while potentially creating real and perceived barriers to utilization of syringe exchange programs, pharmacies, and related public health prevention services (33, 34). Syringe confiscation has been associated with increased risk of infection (28, 35, 36). In this sample, although a larger proportion of Ciudad Juarez respondents reported syringe confiscation and a slightly larger proportion reported lifetime prevalence of syringe sharing, other indicators of injection risk, such as frequent receptive syringe sharing, were higher in Tijuana. Given that HIV prevalence was comparable across cities, research assessing additional proximal risk factors is needed to unveil the public health impact of syringe confiscation on risk of infection.

Horrible and irreparable damage caused by these civil and human rights violations goes well beyond the physical and psychological health of the individual women. Disease acquired as a result

of adverse police practices can spread quickly through FSW-IDU networks, fueling concentrated epidemics among high-risk groups as well as transmission to the general population. Forced sexual activity with multiple FSWs also suggests a possible role of law enforcement personnel as vectors of STIs among FSWs and others in the community. Meanwhile, given the large number of itinerant federal military and police personnel in the Northern Border Region, these data illuminate a substantial risk of diffusion of STIs once itinerant soldiers return to their places of origin (36, 37). This pattern would parallel phenomena repeatedly observed on other continents, where itinerant troops effectively distributed an epidemic from an epicenter conflict locale to populations in their places of origin (33, 37).

Only about half of the respondents in this study reported ever having an HIV test, and only about 1 in 10 had ever participated in a syringe exchange program. In Tijuana, women reported experiencing significantly greater access to sterile syringes, condoms, and primary health care over the past year relative to Ciudad Juárez, which reflects the considerable resources that were expended by state and federal health authorities in HIV/STI prevention in Tijuana. In contrast, in Ciudad Juárez, few women reported improvements in any of these services over the past year. Urgency to build and sustain capacity in HIV/STI prevention efforts is paramount, especially in light of recent reports that support from the Global Fund to Fight AIDS, Tuberculosis, and Malaria may be significantly curtailed. Respondents reported relatively high prevalence of incarceration and drug treatment experiences. According to international best practices and guidelines of the United Nations Office of Drugs and Crime (38), contact with these institutional structures can serve as an important opportunity for delivery of HIV testing, treatment, education, and opioid substitution therapy.

Pervasive corruption, high rates of injection drug use and sexual abuse, and other human rights abuses make them venues for increased sexual and injection risk (39). Although progress has been recently made in institutional reform to

align drug treatment and correctional institutions with public health prevention goals to reach high-risk groups in Mexico, many challenges remain in shifting approaches taken by these institutions from purely punitive frameworks for drug abuse toward evidence-based models (40).

As these institutions strive to reform, upstream challenges in the realm of street-level police and army practices toward vulnerable populations remain formidable. Theoretically, the relatively liberal legal regimes relating to syringe possession and sex work open the door for harmonization of policing and public health efforts targeting FSW-IDUs. As is often the case, however, the law "on the books" differs substantially from the law "on the street" in these cross-border cities (41, 42). The findings of this study paint a troubling picture of pervasive abuse and extrajudicial punishment at the hands of law enforcement to the detriment of FSW-IDUs' health and human rights.

Facets of the structural environment, such as laws and policies, employment opportunities, access to health services, and other exogenous factors are understood to influence disease risks (15, 19). Structural interventions can help shift this environment, thus improving health and human rights outcomes. These interventions range from legislation to decriminalize sex work, to police training and professionalization, to strategic litigation against police abuse. Mexico has already embarked on a program of legislative reforms designed to humanize drug policy. Ambitious changes in the criminal justice system and the judiciary have also been initiated, with a promise to promote transparency, accountability, and professionalism among police, judges, and other public servants (40). In view of multiple governance failures and challenges faced by the Mexican judicial system, police training, human rights surveillance, and relationship building between law enforcement and public health sectors are the approaches that are more likely to produce street-level change (16, 33, 43, 44).

Given the nature of this analysis, the associations reported should be viewed with several caveats. The comparative

analysis did not control for the potential confounding effects of observed and unobserved factors. Cross-sectional data do not provide an opportunity to draw causal inferences, which require confirmation in prospective analyses. The sample is likely not representative of the overall FSW-IDU population in either city because, by design, recent unprotected sex and sharing of injection equipment were among the inclusion criteria. Measuring representativeness is especially difficult in view of the lack of reliable estimates for the overall population of FSW-IDUs in the two cities studied.

Despite these limitations, this study provides a unique empirical perspective on the potential influence of policing on health and human rights of a highly vulnerable population in the area affected by Mexico's drug-related violence. The findings suggest that the continuing militarization of security may exacerbate HIV/STI risk among FSW-IDUs and uniformed personnel, with broader implications for health outcomes in the Northern Border Region and beyond. These data highlight the critical need to scale up public health efforts and to redouble investment in domestic and international policy approaches to mitigate the collateral public health harm from the cross-continental campaign against the drug cartels.

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## RESUMEN

**El conflicto en la frontera norte de México: daños colaterales a la salud y los derechos humanos en grupos vulnerables**

**Objetivo.** Comparar las distribuciones de las violaciones a los derechos humanos y el riesgo de enfermedades; yuxtaponer los patrones obtenidos con las variables demográficas y estructurales del entorno, y formular las implicaciones de llevar a cabo intervenciones estructurales.

**Métodos.** Se entrevistaron trabajadoras del sexo que consumían drogas inyectables en Tijuana y Ciudad Juárez, México. Entre octubre del 2008 y octubre del 2009 se llevaron a cabo entrevistas estructuradas y pruebas para detectar infecciones de transmisión sexual (ITS). Se compararon entre las dos ciudades las frecuencias de factores individuales y ambientales, como el abuso policial, el riesgo de infección por el VIH y las conductas protectoras, usando regresión logística de una sola variable.

**Resultados.** De 624 mujeres, casi la mitad comunicaron la confiscación de jeringas por la policía a pesar de que es legal poseerlas; 55,6% informaron extorsión (en los últimos 6 meses), con proporciones significativamente mayores en Ciudad Juárez ( $P < 0,001$ ). Los informes de solicitud reciente de favores sexuales (28,5% en Tijuana, 36,5% en Ciudad Juárez,  $P = 0,04$ ) y de abuso sexual (15,7% en Tijuana, 18,3% en Ciudad Juárez) por la policía fueron comunes. La prevalencia de ITS fue significativamente menor en Tijuana que en Ciudad Juárez (64,2% y 83,4%,  $P < 0,001$ ), en forma análoga a la menor prevalencia de conductas sexuales de riesgo en la primera ciudad. Las mujeres entrevistadas en Ciudad Juárez informaron una mediana del número de clientes mensual significativamente mayor (6,8 frente a 1,5,  $P < 0,001$ ) y una mediana del pago por acto sexual menor (US\$ 10 frente a US\$ 20,  $P < 0,001$ ) en el último mes. En el último año, las mujeres entrevistadas percibieron un mayor aumento del despliegue de seguridad, especialmente la presencia del ejército, en Ciudad Juárez que en Tijuana (72,1% frente a 59,2%,  $P = 0,001$ ).

**Conclusiones.** Los daños colaterales derivados de las prácticas policiales en el contexto del conflicto de narcotráfico de México pueden afectar a la salud pública en la región de la frontera norte de México. Los oficiales itinerantes pueden facilitar la propagación de enfermedades más allá de la región. Se analiza la urgencia para establecer intervenciones estructurales.

**Palabras clave**

Trabajadores sexuales; abuso de sustancias por vía intravenosa; violaciones de los derechos humanos; violencia contra la mujer; infecciones por VIH; enfermedades transmisibles; poblaciones vulnerables; México.