



High prevalence of abscesses and self-treatment among injection drug users in Tijuana, Mexico

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SUMMARY

Background: Soft tissue infections are common among injection drug users (IDUs), but information on correlates and treatment in this highly marginalized population is lacking.

Methods: Six hundred twenty-three community-recruited IDUs in Tijuana, Mexico, completed a detailed interview on abscess history and treatment. Univariate and multiple logistic regressions were used to identify factors independently associated with having an abscess in the prior 6 months.

Results: Overall, 46% had ever had an abscess and 20% had had an abscess in the past 6 months. Only 12% had sought medical care for their most recent abscess; 60% treated the abscess themselves. The most common self-treatment method was to apply heated (24%) or unheated (23%) *Aloe vera* leaf. Other methods included draining the wound with a syringe (19%) or knife (11%). Factors independently associated with recent abscess were having income from sex work (adjusted odds ratio (aOR) 4.56, 95% confidence interval (CI) 2.08–10.00), smoking methamphetamine (aOR 1.65, 95% CI 1.05–2.62), seeking someone to help with injection (aOR 2.06, 95% CI 1.18–3.61), and reporting that police affected where they used drugs (aOR 2.14, 95% CI 1.15–3.96).

Conclusions: Abscesses are common among IDUs in this setting, but appropriate treatment is rare. Interventions to reduce barriers to medical care in this population are needed. Research on the effectiveness of *Aloe vera* application in this setting is also needed, as are interventions to provide IDU sex workers, methamphetamine smokers, and those who assist with injection with the information and equipment necessary to reduce abscess risk.

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1. Introduction

Soft tissue infections are common among injection drug users (IDUs). A prospective study of IDUs in Amsterdam reported an incidence of one abscess per 3 years of injection.¹ In San Francisco, 32% of street-recruited IDUs were found to have an abscess, cellulitis, or both, based on physical examination at the time of interview.² Community-based studies of IDUs in Vancouver³ and Baltimore⁴ found 6-month abscess prevalence of 22% and 11%, respectively. Among IDUs recruited through needle exchange programs and supervised injection facilities that provide information and materials to promote safer injection and prevent abscesses, prevalence of abscesses has been found to be lower, at <10% over 12–18 months.^{5,6}

Abscesses can also lead to serious infections, including endocarditis, osteomyelitis, and septicemia. Despite these potentially serious consequences, IDUs often delay medical care for abscesses. In San Francisco,² 77% of IDUs with a history of abscess had been treated by a doctor, but 48% reported at least one abscess for which they had not sought treatment; 27% had lanced their own abscess and 16% had used antibiotics acquired on the street. Delaying or avoiding care can result in complicated clinical presentations requiring more complex treatment and higher morbidity and mortality. In Seattle, the median time between symptom onset and seeking care among IDUs with abscess was found to be 5 days, with 35% of patients ultimately requiring hospitalization.⁷ Serious soft tissue infections were reported to be the most common reason for emergency department visits and the second most common reason for hospital admission in a cohort of IDUs in Vancouver.⁸ A hospital records review in San Francisco found that among patients admitted with a primary diagnosis of soft tissue infection, 70% had injected drugs in the past 12 months.⁹ There appear to have been no

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empirical studies focused on barriers to abscess care among IDUs, although at least one study has cited lack of financial resources and concern about negative or punitive interactions with healthcare providers as contributing to delays in care.¹⁰

Similarly, there have been relatively few studies examining risk factors for abscesses among IDUs. Identified risk factors include poor injection hygiene practices like licking the needle before injecting² and inconsistently washing hands before injecting,⁵ while skin cleaning before injection is protective.^{4,11} Subcutaneous or intramuscular injection ('skin popping'),^{2,11} drawing blood into the syringe before injecting ('booting'),¹¹ injecting heroin and cocaine together ('speedballing'),^{1,2,11} and high injection frequency^{1,12} have also been associated with abscesses among IDUs. Further, HIV infection^{1,3} and female gender^{1,3,6,11,12} have been associated with abscess in multiple studies, as have contextual factors like engaging in sex work^{1,3} and unstable housing.^{3,5}

Other studies have suggested that the type of drug used may contribute to abscess risk. A prior study in Tijuana, Mexico, found that IDUs who injected white or colored methamphetamine were more likely to report abscesses than those who injected clear methamphetamine.¹³ Black tar heroin injection has also been associated with soft tissue infections. Black tar is sometimes 'cut' with contaminated adulterants, including soil, which can promote inoculation of bacteria and subsequent soft tissue infection.¹⁴ The thick consistency of black tar heroin commonly results in a high degree of venous sclerosis, making intravascular injection difficult and increasing the likelihood that IDUs may resort to subcutaneous injection.

Tijuana, Baja California, Mexico is situated on the Mexico–USA border adjacent to San Diego, California, on a major drug trafficking route. Increased drug trafficking in recent years has created a local consumption market in Tijuana, where black tar heroin and methamphetamine predominate. We examined the prevalence and treatment of abscesses among IDUs in Tijuana and identified correlates of recent abscess to identify opportunities for prevention and treatment interventions.

2. Methods

2.1. Recruitment

Between April 2006 and April 2007, 1056 IDUs were recruited in Tijuana into a prospective study of behavioral and contextual factors associated with HIV, syphilis, and tuberculosis (TB) infections, which has been previously described.¹⁵ Eligibility criteria included being ≥ 18 years of age; having injected illicit drugs within the past month, as confirmed by inspection of injection stigmata ('track marks'); ability to speak Spanish or English; being able to provide informed consent; and having no plans to permanently move out of the city in the next 18 months. Methods were approved by the Institutional Review Board of the University of California, San Diego, and the Ethics Board of the Tijuana General Hospital.

Respondent-driven sampling (RDS) was used to recruit participants.¹⁶ Briefly, a diverse group of 'seeds' (heterogeneous by age, gender, and neighborhood) was selected and given uniquely coded coupons to refer their peers to the study. Waves of recruitment continued as subjects returning with coupons were given coupons to recruit members of their social networks. Recruitment and interviews were conducted by indigenous outreach workers through the use of a modified recreational vehicle and a storefront office.

2.2. Data collection

At baseline and semi-annually thereafter, participants completed an interviewer-administered survey eliciting information on socio-demographic, behavioral, and contextual characteristics. At the first follow-up visit, a cross-sectional survey on abscess history and

treatment was added to the study instrument, which included questions on lifetime and recent history of abscess (i.e., "Have you ever had an abscess?", "When was the last time you had an abscess?"), followed by detailed questions regarding the characteristics of the most recent abscess. Among these characteristics were the symptoms accompanying the abscess, e.g., 'swelling', 'fever', 'pus or fluid under the skin', and 'oozing of clear, white, or yellow fluid or pus from the skin'. Participants who had an abscess at the time of the interview were instructed to provide details of the most recent abscess prior to the current abscess, unless the current abscess was their first, and were offered treatment by on-site medical personnel or referred to a local clinic or hospital for care. Questions on modes of self-treatment were formulated based on field observations and piloting of the cross-sectional survey instrument.

Serological testing for HIV antibody was conducted using the Determine[®] rapid HIV antibody test (Abbott Pharmaceuticals, Boston, MA, USA) and confirmatory testing with an HIV-1 immunoassay and immunofluorescence assay. Syphilis serology was conducted using the rapid plasma reagin (RPR) test (MacroVue, Becton Dickinson, Cockeysville, MD, USA); RPR-positive samples were confirmed using the *Treponema pallidum* particle agglutination assay (TP-PA; Fujirebio, Wilmington, DE, USA).

2.3. Statistical analysis

Descriptive statistics were used to characterize lifetime abscess history and details of the most recent abscess and its treatment. To identify factors associated with abscess in the past 6 months, we conducted a cross-sectional univariate analysis using Chi-square tests for categorical variables and *t*-tests and Wilcoxon rank-sum tests for normally and non-normally distributed continuous variables, respectively. Variables that achieved significance of ≤ 0.10 were entered into a multiple logistical regression model in a manual, stepwise fashion to identify baseline variables independently associated with reporting abscess in the 6 months prior ($p < 0.05$). Given previous findings that abscesses are more frequent among female than male IDUs we also tested for interactions between gender and other exposure variables.

As described previously,¹⁵ we explored the potential effects of RDS on our estimates using the RDS Analysis Tool (version 5.6.0, October 2006; Cornell University) and WinBUGS (version 1.4.1, 2004; Imperial College and Medical Research Council, UK). Odds ratios and 95% confidence intervals produced by the RDS analysis were compared to our multivariate logistic regression models. Since no significant differences between the RDS-adjusted and unadjusted models were identified, unadjusted models are presented.

3. Results

Overall, 653 participants (62%) completed the abscess questionnaire at the first semi-annual follow-up visit. Of these, we excluded 20 who did not report injection in the past 6 months and 10 for whom abscess history questions were missing. Of the remaining 623 IDUs, 82% were male and the median age was 37 years (interquartile range (IQR) 32–43 years). The median time since first injection was 15 years (IQR 9–23 years). Most (88%) injected daily during the past 6 months; the most common drugs injected were heroin alone (81%) or in combination with methamphetamine (51%), followed by methamphetamine alone (14%), and heroin and cocaine together (6%). In addition, 22% smoked methamphetamine during the past 6 months.

3.1. Abscess characteristics

Two hundred eighty-five IDUs (46%) reported ever having an abscess (median 3, IQR 2–5) and 127 (20%) reported an abscess in

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