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Cross-border migration and initiation of others into drug injecting in Tijuana, Mexico

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Abstract

Introduction and Aims. *Efforts to prevent injection drug use (IDU) are increasingly focusing on the role that people who inject drugs (PWID) play in facilitating the entry of others into this behaviour. This is particularly relevant in settings experiencing high levels of IDU, such as Mexico's northern border region, where cross-border migration, particularly through forced deportation, has been found to increase a range of health and social harms related to injecting.* ***Design and Methods***. *PWID enrolled in a prospective cohort study in Tijuana, Mexico, since 2011 were interviewed semi-annually, which solicited responses on their experiences initiating others into injecting. Univariate and multivariable logistic regression analyses were conducted at the Preventing Injection by Modifying Existing Responses (PRIMER) baseline, with the dependent variable defined as reporting ever initiating others into injection. The primary independent variable was lifetime deportation from the USA to Mexico.* ***Results***. *Among 532 participants, 14% (*n = *76) reported initiating others into injecting, the majority of participants reporting initiating acquaintances (74%,* n = *56). In multivariable analyses, initiating others into injecting was independently associated with reporting living in the USA for 1–5 years [adjusted odds ratio (AOR) = 2.42; 95% confidence interval (CI) 1.22–4.79,* P = *0.01], and methamphetamine and heroin injection combined (AOR = 3.67; 95% CI 1.11–12.17,* P = *0.03). Deportation was not independently associated with initiating others into injecting.* ***Discussion and Conclusions***. *The impact of migration needs to be considered within binational programming seeking to prevent the expansion of epidemics of injecting and HIV transmission among mobile populations residing in the Mexico–USA border region.* [Rafful C, Melo J, Medina-Mora ME, Rangel G, Sun X, Jain S, Werb D. Cross-border migration and initiation of others into drug injecting in Tijuana, Mexico. *Drug Alcohol Rev* 2017]

Key words: injection initiation, people who inject drugs, migration, Mexico, USA, border health.

Introduction

Efforts to prevent the transmission of blood-borne diseases such as HIV and hepatitis C virus among people who inject drugs (PWID) are increasingly considering the role of injection drug use (IDU) initiation in heightening transmission risk [1]. That is because the period of transition into injecting has been previously characterised by an increased incidence of blood-borne disease transmission through the sharing of contaminated syringes [2]. Further, consensus is emerging that the transition of drug-using individuals into injecting often requires facilitation from established injectors, given that 'initiates' often lack the necessary knowledge to inject themselves [3]. For instance, several studies in high-income settings have found that exposure to injecting is a risk factor for injection initiation among PWID [4–7], and that PWID play a key role in the

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transition of others into this behaviour [8–10], with decisions to initiate injecting having been shown to be associated with friendship or intimate relationships with PWID [5,6]. For instance, 27% of PWID participants in a study in Toronto (n = 26) reported ever initiating others [8].

Despite this evidence, there remain knowledge gaps regarding the role that PWID residing in middle- and lower-income settings [11], such as Mexico's northern border region, may play in the initiation of others into injecting. This is of critical importance given that Tijuana, a city in the northern Mexican border state of Baja, is the epicenter of an epidemic of HIV among PWID and sex workers [12–16]. The Tijuana–San Diego border crossing is also one of the busiest borders worldwide [17], and is a central node in one of the highest-volume drug trafficking routes stretching from Central America, through Mexico and to the USA [18,19]. This geopolitical context has created a unique drug use risk environment in Tijuana. The risk environment is defined as the social and structural environment experienced by PWID that influences and constrains their injection-related choices [20]. It allows for an examination of how interactions between social, structural, physical and political/economic influences operating at micro, meso and macro levels of an individual's environment may shape their local drug scene and behaviour [1]. In Tijuana, aspects of the risk environment include a high level of drug availability but also sustained migration from other Mexican regions, Central America and, in recent years, a substantial number of Mexican migrant returnees from the USA, as a result of an increase in deportations [21,22]. The conceptual framework for this study also, therefore, included 'Big Events Theory', an extension of the risk environment framework that posits that wars and other massive geopolitical events may increase the vulnerability of individual PWID to social and individual harms [23]. In this study, we assume that the mass migration and deportation of Mexicans from the USA is consistent with a 'Big Event'. From 2013 to 2015, there were 564 593 deportations of Mexicans from the USA [24–26], and data demonstrate that Tijuana received 22% of all USA deportees in 2013, even though less than 3% of them were born in Baja, California [21]. In the same year, 50% of people deported to Mexico were between ages 20 and 24 years, and most of them were men [21]. This suggests that a large number of deportees to Tijuana are unfamiliar with the city to which they have been deported, which may increase their sense of social isolation and dislocation [27], and thereby put them at greater risk of engaging in substance use.

Data suggest that men deportees in Tijuana were more likely to be younger and have used non-injection drugs in Mexico prior to their migration compared with non-deportees [28]. In addition, more than one-third reported first injecting drugs while living as undocumented migrants in the USA [28]. Further, a history of deportation among PWID in Tijuana has been shown to be associated with more frequent drug injection and less interaction with medical or treatment services [29]. People who are deported to Mexico are often not familiar with Mexican bureaucracy, which may present difficulties in meeting basic requirements for work and residence [30]. Additionally, patterns of deportation from the USA have resulted in most people deported to the Mexican border cities having come originally from other parts of Mexico and therefore having little social support upon arrival [30,31]. This combination of structural and social vulnerability has resulted in injection drug-using deportees in Tijuana having a greater risk of HIV acquisition [32], and a higher prevalence of high-dead space density syringe use [33] (which has also been shown to increase the risk of HIV infection [34]) compared with their non-deported counterparts. Deportation is therefore a risk factor for injection-related HIV transmission among this population.

Efforts to control IDU and consequent blood-borne disease transmission in Mexico's northern border region require a greater understanding of the factors associated with entry into IDU, which appears to be a socially communicable phenomenon [1,5–7,9,10]. Given the observed impact of deportation on a range of HIV risk behaviours, we therefore sought to determine correlates of reporting a history of initiating others into injecting among a cohort of PWID in a setting characterised by return migration of Mexicans from the USA who may or may not have been deported, and to specifically characterise the impact of migration history on the risk that PWID in Tijuana report initiating others into injecting.

Methods

Sample and procedures

This analysis was undertaken as part of the Preventing Injection by Modifying Existing Responses (PRIMER) study, a longitudinal multi-site study seeking to investigate structural and biomedical factors associated with IDU initiation and employs existing cohort study mechanisms. PRIMER seeks to characterise socio-structural risk factors that impact the risk that PWID initiate others into drug injecting [1]. Quantitative data analysed in PRIMER is provided through existing cohort studies of PWID located in the following countries settings: Tijuana, Mexico [*Proyecto El Cuete* IV; (ECIV)]; San Diego, USA (study of tuberculosis,

AIDS and hepatitis C risk); Vancouver, Canada (Vancouver drug users study); and Paris, Marseille, Bordeaux, Strasbourg; France (*COhorte pour l'évaluation des facteurs Structurels et INdividuels de l'Usage de drogues*). For the present study, which sought specifically to characterise risks associated with injection initiation among PWID in a low-resource border region, data were drawn from the ECIV study located in Mexico.

ECIV is an ongoing open prospective cohort study in Tijuana, Mexico, that began recruiting PWID participants in 2010 and 2011. At baseline and 6 month intervals, participants completed included interviewer-administered questionnaires. Recruitment was conducted through targeted sampling, which consisted of street-based outreach in 10 neighbourhoods across Tijuana [35]. Inclusion criteria included being 18 years or older, having injected drugs in the past month, speaking English or Spanish, currently living in Tijuana with no plans to move and not currently participating in an intervention study. As part of PRIMER, the ECIV questionnaire introduced items specific to injection initiation assistance in August 2014, along with identical questions in the cohort surveys of PWID in San Diego, USA, and Vancouver, Canada. The ECIV and PRIMER study protocols were both approved by the Human Research Protections Program of the University of California, San Diego. In Tijuana, the ECIV study protocol was approved by the Ethics Board at El Colegio de la Frontera Norte. All procedures performed in studies involving human participants were in accordance with the ethical standards of the University of California, San Diego, and El Colegio Frontera Norte Institutional Research Boards and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Measures

A structured interviewer-administered survey was employed, which solicited socio-demographic, contextual and behavioural factors, including those related to drug use and the initiation of others into injecting.

Lifetime non-injection heroin use was selected given that data suggest that non-IDU may increase the risk that PWID are in contact with injection naïve drug users at risk of initiating drug injecting [5–7]. Lifetime combined injection of heroin and methamphetamine was also included given previous findings by our research team that the use of these drugs in combination is associated with a range of injection-related HIV risk behaviours [36], and we hypothesised that it may therefore be associated with injection initiation assistance. Additionally, survey items solicited data on age, sex, housing status (i.e. living in a house or apartment owned by participants, their parents, friends or partner vs. other) and marital status (i.e. married vs. other).

Variable selection was guided by the Risk Environment and Big Events framework, and each variable of interest was linked to one or both of the frameworks. We included: history of imprisonment (Risk Environment), history of deportation from the USA (Big Events), years living in the USA (defined as never vs. 1–5 vs. 6 or more; Big Events), years living in Tijuana (defined as never vs. 1–5 vs. 6–10 vs. 11 or more; Big Events), years since first injecting (Risk Environment) and country of first injection (Mexico vs. USA; Big Events).

As part of the PRIMER study, survey items regarding participants' history of injection initiation of others were introduced in visit 7 of ECIV (i.e. September 2014). These questions included: 'Have you ever helped someone inject who had never injected before?'; 'How many different people have you ever helped inject who had never injected before?'; 'What were the reasons why you helped someone inject who had never injected before?'; and 'What was your relationship to the people who never had injected before and you helped injected?'.

Analysis

The present analysis was restricted to the PRIMER baseline, wherein participants reported on whether they had ever initiated others into injecting, which was the dependent outcome for this study. Descriptive summaries were performed for data on injection initiation. Cross-tabulations and logistic regression evaluated univariate associations between a history of reporting injecting initiation assistance and potential risk factors. These included: ever having been in prison, ever having been deported, years lived in the USA, years lived in Tijuana, years since first injection, lifetime use of non-injection heroin and injection of heroin and methamphetamine combined, as well as socio-demographic characteristics (i.e. age, sex, marital status and housing). Multivariable logistic regression models identified factors independently associated with injection initiation assistance. We constructed models using an a priori protocol whereby age, sex and years since first injection were included, as well as variables that were significant in the univariate analysis at the $P < 0.05$ level. Model diagnoses were performed including variance inflation factors to assess multicollinearity. Statistical analyses were performed in R version 3.3.2. No adjustments were made for multiple

comparisons. *P*-values less than 0.05 were considered statistically significant.

Results

Among 735 participants enrolled in ECIV, 532 (72%) completed questions at the PRIMER baseline on their experiences initiating others into IDU. Overall, 76 participants (14%) reported ever having helped someone initiate injecting. Among those who reported having initiated others, the median number of 'initiates' was 2 (interquartile range 1–3). Out of the 76 participants that reported ever having helped someone initiate injection, 34 also reported their reasons for initiating others, which included: to share drugs (41%, 14), to share the experience (27%, 9), as a result of being a 'hit doctor' (i.e. someone who provides injection assistance to others for a fee) (18%, 6), because they were worried about the new users' safety (6%, 2), multiple reasons (3%, 1) or other reasons (6%, 2). Regarding the type of relationship between initiator and initiate, the majority of participants reported initiating acquaintances (74%, 56), while others reported initiating friends (12%, 9), strangers (5%, 4), intimate partners (3%, 2) or other types of relationships (6%, 5).

Table 1 presents univariate associations between reporting ever initiating others into injecting and potentially relevant socio-demographic and drug use behaviour characteristics. As is shown, we detected no significant association between age and ever injecting initiation. There was a larger proportion of men than women participants who had ever initiated others into injection (17% vs. 9%, $P = 0.01$). Although not significant, there was a larger proportion of participants unmarried who reported ever initiating others into injection compared with those married (16% vs. 13%; $P = 0.32$). Likewise, there was not a significant difference between those who had stable housing and those who did not in relation to initiation others into IDU (15% vs. 14%; $P = 0.83$). A larger proportion of participants who reported having been incarcerated also reported ever initiating others into injection compared with those who did not (16% vs. 10%), though this difference was not significant ($P = 0.08$). However, participants who reported a history of deportation had a significantly higher proportion of ever initiating others (18% vs. 11%, $P = 0.03$). Participants who reported living in the USA for 1–5 years had a significantly higher proportion of ever initiating others into injection compared to those who had never lived in USA or lived in USA for 6 or more years (25% vs. 10% vs. 13%, $P < 0.01$). Years lived in Tijuana were not significantly associated with injection initiation (never = 15%; 1–5 years = 12%; 6–10 = 13%; 11 or more = 14%; $P = 0.92$). Regarding substance use, lifetime non-injection heroin users reported a higher proportion of ever initiating others into injection compared with those that did not (17% vs. 11%), though this difference was not significant ($P = 0.06$). Those who reported injecting heroin and methamphetamine in combination had a significantly higher proportion of ever initiating others into injection (16% vs. 4%, $P = 0.02$). No significant association was found between years since first injection ($P = 0.44$) and country of first injection (Mexico 15% vs. USA 13%, $P = 0.68$) with reporting ever initiating others into injection.

As shown in Table 2, in multivariable logistic regression, controlling for age, sex and years since first injection, reporting a history of initiating others into injection was significantly associated with having lived in the USA for 1–5 years [adjusted odds ratio (AOR) 2.42; 95% confidence interval (CI) 1.22–4.79, $P = 0.01$), and lifetime injection of methamphetamine and heroin combined (AOR 3.67; 95% CI 1.11–12.17, $P = 0.03$). Deportation was not associated with reporting a history of initiating others into injection (AOR 1.44, 95% CI 0.77–2.72, $P = 0.26$). Variance inflation factors for both 'deportation' and 'years lived in the USA' are <2, suggesting minimal multicollinearity.

Discussion

This is the first study investigating the prevalence and correlates of PWID initiation of others into injecting in the Mexico–USA border region. In an analysis guided by the Risk Environment and Big Events frameworks, we found that participants that reported having lived in the USA from 1 to 5 years had significantly increased odds of reporting a history of initiating others into injecting.

It is noteworthy that unlike other settings in which injecting initiates were most commonly family members, friends or intimate partners [5,6,8,37,38], a surprisingly high proportion of those initiated by PWID in this sample were reported to be acquaintances. Consistent with Big Events Theory, we posit that this may be related to the transient nature of PWID populations in Tijuana, given that PWID in the city are characterised by frequent migration, both voluntary and through deportation, to and from other parts of Mexico and the USA as part of larger patterns of migration across the Americas [32]. Migration, especially deportation, also disrupts family and other social networks [39], and in this way mass migration may heighten the risk environment for injection initiation experienced by

Table 1. *Univariate associations with ever initiating others into injection drug use in Tijuana, Mexico [PRIMER/El Cuete IV (*n = *532)]*

	No (*n* = 456)	Yes (*n* = 76)	OR (95% CI)	X^2	*P*-value[a]
Age, median (IQR)	40.4 (34.7–47.1)	40.6 (35.6–45.8)	1.00 (0.97–1.02)	0.08	0.784
Sex, n (%)					
Men	270 (82.6)	57 (17.4)	1.00	6.65	**0.010**
Women	186 (90.7)	19 (9.3)	0.48 (0.28–0.84)		
Marital status, n (%)					
Married	214 (87.4)	31 (12.7)	1.00	0.99	0.321
Other	242 (84.3)	45 (15.7)	1.28 (0.78–2.10)		
Housing, n (%)					
Other	174 (86.1)	28 (13.9)	1.00	0.05	0.827
Stable housing	282 (85.4)	48 (14.6)	1.06 (0.64–1.75)		
Ever in prison, n (%)					
No	129 (90.2)	14 (9.8)	1.00	3.17	0.075
Yes	327 (84.1)	62 (15.9)	1.75 (0.95–3.23)		
Ever deported, n (%)					
No	260 (88.7)	33 (11.3)	1.00	4.79	**0.029**
Yes	196 (82.0)	43 (18.0)	1.73 (1.06–2.82)		
Years lived in the US, n (%)					
Never	209 (89.7)	24 (10.3)	1.00	12.29	**0.002**
1–5	78 (75.0)	26 (25.0)	2.90 (1.57–5.36)		
6 or more	169 (86.7)	26 (13.3)	1.34 (0.74–2.42)		
Years lived in Tijuana, n (%)					
Never	188 (84.7)	34 (15.3)	1.00	0.51	0.916
1–5	52 (88.14)	7 (11.86)	0.74 (0.31–1.78)		
6–10	52 (86.7)	8 (13.3)	0.85 (0.37–1.95)		
11 or more	162 (85.7)	27 (14.3)	0.92 (0.53–1.59)		
Non-injection heroin use[b]*, n (%)*					
No	216 (88.9)	27 (11.1)	1.00	3.63	**0.057**
Yes	240 (83.0)	49 (17.0)	1.63 (0.99–2.71)		
Injection of heroin and methamphetamine combined[b]*, n (%)*					
No	68 (95.8)	3 (4.2)	1.00	5.78	**0.016**
Yes	388 (84.2)	73 (15.8)	4.27 (1.31–13.92)		
Years since first injection, median (IQR)	19.5 (12.5–25.5)	21.0 (15.3–25.6)	1.01 (0.99–1.04)	0.61	0.435
Country of first injection, n (%)					
Mexico/other[c]	344 (83.3)	59 (14.6)	1.00		
USA	112 (86.8)	17 (13.2)	0.89 (0.50–1.58)	0.17	0.680

[a]Significant values at $P < 0.05$ are in bold. [b]Lifetime drug use. [c]Other ($n = 2$). CI, confidence interval; IQR, interquartile range; OR, odds ratio; PRIMER, preventing injection by modifying existing responses.

PWID, as injection-naïve individuals may be more likely to interact with PWID in the absence of other defined social networks. Additionally, voluntary migration and deportation may also both impede the capacity of PWID to develop long-lasting and intimate social networks, unlike other settings with well-established PWID communities [10,40,41].

While a previous study of PWID that had been deported from the USA to Mexico found that social networks were central factors in the context of first injection experiences in the USA [28], the findings presented herein suggest that having lived in the USA for a period of up to 5 years is significantly related to initiating others into injecting (while deportation was not). A possible explanation for this is that the stressors related to migration put PWID in a more uncertain and vulnerable social and economic situation, which may incentivise initiating others into injecting in order to acquire drugs or to embed themselves in social networks of PWID.

The most common reason reported in this study for initiating others was sharing drugs with an initiate. Access to resources, whether they translate into free drugs or monetary remuneration, has been reported previously by others as a motivation for initiating others [42], and it is likely that given the endemic poverty among study participants, as well as limited opportunities for economic acquisition in Tijuana, these contribute to an economic risk environment that increases the likelihood that PWID will initiate others for economic or remunerative reasons. We also note that in the ongoing qualitative research from the

Table 2. *Multivariable logistic regression to assess risk factors associated with ever initiating others into injection*

	AOR	CI 95%		*P*-value[a]
Sex				
Men	1.00			
Women	0.61	0.34	1.10	0.099
Age	0.96	0.92	1.01	0.122
Years since first injection	1.03	0.99	1.07	0.183
Years lived in the USA				
Never	1.00			
1–5	**2.42**	**1.22**	**4.79**	**0.011**
6 or more	1.15	0.55	2.42	0.712
Lifetime deportation				
No	1.00			
Yes	1.44	0.77	2.72	0.258
Methamphetamine and heroin injection combined				
No	1.00			
Yes	**3.67**	**1.11**	**12.17**	**0.034**

[a]Significant values at $P < 0.05$ are in bold. AOR, adjusted odds ratio; CI, confidence intervals.

PRIMER study, participants have reported that financial remuneration for injection assistance is a key way of obtaining goods practised by highly marginalised PWID in Tijuana [43].

Regarding the type of drug used, we found that the injection of methamphetamine and heroin in combination was associated with an increased risk of reporting injection initiation assistance. Previous work in Tijuana has demonstrated that this drug combination increases the risk of a range of injection-related HIV risk behaviours [36]. This suggests that PWID who inject these drugs in combination should be the subject of tailored intervention efforts that address immediate risk of blood-borne disease transmission, as well as their risk of initiating others into injecting. Moreover, HIV prevention should be explored as a means to potentially address IDU from a syndemic perspective, wherein epidemics of HIV and IDU are understood as linked [44]. This in turn suggests that a comprehensive approach to address both epidemics is needed. This is particularly needed given the increased risk of blood-borne disease transmission among newly initiated PWID [2].

The complex relationship between histories of migration and injecting initiation assistance delineated in this study may be related to the difficulties that migrants to the USA face in their return to Mexico's northern border region. This may be of particular concern given that migration between Mexico and the USA remains high; and suggests that employing a Big Events framework to the analysis of PWID outcomes in this border region therefore appears appropriate in guiding investigations of migration-related health and social outcomes. Recent migration data suggest that the rate of deportees living in the Mexican side of the Mexico–USA border and crossing back to the USA has decreased from 66% in 2000 to 20% in 2010 [45] and that between 2009 and 2014, only 14% of the one million returned Mexicans were deportees [46]. However, the United States Department of Homeland Security reports that between 2009 and 2013, the USA deported 2.7 million Mexicans, an average of 540 000 Mexicans per year [25]. The probability of Mexicans living in the USA to return to Mexico doubled between 2000 and 2010 [45]. Moreover, it has been also estimated that returned Mexicans are spending less time in the USA [47]. This is concerning because others have found that mental disorders are related to short-term residence in the USA [48], and our findings present the same pattern with initiating others into injection. Given the study findings, we stress that future research should seek to determine the role of specific national and binational policies and public health interventions in addressing risks related to injection initiation and blood-borne disease transmission among migrant PWID. Indeed, migrants experience a range of potential harms, including engagement in risky drug-using behaviours, and these should therefore be a primary focus of public health interventions designed to support the reincorporation of return migrants into Mexican society [45].

Limitations

This study, which presents preliminary findings on this topic, has several limitations. First, as a cross-sectional analysis we have limited capacity to interpret temporal relationships between the outcome and independent variables of interest, and we therefore caution against assuming a causal relationship between migration and initiating others into injecting among PWID. Second, we identified a number of marginally significant variables; it is possible that a larger sample size may have provided sufficient statistical power to detect significant differences, and we note that future analyses for the PRIMER study will incorporate data from multiple sites. Third, we are unable to determine whether participants who report having migrated to Tijuana initiated others into injecting in Mexico or elsewhere. However, we did not find a significant difference by country of first injection between initiators and non-initiators, which may suggest that the risk of initiating others into injecting acquired through migration is the primary factor of importance related to injection initiation, rather than the country in which the initiation of others took place. Fourth, given that injecting initiation is a highly stigmatised behaviour among PWID [49] and associated with shame and guilt [50], these behaviours were likely underreported among sample participants. We

note, however, that our field team has years of experience working with the PWID population in Tijuana and creating rapport, which we expect may have increased response frequencies even with this sensitive topic. Finally, this analysis is based on self-reports and as such, we cannot assume unbiased reporting.

Conclusion

This study is not only the first to study the issue of PWID providing injection initiation assistance to others in a developing country, but it does so in the context of the Mexico–USA border region, where migration plays a fundamental role in heightening a range of injection-related harms. Future studies should focus on a range of injection-related HIV risk behaviours reported by PWID who initiate others into injecting. Further, longitudinal studies that can provide a better understanding of the potential underlying explanations for the association between migration and injection initiation assistance over time are needed. There is also a clear need for qualitative data to further elucidate the role current PWID play in heightening the risk that others will initiate injecting. Finally, interventions to address the burden of drug-related morbidity and mortality among PWID in the Mexico–USA border region should also seek to mitigate the risk that this population initiates others into injecting, in order to control the expansion of blood-borne disease transmission through drug injection.

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Conflict of interest

The authors have no conflicts of interest.

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