Inability to access addiction treatment and risk of HIV infection among injection drug users recruited from a supervised injection facility[†]

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ABSTRACT

Background Treatment for drug addiction is effective in reducing the harms of injection drug use, including infection with HIV and/or hepatitis C. We sought to examine the prevalence and correlates of being unable to access addiction treatment in a representative sample of injection drug users randomly recruited from a supervised injection facility.

Methods Using generalized estimating equations, we determined the prevalence and factors associated with being unable to access addiction treatment.

Results Between 1 July 2004 and 30 June 2006, 889 individuals completed at least one interview and were included in this analysis. At each interview, ~20% of respondents reported trying but being unable to access any type of drug or alcohol treatment in the previous 6 months. Being unable to access treatment was independently associated with recent incarceration, daily use of heroin and borrowing used syringes. In a secondary question, the majority of individuals reported waiting lists were the reason for being unable to access treatment.

Conclusion Given the independent association between inability to access addiction treatment and elevated HIV risk behavior, these results suggest expanding addiction treatment may contribute significantly to HIV prevention efforts in this population.

Keywords alcohol and drug treatment, GEE, HIV, injection drug user, supervised injection facility

Introduction

For individuals who use illicit drugs, enrolment in addiction treatment has consistently been associated with reduced risk for drug-related morbidity and mortality.^{1–4} For example, methadone maintenance therapy (MMT) has been demonstrated to be efficacious in lowering the risk of overdose for injection drug users (IDUs) in controlled trials in Australia⁵ and the UK.⁶

Unfortunately, the effectiveness of addiction treatment is limited by the diverse variety of barriers to access described among IDUs in many settings.^{7–9} A substantial proportion of IDUs in a variety of settings report being unable to access addiction treatment^{8,10,11}; in 1998, an expert panel of the National Institutes of Health in the USA estimated that only

20% of individuals with opiate dependence were on MMT.¹² Numerous barriers to treatment, including individual-, social- and structural-level factors, have been identified, such as individual beliefs and attitudes,^{8,13–16} bureaucratic procedures and requirements,^{8,17} and the lack of treatment capacity.^{18–21}

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Even in jurisdictions with universal health care systems, such as the UK, Australia and Canada, many reports indicate that an inadequate supply of publicly-subsidized treatment slots hinders timely access to appropriate addiction treatment.^{17,22,23} Worse, drug treatments such as opioid substitution therapies are illegal in some jurisdictions, most notably Russia, a likely driving factor behind the country's explosive outbreak of HIV among IDUs.²⁴

The failure to deliver appropriate addiction treatment may have direct influence on the spread of HIV among IDUs and their sexual partners. Treatment has long been recognized as an appropriate public health strategy to help prevent the transmission of HIV among IDUs^{25–27} by reducing the frequency of injection and the prevalence of risk factors for infection, such as using contaminated syringes.^{28–30} In Vancouver, Canada, funding cutbacks for social programmes by federal and provincial governments in the mid-1990s and the resulting reduction in addiction treatment capacity was believed to be a contributing factor in the city's explosive outbreak of HIV.³¹ Evidence from a prospective cohort of IDUs recruited in the city's Downtown Eastside (DTES) neighbourhood found inability to access addiction treatment was independently associated with syringe borrowing by HIV-negative participants.³²

Currently, a number of different forms of treatment for drug and alcohol use are available in this setting, including MMT, detoxification and counselling, offered by public health-care facilities and privately-owned providers. For example, the number of publicly-funded methadone slots rose from ~3000 in 1997 to over 8200 in 2007.^{33,34} Unfortunately, barriers to methadone therapy uptake remain.^{35,36} In response to the HIV outbreak and unprecedented number of overdose deaths in the late-1990s, a supervised injection facility (SIF) was opened in 2003.³⁷ One goal of the pilot facility is to increase uptake of healthcare services, including treatment for addiction.³⁸ At the SIF, clients can access an addiction counsellor to aid with enrolment into treatment and, more recently, an on-site in-patient detoxification clinic was opened.

We have previously reported that exposure to the SIF was independently associated with elevated rates of initiation into various forms of addiction treatment among members of a representative sample of SIF users.^{38,39} However, barriers to addiction treatment have not been well described among this population. Indeed, we are unaware of any study which has assessed the correlates of being unable to access treatment in a prospective cohort drawn from an SIF. Thus, we conducted the following study to estimate the proportion of SIF clients unable to access addiction treatment, the reasons for being denied treatment, and the individual, social and structural factors associated with being unable to access treatment.

Methods

The Scientific Evaluation of Supervised Injecting (SEOSI) prospective cohort has been developed to evaluate Insite, North America's first SIF. The recruitment and composition of the cohort have previously been described in detail.⁴⁰ In brief, SEOSI is a representative sample of Insite clients, recruited through random sampling.⁴¹ A random number generators was used to select blocks of time during the facility's hours of operation (10:00 a.m. to 4:00 a.m., 7 days a week); during these times, users of the SIF were invited to enrol in the cohort. A nominal financial stipend (\$20 CDN) was offered to those who appeared at the research site, located separately from the SIF. All participants provided written informed consent. At recruitment and every 6 months thereafter, participants answered an interviewer-administered questionnaire provided serologic samples for testing. Structured interviews using the study instrument took place at a field office separate from the SIF, conducted by trained interviewers who were not also employed by the SIF. The SEOSI cohort has been approved by the University of British Columbia/Providence Research Ethics Board.

The present analysis includes all individuals consenting to the study between 1 July 2004 and 30 June 2006. The primary endpoint of interest was being unable to access addiction treatment defined as answering 'yes' to the question: 'Over the last 6 months, have you ever tried to access any alcohol or drug treatment, but were unable to?' We used a broad definition of alcohol and drug treatment including but not limited to: detoxification, a recovery house or treatment centre, a counsellor or spiritual healer, MMT or some form of a 12-step programme.

We considered variables possibly associated with accessing addiction treatment including: age; gender; Aboriginal ancestry (yes versus no); residence in the DTES (yes versus no); homelessness (yes versus no); daily heroin use (yes versus no); daily cocaine use (yes versus no); daily crack cocaine use (yes versus no); daily crystal methamphetamine use (yes versus no); binge drug use (yes versus no); HIV serostatus (positive versus negative); hepatitis C (HCV) serostatus (positive versus negative); involvement in the sex trade (yes versus no); MMT (yes versus no); incarceration overnight or longer (yes versus no); borrowing syringes (yes versus no); lending syringes (yes versus no); non-fatal overdose (yes versus no); and proportion of all injections in the SIF (75% or more versus other). All dichotomous behavioural variables referred to the period beginning 6 months prior to the interview, except for residence in the DTES and MMT, which referred to current conditions. All behavioural variable definitions were identical to prior reports.⁴²

Since analyses of factors possibly associated with being denied access to addiction treatment included serial measures for each participant, we used generalized estimating equations (GEE), a marginal method for the analysis of correlated longitudinal data. This approach allows for the identification of factors independently associated with an outcome over an entire study period using repeated measures.⁴³ Standard errors for each parameter value are calculated using an exchangeable correlation structure, adjusted for multiple observations per person. As each individual can report being unable to access addiction treatment or not at each interview, a GEE model can examine behaviours and characteristics correlated with times when the outcome did or did not occur within and between participants.

As participants completed a baseline and multiple follow-up interviews, serial measures of the dependent variable and all explanatory variables were available for analysis. To identify the relationship between each explanatory variable and the dependent variable whereas accounting for the correlation between observations from the same individual, we use GEE. This method is commonly used in the analysis of data, often generated by prospective cohorts, which are correlated, for example at the level of individuals or treatment centres. The GEE approach and other forms of longitudinal analysis allow for the identification of explanatory factors associated with the outcome over the entire study using repeated measures.⁴³ Standard errors for each term in the regression equation are generated, in this instance, using an exchangeable correlation structure adjusted for multiple observations per person. Other forms of analysis, such as multiple logistic analysis do not take into account the correlation between observations from the same individual and thus produce overestimates of the standard error and inappropriately inflated confidence intervals for the effect measures. The GEE is commonly employed in drug use studies, for example a 2006 analysis that identified predictors of drug use cessation and relapse among IDU in Baltimore, Maryland, USA.⁴⁴

We fit a multivariate GEE model defined *a priori* to include any explanatory variables with a *P*-value <0.05 in univariate analyses, as well as age, gender, Aboriginal ethnicity and being on MMT.

Results

Between 1 July 2004 and 30 June 2006, 889 individuals completed at least one interview and were included in this analysis. Of these, 263 (29.6%) were female and the median age at the most recent interview was 39.0 (Inter-Quartile

Range: 33.3–44.7). At the first interview, 109 (20.0%) individuals were seropositive for HIV infection. Overall, the 889 individuals contributed 1993 observations to the analysis and the median number of interviews by each participant was two (Inter-quartile range: 2–3).

Two hundred seventy-three (30.7%) participants reported being unable to access addiction treatment at some point during the study period. At interview 1, 111 (20.4%) of participants seen at that interview reported being unable to access treatment. At interview 2, 118 (16.5%) of participants seen at that interview reported being unable to access treatment. At interview 3, 119 (16.3%) of participants seen at that interview reported being unable to access treatment. Overall, 348 (21.2%) of all interviews included a report of being unable to access treatment.

Information on socio-demographic characteristics, drug-using behaviours and HIV/HCV serostatus among the cohort participants at the first interview stratified by being unable to access addiction treatment in the previous 6 months is presented in Table 1. The results of the GEE

Table 1 Socio-demographic characteristics and HIV/HCV serostatus stratified by being unable to access drug and alcohol treatment at interview 1 in SEOSI (n = 545 individuals)

Characteristic	Unable to access addiction treatment ^a		P-value
	No 434 (79.6)	Yes 111 (20.4)	
Age			
Median (IQR)	40.0 (34.1–46.0)	38.5 (33.1–43.9)	0.250
Gender			
Female	130 (30.0)	35 (31.5)	0.747
Male	304 (70.0)	76 (68.4)	
Aboriginal ethnicity			
No	355 (81.8)	85 (76.6)	0.213
Yes	79 (18.2)	26 (23.4)	
Current DTES residence			
No	134 (30.9)	34 (30.6)	0.960
Yes	300 (69.1)	77 (69.4)	
Homelessness ^a			
No	369 (85.0)	85 (76.6)	0.033
Yes	65 (15.0)	26 (23.4)	
Daily heroin use ^a			
No	269 (62.0)	65 (58.6)	0.509
Yes	165 (38.0)	46 (41.4)	
Daily cocaine use ^a			
No	238 (54.8)	69 (62.1)	0.165
Yes	196 (45.1)	42 (37.8)	

Table 1 Continued

Characteristic	Unable to access addiction treatment ^a		P-value
	No 434 (79.6)	Yes 111 (20.4)	
Daily crystal meth use ^a			
No	319 (73.5)	78 (70.2)	0.494
Yes	115 (26.5)	33 (29.8)	
Binge drug use ^a			
No	210 (48.4)	37 (33.3)	0.004
Yes	224 (51.6)	74 (66.6)	
HIV serostatus			
Negative	347 (80.0)	88 (80.0)	0.991
Positive	87 (20.0)	22 (20.0)	
HCV serostatus			
Negative	44 (10.2)	7 (6.5)	0.246
Positive	387 (89.8)	100 (93.4)	
Sex trade participation ^a			
No	357 (82.2)	90 (81.1)	0.773
Yes	77 (17.8)	21 (18.9)	
Incarceration ^a			
No	302 (69.5)	56 (50.4)	<0.001
Yes	132 (30.5)	55 (49.6)	
Borrow syringes ^a			
No	405 (93.3)	102 (91.9)	0.598
Yes	29 (6.7)	8 (8.1)	
Lend syringes ^a			
No	397 (91.5)	104 (93.7)	0.444
Yes	37 (8.5)	7 (6.3)	
Non-fatal overdose ^a			
No	386 (88.9)	99 (89.1)	0.940
Yes	48 (11.0)	12 (10.8)	
SIF use ^a			
<75% of injections	301 (69.3)	66 (59.4)	0.047
≥75% of injections	133 (30.6)	45 (40.6)	
Current methadone			
No	304 (70.0)	82 (73.9)	0.428
Yes	130 (30.0)	29 (26.1)	

^aRefers 6 months period prior to interview.

analyses of factors associated with being unable to access addiction treatment during follow-up are presented in Table 2. At the univariate level, younger age, homelessness, frequent use of heroin, frequent use of cocaine, frequent use of crack cocaine, binge drug use, homelessness, recent incarceration and borrowing syringes were associated with being unable to access addiction treatment. Factors independently associated with being unable to access addiction treatment in the multivariate GEE analysis are also shown in

Table 2 Univariate and multivariate GEE analyses of factors associated with being unable to access alcohol or drug treatment in SEOSI

Characteristic	OR (95% CI)	P-value	AOR (95% CI)	P-value
Age				
Per year older	0.97 (0.96–0.99)	<0.001	0.98 (0.97–0.99)	0.047
Gender				
Female versus male	0.92 (0.69–1.23)	0.580	0.89 (0.62–1.27)	0.513
Aboriginal ethnicity				
Yes versus no	0.96 (0.69–1.33)	0.809	0.91 (0.65–1.28)	0.594
DTES residence				
Yes versus no	0.90 (0.70–1.17)	0.452		
Homelessness ^a				
Yes versus no	1.65 (1.24–2.19)	<0.001	1.47 (1.09–1.98)	0.011
Daily heroin use ^a				
Yes versus no	1.72 (1.35–2.19)	<0.001	1.47 (1.13–1.90)	0.004
Daily cocaine use ^a				
Yes versus no	1.39 (1.07–1.82)	0.014	1.24 (0.93–1.67)	0.145
Daily crack cocaine use ^a				
Yes versus no	1.72 (1.10–2.70)	0.018	1.27 (0.77–2.09)	0.354
Daily crystal meth use ^a				
Yes versus no	1.21 (0.63–2.31)	0.571		
Binge drug use ^a				
Yes versus no	1.42 (1.12–1.80)	0.004	1.28 (1.00–1.63)	0.048
HIV serostatus				
Positive versus negative	0.95 (0.69–1.33)	0.780		
HCV serostatus				
Positive versus negative	0.86 (0.58–1.28)	0.451		
Sex trade ^a				
Yes versus no	1.07 (0.78–1.47)	0.659	0.93 (0.62–1.39)	0.709
Incarceration ^a				
Yes versus no	1.93 (1.51–2.48)	<0.001	1.62 (1.25–2.09)	<0.001
Borrow syringes ^a				
Yes versus no	2.03 (1.34–3.08)	<0.001	1.67 (1.09–2.56)	0.019
Lent syringes ^a				
Yes versus no	1.44 (0.97–2.15)	0.073		
Non-fatal overdose ^a				
Yes versus no	1.03 (0.71–1.50)	0.862		
SIF use ^a				
≥75% versus <75%	1.08 (0.84–1.40)	0.540		
Current methadone				
Yes versus no	0.72 (0.55–0.95)	0.020	0.87 (0.66–1.16)	0.348

^aRefers to the 6 months period preceding the interview.

Table 2, and included: age [Adjusted Odds Ratio (AOR) = 0.98, 95% Confidence Interval (CI): 0.97–0.99]; frequent heroin use (AOR = 1.47, 95% CI: 1.13–1.90); recent incarceration (AOR = 1.62, 95% CI: 1.25–2.09); homelessness (AOR = 1.47 (95% CI: 1.09–1.98); binge drug use (AOR = 1.28, 95% CI: 1.00–1.63); and borrowing used syringes (AOR = 1.67, 95% CI: 1.09–2.56) after adjustment for gender, ethnicity, frequent cocaine use, frequent crack cocaine use, involvement in the sex trade and current MMT.

Discussion

Main finding of this study

In the present study, we observed that ~20% of participants reported trying and being unable to access addiction treatment in the previous 6 months at each interview. Over the entire study period, 30% of all study participants were unable to access treatment at least once. In a longitudinal analysis, factors independently associated with being unable to access treatment included: frequent heroin use; recent incarceration; homelessness; binge drug use; and borrowing used syringes.

What is already known on this topic

The link between being unable to access addiction treatment and high-risk receptive syringe sharing supports previous work³² identifying the lack of treatment space as a contributing factor to ongoing HIV risk behaviour. Similarly, exposure to the criminal justice and correctional systems have previously been associated with many drug-related harms^{45–47} including infection with HIV and other blood-borne pathogens.

What this study adds

This new evidence, generated from a representative sample of SIF users, suggests that although exposure to the SIF was previously shown to assist entry into treatment,³⁹ there remains a residual group of high-risk IDUs who have persistent barriers to addiction treatment. It should be noted that the association between being denied treatment and syringe borrowing persisted even after adjustment in the multivariate model for several factors previously associated with HIV transmission in this setting, including recent incarceration,⁴⁸ frequent heroin use⁴⁹ and participation in the sex trade.⁵⁰

The link between imprisonment and being denied addiction treatment identified in the multivariate model raises the question of prison as a strategy to reduce drug-related harms. We recognize we cannot infer a temporal relationship between the outcome and exposure to correctional environments, however, in this setting, incarceration has been found to predict a lower

odds of receiving MMT³⁵ and was associated with poorer adherence to antiretroviral therapies and inferior clinical outcomes among HIV-positive IDUs.⁵¹ Our findings, alongside previous investigations from varied settings of the effect of police-led displacement of drug users into so-called shooting galleries,⁵² police confiscation of sterile injection equipment⁵³ and the use by police of emergency medical personnel to identify illicit drug users,⁵⁴ as well as other examples,^{55–57} support the conclusion that enforcement-based strategies to reduce drug use may complicate the delivery of medical care to individuals who use illicit drugs.

Finally, the substantial proportion of IDUs who are unable to secure addiction treatment points to the need for an increased emphasis on providing increased low threshold treatment opportunities. Although the local addiction treatment infrastructure has benefited from some recent investment and reorganization after a decade of funding reductions and institutional instability, and many local and national political leaders have emphasized their commitment to drug treatment for DTES residents,⁵⁸ demand appears to still far exceed local capacity.⁵⁹ Further, the finding that higher intensity heroin use and homelessness was associated with a greater risk of being unable to access treatment and the fact that high-intensity drug use was not protective for the outcome suggests that local health care providers should consider how to best reform procedures to lower treatment barriers and bring the highest risk IDUs into care. This could include expansion and evaluation of low-threshold programmes. Our findings support a hypothesis that such an increase in low-barrier treatment could augment HIV prevention measures in this setting given that those who reported recent syringe sharing were also more likely to report inability to access addiction treatment.

These findings also suggest additional public policy reforms. First, the link between being incarcerated and being unable to access treatment suggests an emphasis on enforcement-based approaches is not entirely compatible with expanding access to addiction treatment, especially for IDUs. For example, Canada's federal government is concurrently proposing an expansion in addiction treatment capacity and increased criminal penalties for drug use, including mandatory minimum sentences.^{60,61} As observed in many other settings, a crackdown on drug users could, in addition to presenting a barrier to drug treatment, result in the production of other harms.^{55,62,63} International public health consensus organizations, such as the World Health Organization, have repeatedly endorsed treatment to reduce the harms attendant with injection drug use.^{64,65} Finally, our findings point to the need to increase access to low-threshold treatment opportunities for local drug users. Although evaluations of the SIF have indicated several

positive impacts on the health status of IDUs, including increased contact with appropriate medical services,^{66–68} these findings suggest additional interventions will be necessary to further expand use of addiction treatment in this setting.

Limitations of the study

This study has a number of limitations. Although previous analyses of SIF use and detoxification³⁹ benefited from formal data linkages between the cohort and local service providers, the current measure of being denied treatment relied on self-report and, thus, might be influenced by recall or social desirability biases. However, self-reports by drug users have been found to be reliable in numerous settings^{69–71} and many previous analyses of IDUs in treatment settings have found self-reports to be reliable and valid.^{72–74} We have previously used self-reported data in studies of drug use and treatment exposure.^{75–77} Further, in this instance, we know of no reason why the outcome of interest would be differentially reported by individuals who did or did not report borrowing syringes. Second, our analysis of the effect of incarceration on treatment access is limited by an inability to discern between different durations and types of incarceration. Future studies should seek to assess if difficulty accessing addiction treatment is occurring within prison or after release.

In the present study, we observed that a consistently high proportion of IDUs in a representative sample of SIF users reported trying and being unable to access treatment for drug or alcohol addiction in the last 6 months at each study follow-up. In a longitudinal regression analysis, we found that being denied treatment was independently associated with frequent heroin use, recent incarceration, homelessness, binge drug use and borrowing used syringes. These findings demonstrate the need for an expansion of low-threshold treatment opportunities and indicate a potential benefit for HIV prevention given that those reporting syringe sharing were more likely to report difficulty accessing treatment.

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