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Changes in injecting practices associated with the use of a medically supervised safer injection facility

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ABSTRACT

Injection drug users (IDUs) are vulnerable to serious health complications resulting from unsafe injection practices. We examined whether the use of a supervised safer injection facility (SIF) promoted change in injecting practices among a representative sample of 760 IDUs who use a SIF in Vancouver, Canada. Consistent SIF use was compared with inconsistent use on a number of self-reported changes in injecting practice variables. More consistent SIF use is associated with positive changes in injecting practices, including less reuse of syringes, use of sterile water, swabbing injection sites, cooking/filtering drugs, less rushed injections, safe syringe disposal and less public injecting.

Keywords epidemiology, HIV/AIDS, prevention, substance abuse

Introduction

Injection drug users (IDUs) are vulnerable to an array of adverse health outcomes including infectious diseases such as HIV and hepatitis C; endocarditis, osteomyelitis and abscesses; and high rates of overdose mortality.[1,2] Many of these complications result from non-sterile injection practices and sharing of syringes, and they account for a large proportion of emergency room visits and hospitalizations among IDUs.[3]

In response to growing concern regarding harms associated with illicit drug injection, North America's first medically supervised safer injection facility (SIF) for illicit drug users was opened in Vancouver, Canada, on 22 September 2003.[4] As previously described, IDUs using the facility can inject illicit drugs under the supervision of a nurse, access guidance regarding safer injecting practices and obtain clean injecting equipment and referrals to health care and addiction counselling.[4] In the facility, IDUs are provided with alcohol swaps, sterile syringes, sterile water and cookers and medical intervention in the case of overdose. Although the use of the Vancouver SIF was recently shown to be associated with reduced syringe sharing,[5] there have been no formal epidemiological analyses of the effects of use of a SIF on other reported high-risk injecting practices. Specifically, there have been no formal evaluations of SIF use on reuse of syringes, rushing injections, injecting outdoors, using clean water for injecting, cooking or filtering drugs prior to injection, tying off (using a tourniquet or similar on arms or legs) prior to injecting, safer syringe disposal, less difficulty finding a vein and injecting in a clean place. Therefore, we examined associations between consistent SIF use and self-reported changes in injecting practices among a representative cohort of SIF users.

Method

The Scientific Evaluation of Supervised Injecting (SEOSI) cohort has been described in detail previously.[4] In brief, the SEOSI cohort is a representative sample of randomly recruited SIF users. At baseline and 6-month follow-up intervals, SEOSI participants provide a venous blood sample and complete an interviewer-administered questionnaire. The questionnaire elicits demographic data as well as information about current and past drug use, HIV risk behaviour, enrolment into addiction treatment and use of the SIF. All participants provide informed consent and are given a stipend

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(CDN$20) at each study visit. The SEOSI study has been approved by the University of British Columbia/Providence Healthcare Research Ethics Board.

Self-reported change was measured by asking participants whether their injection practices had changed for the following variables: syringe reuse, rushed during injections, injecting outdoors, using clean water to inject, cook/filtering drugs prior to injection, tying off prior to injection, syringe disposal practices, ability to get a vein the first time and injecting environments. Variables were chosen on the basis of assessing both micro-level changes in injecting practices (e.g. cook/filter drugs and use clean water) as well as macro-level practices that have community impact (e.g. less injecting outdoors and less inappropriate syringe disposal).

Consistent with a previous study,[5] participants were asked, 'In the last month, what proportion of your injections took place at the SIF?' Response options were none (0% of the time), few (≤25% of the time), some (26–74% of the time), most (≥75% of the time) and all (100% of the time). Consistent injectors were defined as those who said they used the SIF for some, most or all of their injections (i.e. >25% of all injections).

Respondents were then asked whether they thought their injecting behaviours had changed since using InSite (yes versus no). Those who answered 'yes' were asked in what ways their behaviours had changed and were presented with a checklist of the variables previously listed: reuse syringes less often, less rushed during injections, less injecting outdoors, using clean water to inject, cook/filter drugs prior to injection, tie off prior to injection, dispose of syringes in a safer way, easier to get vein first time and inject in a clean place.

As a first step, we compared consistent versus inconsistent users of SIF on a number of injection behaviour change variables using Pearson's Chi-square test and the Wilcoxon rank sum test. We were aware that apparent differences in injection practices between consistent and inconsistent SIF users could be due to selection effects rather than due to a direct effect of the SIF. However, we were also aware of the pitfalls of including a number of collinear variables in a multivariate model. This was of particular concern for the present study because we wanted to control for potential socio-demographic differences but were aware that many of our outcomes may have been derived through the same causal mechanism (e.g. SIF use). Therefore, a series of separate logistic regression models were also constructed in which each injection behaviour variable was considered separately as a dependent variable and the consistent versus inconsistent SIF variable as the independent variable of interest. Thus, in order to adjust for potential differences between consistent and inconsistent SIF users, we *a priori* decided to adjust the models for age, gender and the frequency of cocaine and heroin injection. We also adjusted for any differences observed in univariate comparisons of consistent versus inconsistent SIF users.

Findings

Overall, 760 participants completed follow-up surveys between 1 July 2004 and 30 June 2005. Among these individuals, 226 (30%) were women, 148 (19%) were Aboriginal, and the median age was 39.3. Of these participants, 433 (57%) reported using the SIF for some, most or all of their injections. We compared individuals who did and did not return for a follow-up survey. Those who failed to return during this time period did not differ significantly for gender, ethnicity or frequency of SIF use. For age, Mann–Whitney test results also showed no significant difference between the age of those who returned for follow up during this time period and those who did not ($P = 0.765$). Although it may appear high, the median age here is consistent with previous descriptions of the Vancouver SIF user population.[6]

As summarized in Table 1, when we compared the characteristics of consistent versus inconsistent SIF users, we found that participants who self-reported daily use of heroin also reported more consistent SIF use (OR = 2.06, 95% CI = 1.52–2.79, $P < 0.001$) and that participants who had been involved in the sex trade in the last 6 months also reported more consistent SIF use (OR = 1.51, 95% CI = 1.01–2.27, $P < 0.05$).

As summarized in Table 2, in univariate analyses, reuse syringes less often (OR = 2.16, 95% CI = 1.48–3.16, $P < 0.001$), less rushed during injection (OR = 2.94, 95% CI = 2.14–4.02, $P < 0.001$), less injecting outdoors (OR = 2.99, 95% CI = 2.13–4.21, $P < 0.001$), using clean water for injecting (OR = 3.15, 95% CI = 2.26–4.39, $P < 0.001$), cooking or filtering drugs prior to injecting (OR = 3.02, 95% CI = 2.03–4.49, $P < 0.001$), tying off prior to injection (OR = 2.18, 95% CI = 1.70–4.64, $P < 0.001$), safer disposal of syringes (OR = 2.22, 95% CI = 1.54–3.20, $P < 0.001$), easier finding a vein (OR = 2.78, 95% CI = 1.93–4.10, $P < 0.001$) and injecting in a clean place (OR = 3.00, 95% CI = 2.22–4.06, $P < 0.001$) were all associated with consistent SIF use. In multivariate models adjusted for age, gender, sex trade involvement, daily cocaine and heroin injection, each change in injection behaviour was independently and positively associated with consistent SIF use: reuse syringes less often (AOR = 2.04, 95% CI = 1.38–3.01, $P < 0.001$), less rushed during injection (AOR = 2.79, 95% CI = 2.03–3.85, $P < 0.001$), less injecting outdoors (AOR = 2.7, 95% CI = 1.9 3–3.87, $P < 0.001$), using clean water for injecting (AOR = 2.99, 95% CI = 2.13–4.18, $P < 0.001$), cooking or

Table 1 Demographic variables stratified by frequent and infrequent safer injection facility (SIF) use

Behaviour	*Frequent SIF use,* n *(%)*	*Infrequent SIF use,* n *(%)*	*Odds ratio (95% CI)*	P *value*
Age				
Median (IQR)	39.1 (11.4)	40.0 (12.5)	0.99 (0.98–1.01)	0.351
Gender				
Male	302 (69.7)	232 (70.9)	0.94 (0.69–1.29)	0.720
Female	131 (30.3)	95 (29.1)		
Aboriginal				
Yes	86 (19.9)	62 (19.0)	1.06 (0.74–1.52)	0.756
No	347 (80.1)	265 (81.0)		
Resides DTES*				
Yes	292 (67.4)	226 (69.1)	0.93 (0.68–1.26)	0.623
No	141 (32.6)	101 (30.9)		
Daily heroin injection				
Yes	203 (46.9)	98 (30.0)	2.06 (1.52–2.79)	<0.001
No	230 (53.1)	229 (70.0)		
Daily cocaine injection				
Yes	114 (26.3)	80 (24.5)	1.10 (0.79–1.54)	0.560
No	319 (73.7)	247 (75.5)		
Sex trade in the last 6 months				
Yes	79 (18.2)	42 (12.8)	1.51 (1.01–2.27)	0.044
No	354 (81.8)	285 (87.2)		
Borrowed syringe in the last 6 months				
Yes	22 (5.1)	21 (6.4)	0.78 (0.42–1.44)	0.428
No	411 (94.9)	306 (93.6)		
Lent syringe in the last 6 months				
Yes	25 (5.8)	29 (8.9)	0.63 (0.36–1.10)	0.100
No	408 (94.2)	298 (91.1)		

*DTES denotes Downtown Eastside neighbourhood, Vancouver

filtering drugs prior to injecting (AOR = 2.76, 95% CI = 1.84–4.15, $P < 0.001$), tying off prior to injection (AOR = 2.63, 95% CI = 1.58–4.37, $P < 0.001$), safer disposal of syringes (AOR = 2.13, 95% CI = 1.47–3.09, $P < 0.001$), easier finding a vein (AOR = 2.66, 95% CI = 1.83–3.86, $P < 0.001$) and injecting in a clean place (AOR = 2.85, 95% CI = 2.09–3.87, $P < 0.001$).

Discussion

Main finding of this study

In this study, we found that more consistent use of a SIF is associated with positive changes in injecting practices, including less reuse of syringes, increased use of sterile water, cleaning of injection sites and cooking/filtering of drugs. In addition, those participants who reported consistent SIF use were less likely to report rushed injections, a practice associated previously with non-sterile injection and increased risk for overdose.[7] Individuals reporting consistent use of the SIF were also more likely to report safe disposal of syringes and less injecting in public spaces.

What is already known on this topic

Drug injection is a multi-step process involving a complex set of skills required by the user to avoid overdose, infectious disease and damage to soft tissue. At any number of points in the process, both the behavioural practices of the injector and the context in which they inject can increase the risk of health-related harm.[8,9] Two previous studies of hospital utilization have demonstrated that soft-tissue infections account for a majority of emergency room visits among Vancouver IDUs.[3,10] Because unsafe and non-sterile injection practices (e.g. rushing injections, reusing needles and not swabbing the injection site with alcohol) contribute to soft-tissue infections, the changes in practice found among IDUs in the present study suggest the potential for reduced transmission of infectious diseases and venous injury. In turn, fewer infections among IDUs because of safer injecting practices

Table 2 Univariate and stratified* multivariate logistic regression models of changes in injection practices associated with consistent safer injection facility (SIF) use

Variable	*Unadjusted odds ratio (OR)*			*Adjusted* odds ratio (AOR)*		
	OR	*(95% CI)*	P *value*	*OR*	*(95% CI)*	P *value*
a) Reuse syringes less often (Yes versus no)	2.16	(1.48–3.16)	<0.001	2.04	(1.38–3.01)	<0.001
b) Less rushed during injection (Yes versus no)	2.94	(2.14–4.02)	<0.001	2.79	(2.03–3.85)	<0.001
c) Less injecting outdoors (Yes versus no)	2.99	(2.13–4.21)	<0.001	2.73	(1.93–3.87)	<0.001
d) Use clean water for injecting (Yes versus no)	3.15	(2.26–4.39)	<0.001	2.99	(2.13–4.18)	<0.001
e) Cook/filter drugs prior to injection (Yes versus no)	3.02	(2.03–4.49)	<0.001	2.76	(1.84–4.15)	<0.001
f) Tie off prior to injection (Yes versus no)	2.81	(1.70–4.64)	<0.001	2.63	(1.58–4.37)	<0.001
g) Safer syringe disposal (Yes versus no)	2.22	(1.54–3.20)	<0.001	2.13	(1.47–3.09)	<0.001
h) Easier to get vein first time (Yes versus no)	2.78	(1.93–4.01)	<0.001	2.66	(1.83–3.86)	<0.001
i) Injection in a clean place (Yes versus no)	3.00	(2.22–4.06)	<0.001	2.85	(2.09–3.87)	<0.001

*Each injection behaviour variable was considered in a separate multivariate logistic model (a–i) that considered factors associated with consistent SIF use and was adjusted for age, gender, sex trade involvement, daily cocaine and heroin injection.

suggest a potentially reduced need for primary care and emergency room use, as well as hospitalization.[3,10]

Previous studies have found that SIF users tend to be individuals who otherwise inject in public spaces.[11] Situating the complex behavioural set of injection practices within a public setting increases the associated risks due to environmental factors such as the lack of sterile equipment and water and rushed injections. These environmental factors or 'ecological conditions' have been shown to increase risk for abscesses, syringe sharing, overdose, HCV infection and vein damage.[8,12,13] For example, studies have found that many IDUs injecting in public rush their injections during periods of escalated police activity,[14–18] a practice that further increases risk of infection, vascular damage and abscesses. Studies also show that police presence is associated with accidental syringe sharing,[18] lower access to clean syringes[15] and low access to needle exchanges,[19–22] all of which impact use and safe disposal practices of sterile injecting equipment.

What this study adds

In this study, individuals reporting consistent use of the SIF were more likely to report safe disposal of syringes and less injecting in public spaces. These findings are consistent with an earlier report demonstrating that the SIF was associated with reduced public drug use.[23] Specifically, the earlier study included three variables that are consistent with the notion of 'injection practices' used in this study: public injection drug use, publicly discarded syringes and publicly discarded injection-related litter, all of which showed significant decreases after the opening of the Vancouver SIF. Both studies point to a positive shift in macro-level injecting practices associated with the use of a SIF.

This study suggests that a SIF may act as a structural intervention that serves to modify the ecological conditions that determine injection-related harm among public injectors. Although SIF attempts to modify individual behaviour by reducing high-risk behaviours that can lead to overdose or blood-borne virus transmission, SIF also seek to alter ecological conditions by providing a 'safer' setting for injection that is conducive to employing safer injecting practices. Supervised injection facilities represent a fundamental shift in public health efforts to reach IDUs, providing an alternative to the risk environment that characterizes public injecting venues.[24,25]

Limitations of this study

There are limitations associated with this analysis. In particular, we relied on self-reported information, which may be

susceptible to socially desirable responding.[26] Although some risky behaviours may have been under-reported and some beneficial effects of the SIF may have been over-reported, we know of no reason why this concern would be differentially distributed among those who used the SIF to varying degrees. Specifically, the questions regarding behaviours were asked totally independent of consistency of SIF use. In addition, our findings could be due to residual confounding if those using the SIF for a higher proportion of their injections were inherently at a lower risk of engaging in high-risk injecting practices. However, previous analyses suggest that more consistent SIF users exhibit characteristics associated with higher-risk injecting practices,[11] and consistent SIF use was independently associated with reduced problematic behaviours even after intensive covariate adjustment using an *a priori* defined statistical adjustment protocol.

In summary, our findings suggest that consistent use of a SIF was associated with positive changes in individual's drug-injecting practices. These findings suggest potential for reduced transmission of viral and bacterial infection and hence hospitalization, as well as reductions in public disorder due to less consistent public injecting and unsafe disposal of syringes. These results may help inform discussions in settings where the merits of SIF are currently being debated.[27] Future prospective analyses are needed to examine the impact of regular SIF use on the incidence of infectious disease transmission and medical service use among IDUs.

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