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Public Injecting and HIV Risk Behaviour among Street-Involved Youth

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Abstract

Background: Although street-involved youth who inject illicit drugs are known to be at an increased risk of HIV and other adverse health outcomes, little is known about public injecting among this population and how injecting in public environments may impact HIV risk behaviour.

Methods: We used data derived from a study of 560 street-involved youth in Vancouver, Canada to examine the factors associated with injecting in public environments among youth who reported injecting drugs in the past six months.

Results: At baseline, 162 (28.9%) reported injecting drugs in the past six months. Among injectors, the 124 (76.5%) participants who reported injecting in public were more likely to be homeless (odds ratio [OR] = 6.39, $p < 0.001$), engage in unprotected intercourse (OR = 3.09, $p = 0.004$), deal drugs (OR = 2.26, $p = 0.032$), smoke crack cocaine (OR = 3.00, $p = 0.005$), inject heroin (OR = 3.48, $p = 0.001$), drop used syringes outdoors (OR = 8.44, $p < 0.001$), share syringes (OR = 4.43, $p = 0.004$), and were less likely to clean injection sites >75% of the time (OR = 0.36, $p = 0.008$). The majority (62.1%) reported feeling rushed while injecting in public.

Conclusions: Youth who inject in public are significantly more likely to engage in sexual and injection-related risk behavior. Given the known elevated rates of HIV infection and other harms among this population, youth-focused interventions that target both sexual and drug-related risks associated with public drug-using environments are in urgent need of evaluation.

Keywords

public injecting; injection drug use; risk behavior; youth; homelessness

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1.0 INTRODUCTION

Homeless and street-involved youth who inject illicit drugs are known to be at a substantially increased risk of sexually transmitted and injection-related infections including HIV (Noell et al., 2001; Pan et al., 2005; Roy et al., 2003). While much epidemiological research has investigated individual-level risk behaviours (e.g. syringe sharing) as primary determinants of marginalized youths' heightened vulnerability to infections, recent thinking has posited that the social and environmental context in which these behaviours are situated play important roles in the production of infectious disease risk (Marshall, 2008; Rhodes, 2002; Voisin et al., 2006). Furthermore, since the physical, social, and cultural setting of drug use influences the ways in which drug-related risks are experienced and mitigated by young people (Duff, 2003), a better understanding of drug use settings can inform more effective public health interventions.

Public injection settings (e.g., streets, alleys, parks) have been identified as environments of particular importance in the shaping of drug-related risk among injection drug users (IDUs) (Rhodes et al., 2006). Studies of adult IDUs have consistently shown that overdose, risk behaviours such as syringe sharing, and increased severity of drug dependence are all more common among IDUs injecting in public settings (Darke et al., 2001; DeBeck et al., 2009; Green et al., 2003; Navarro and Leonard, 2004). Furthermore, IDUs who inject in public often report feeling rushed due to fear of being confronted by police or other members of the public, which in turn may reduce the likelihood of engagement in safer and hygienic injecting practices (Klee and Morris, 1995; Small et al., 2007).

Although the context and harms associated with public injecting among adult IDUs have been reasonably well-described, little is known about public injection risk and experiences among street-involved youth who inject illicit drugs. Therefore, the objective of this study was to describe the prevalence and circumstances of public injection among a sample of street-involved youth, as well as to characterise the HIV-related risks associated with injecting in these environments.

2.0 METHODS

The At Risk Youth Study (ARYS) is a prospective cohort of drug-using and street-involved youth that has been described in detail previously (Wood et al., 2006). In brief, snowball sampling and extensive street-based outreach were conducted to recruit participants into the study. The term "street-involved youth" has been defined as a young person who spends a substantial amount of time on the street or who is heavily engaged in the street or illicit drug economies (Gleghorn et al., 1998), and may include youth who are absolutely, periodically, or at imminent risk of homelessness (Daly, 1996). To be consistent with this broad definition of street youth, we used the following eligibility criteria: being between the age of 14 and 26, self-reported use of illicit drugs other than or in addition to marijuana in the past 30 days (as a marker for street and illicit drug involvement), and the provision of informed consent. The study has been approved by the University of British Columbia/Providence Health Care Research Ethics Board.

All participants who completed a baseline survey between September, 2005 and October, 2006 and who reported injecting an illicit drug in the past six months were eligible for this analysis. Upon recruitment, participants completed an interviewer-administered questionnaire and provided blood samples for HIV and hepatitis C serology. Injection drug use was self-reported although nurses also screened participants for injection stigmata (i.e., "track marks"). Among 560 participants who were enrolled during the study period, 162 (28.9%) reported recently injecting and were thus included in this analysis. Recent injectors were more likely to be older

(median age [IQR]: 23 [19 – 23] vs. 21 [21 – 25], $p < 0.001$), but were not significantly different than non-injectors with respect to gender (percent female: 34.2% vs. 31.2%, $p = 0.503$) or ethnicity (percent Aboriginal: 21.0% vs. 24.6%, $p = 0.359$).

The dependent variable of interest in this study was any self-reported injecting in public environments at baseline. To derive this outcome, participants were asked to list all locations in which they had injected in the past six months. To be consistent with previous analyses (DeBeck et al., 2009), we defined public environments as streets, public lavatories, alleys, parks, parking lots, abandoned buildings, and other public settings. Subsequent questions assessed the frequency of public injection and whether these injections were rushed. Independent variables that were included in this analysis included an array of sociodemographic and behavioural characteristics: age, sex (female vs. male), Aboriginal ethnicity (yes vs. no), homelessness in the past six months, current relationship status (married or regular partner vs. single or casually dating), experiencing violence, engagement in unprotected intercourse, and total number of sex partners in the past six months (excluding those in the context of sex work). As previously (Wood et al., 2008), Aboriginal ethnicity was defined as being of First Nations, Aboriginal, Inuit or Métis origin. The ethnicity variable was dichotomized in this manner since the majority of non-Caucasian street youth are Aboriginal in our setting and to reflect the previously established high prevalence of HIV infection among Aboriginal-identified street youth (Marshall et al., 2008b; Spittal et al., 2007). As defined in previous studies (Marshall et al., 2008a; Marshall et al., 2009b), experiencing violence was defined as an affirmative response to the question, “Have you been attacked, assaulted, or suffered any kind of violence in the past 6 months?”, and unprotected intercourse was defined as not always using condoms during vaginal and/or anal intercourse with all sex partners in the past 6 months. Drug-related factors are listed in Table 1 and included a variety of social behaviours, drug use preferences, and micro-injecting practices. As described previously (Lloyd-Smith et al., 2008), syringe sharing was defined as borrowing or lending a used syringe. We also defined: “dropped syringe outside” as dropping a used syringe outside after having used it; “filtering drugs” and “clean injection sites” referred to typical behaviour directly prior to injecting and were dichotomized based on an *a priori* defined cut-off ($>75\%$ of time vs. $\leq 75\%$ of time).

Pearson's chi-square test for categorical variables and the Wilcoxon rank sum test for continuous variables were used to determine the factors associated with public injecting at baseline. Fisher's exact test was used when one or more of the cell counts was less than or equal to five. Due to a small sample size, an exploratory multivariate model was constructed using a two-stage approach. A preliminary model was constructed including all variables significant in bivariate analysis at $p < 0.10$; these variables were then subjected to a backwards selection procedure based on the Akaike information criterion (AIC) and Type III p -values (Lima et al., 2008). Each variable with the highest p -value was removed sequentially, with the final model including the set of variables associated with the lowest AIC. Statistical analysis was conducted in SAS (version 9.1) and all p -values are two-sided.

3.0 RESULTS

Of those who reported injecting in the past six months, 124 (76.5%) reported injecting in a public setting at least once. Approximately one quarter (27.2%) of the total sample reported injecting in public all the time, while 28.4%, 11.7%, and 9.9% reported injecting in public usually ($>75\%$ of the time), sometimes (26-74% of the time) or occasionally ($<25\%$ of the time), respectively. The majority (62.1%) reported having to rush at least once while injecting in public in the past six months. The most common public injection settings reported were streets (74.7%), followed by public bathrooms (40.7%), parking lots (37.7%), and parks

(36.4%). Of all settings listed (including private and semi-private environments), the street was reported as being used most often to inject by 89 (54.9%) participants.

As shown in Table 1, those who reported injecting in public were more likely to be: homeless, engage in unprotected intercourse, deal drugs, use crack cocaine, inject heroin, drop a used syringe outside, share syringes, and were less likely to clean injection sites >75% of the time. The following variables were significant in the final exploratory multivariate model: homelessness, crack cocaine use, injection heroin use, and unprotected intercourse.

In order to determine if the correlates of public injecting were similar among younger participants in the study, we conducted a sub-analysis whereby we restricted the multivariate analysis to individuals less than or equal to 24 years of age. Homelessness, crack use, and injection heroin use all remained independently associated with public injection; however, unprotected intercourse failed to reach statistical significance (adjusted odds ratio [AOR] = 2.22, 95% CI: 0.81 – 6.07, $p = 0.121$). Regarding the potential for a type II error, we note that the power to detect a significant difference in this younger sample is diminished, and that the magnitude of the estimate is similar to that derived from the larger sample (i.e., AOR = 2.54).

4.0 DISCUSSION

Among a community-recruited sample of street-involved youth who inject illicit drug, over three quarters (77%) reported recently injecting in public. A number of sociodemographic and behavioural characteristics were associated with public injection, including homelessness, syringe sharing, and failing to consistently clean one's injection site. Furthermore, we report a novel association between unprotected intercourse and public injection. These findings also support previous research demonstrating that public injecting occurs within the context of heightened vulnerability to HIV and other injection-related infections (DeBeck et al., 2009; Navarro and Leonard, 2004), and indicate that these environments are potentially important sites of public health intervention.

The finding that youth who inject in public are more likely to share syringes and are less likely to clean injection sites further highlights the importance of place in the production of HIV risk behaviour among young injection drug users (Rhodes et al., 2006). For example, qualitative studies of adult IDUs who inject in public have demonstrated that fear of being interrupted, often by the police, leads to rushed and less hygienic injecting practices (Cooper et al., 2005; Small et al., 2007). Given that over 60% of this sample reported being rushed while injecting in public settings, it is likely that similar phenomena play an important role in augmenting risk for blood - and skin-borne infections among younger populations as well. We also note that the lack of association between injection cocaine use and public injecting is similar to that observed in our recent study of adult IDU (DeBeck et al., 2009); however, these results differ from an older study conducted in Montreal, Canada (Green et al., 2003). Further research is required to elucidate the relationship between injecting environments and drug use patterns, particularly among young people.

While the relationship between public injection settings and injection-related risk behaviour has been previously reported, a novel finding in this analysis is the observed association between injecting in public and engagement in unprotected intercourse. It should be noted that this association persisted even in an exploratory multivariate model adjusting for homelessness and drug use. It is possible that youth who inject in public are more disconnected from traditional sexual health services including condom distribution programs. Furthermore, they likely experience multiple barriers while attempting to access them; in fact, we have previously shown how youth who are unable to access health and harm services are more likely to report inconsistent condom use with their sex partners (Marshall et al., 2009a). In this context, it is

clear that innovative, non-judgmental, and youth-centered services are required. Specifically, public health interventions should identify and reinforce risk management practices that exist among young drug users and should involve youth in all stages of the development and delivery of these programs (Duff, 2003). One example of this approach is peer-based harm reduction programs which distribute sterile injecting equipment and safer sex supplies. These programs have been shown to have higher levels of acceptability among young street-based IDUs as compared to traditional needle exchange programs that are not perceived to be youth-friendly (Sears et al., 2001). Given the high level of sexual risk behaviour among public injectors in this study, street-based harm reduction programs should also address barriers to accessing STI testing and treatment services experienced by this population. Uncertainties regarding where to go to obtain youth-friendly services, a lack of gender-specific programming, and negative judgmental attitudes held by practitioners have been identified by street youth as barriers to accessing STI services (Rew et al., 2002). Street-based STI testing and mobile outreach programs (Auerswald et al., 2006; Solorio et al., 2006) have been shown to be effective at reaching youth who face multiple barriers to accessing traditional clinic or service environments.

Some authors have proposed that “safer environment interventions” be implemented to reduce the harms associated with injecting in public (Rhodes et al., 2006). For example, supervised injecting facilities (SIFs) are programs in which individuals can inject pre-obtained illicit drugs in a hygienic environment under the supervision of a nurse. Such facilities have been shown to be successful in terms of reducing public disorder and public injection drug use (Wood et al., 2004). They have also been shown to be well-utilized by young IDUs, particularly those who are homeless and inject in public (Stoltz et al., 2007). While the impact of these facilities on sexual risk taking has not been fully described, a recent study demonstrated that SIF utilization was associated with increased condom use among clients (Marshall et al., 2009c). Given that SIFs are an effective, evidence-based intervention to reduce public injection and related harms, youth-focused facilities warrant further attention. Furthermore, the current regulations for the local SIF preclude individuals less than 16 years of age from using the facility. The present study indicates that younger individuals who have already initiated injecting would likely benefit from a change to these guidelines which would allow them to participate in this program.

Our study has several limitations that should be noted. Although steps were taken to ensure that ARYS is as representative of the street youth population as possible (e.g., street outreach at various times throughout the day and night), the results may be not generalizable to other settings. Secondly, the low sample size of recent injectors increases the risk of a type-II error and also limited our ability to construct a robust multivariate model. Nevertheless, the fact that some associations persisted in multivariate analyses is noteworthy. Furthermore, the small sample size precluded our ability to examine the impact of specific public injecting environments (e.g., outdoor versus semi-private settings) and the frequency of public injecting on risk behaviour. We were able, however, to describe qualitatively the most commonly reported public injecting environments, and these data may have important implications for the implementation of harm reduction programs for young people. Finally, socially desirable reporting may have resulted in an under-estimate of stigmatized behaviours such as unprotected intercourse and syringe sharing; however, we have no reason to believe this bias would differ between public and non-public injectors and thus if present would only bias our association towards the null.

Given the high level of risk behaviour associated with public injection, policymakers and public health professionals should consider interventions that modify the environments in which these behaviours take place. Peer-based harm reduction programs and supervised injecting facilities have been shown to be successful at reducing public injection-related harms in adult

populations (Rhodes et al., 2006; Wood et al., 2004); thus, similar youth-focused interventions warrant urgent implementation and evaluation.

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Table 1Factors associated with public injecting among a cohort of injection drug-using street-involved youth ($n = 162$).

Characteristic	Public Injecting <i>n</i> (%) <i>n</i> = 124*	No Public Injecting <i>n</i> (%) <i>n</i> = 38*	Odds Ratio (95% CI)	<i>p</i> – value
Age (median, IQR)	23 (21 – 25)	23 (20 – 24)	1.05 (0.92 – 1.19)	0.502
Sex				
Female	42 (33.9)	12 (33.3)	1.02 (0.47 – 2.25)	0.952
Male	82 (66.1)	24 (66.7)		
Aboriginal Ethnicity				
Yes	23 (18.5)	11 (29.7)	0.54 (0.23 – 1.24)	0.144
No	101 (81.5)	26 (70.3)		
Homeless [†]				
Yes	108 (87.1)	19 (51.4)	6.39 (2.78 – 14.69)	<0.001
No	16 (12.9)	18 (48.6)		
Relationship Status				
Regular Partner	30 (24.4)	6 (16.2)	1.67 (0.63 – 4.38)	0.296
Single/Dating	93 (75.6)	31 (83.8)		
Attacked ^{†‡}				
Yes	66 (53.7)	14 (37.8)	1.90 (0.90 – 4.04)	0.092
No	57 (46.3)	23 (62.2)		
Unprotected Intercourse [†]				
Yes	74 (59.7)	12 (32.4)	3.09 (1.42 – 6.70)	0.004
No	50 (40.3)	25 (67.6)		
Sex Work [†]				
Yes	20 (16.1)	9 (24.3)	0.60 (0.25 – 1.46)	0.255
No	104 (83.9)	28 (75.7)		
Number of Sex Partners [†] (median, IQR)	1 (1 – 3)	1 (0 – 4)	0.99 (0.94 – 1.06)	0.839
Money Spent on Drugs				
≥\$50 per day	66 (53.2)	14 (37.8)	1.87 (0.89 – 3.97)	0.100
<\$50 per day	58 (46.8)	23 (62.2)		
Drug Dealing [†]				
Yes	83 (66.9)	17 (47.2)	2.26 (1.06 – 4.81)	0.032
No	41 (33.1)	19 (52.8)		
Crack Cocaine Use [†]				
Yes	92 (76.0)	18 (51.4)	3.00 (1.37 – 6.56)	0.005
No	29 (24.0)	17 (48.6)		
Inject Cocaine [†]				
Yes	40 (33.6)	12 (34.3)	0.97 (0.44 – 2.15)	0.941
No	79 (66.4)	23 (65.7)		
Inject Heroin [†]				

Characteristic	Public Injecting <i>n</i> (%) <i>n</i> = 124*	No Public Injecting <i>n</i> (%) <i>n</i> = 38*	Odds Ratio (95% CI)	<i>p</i> – value
Yes	92 (76.7)	17 (48.6)	3.48 (1.58 – 7.64)	0.001
No	28 (23.3)	18 (51.4)		
Inject Methamphetamine [†]				
Yes	83 (69.2)	12 (54.3)	1.89 (0.87 – 4.08)	0.103
No	37 (30.8)	16 (45.7)		
Dropped Syringe Outdoors [†]				
Yes	43 (35.2)	2 (6.1)	8.44 (1.93 – 36.97)	<0.001
No	79 (64.8)	31 (93.9)		
Syringe Sharing [†]				
Yes	43 (35.0)	4 (23.1)	4.43 (1.47 – 13.35)	0.004
No	80 (65.0)	33 (89.2)		
Filter Drugs				
>75% of the time	40 (32.3)	11 (31.4)	1.04 (0.46 – 2.33)	0.926
≤75% of the time	84 (67.7)	24 (68.6)		
Clean Injection Site				
>75% of the time	48 (39.0)	23 (63.9)	0.36 (0.17 – 0.78)	0.008
≤75% of the time	75 (61.0)	13 (36.1)		
Non-Fatal Overdose [†]				
Yes	29 (23.4)	8 (21.6)	1.11 (0.46 – 2.68)	0.823
No	95 (76.6)	29 (78.4)		

Notes: Public spaces are defined as public lavatories, streets, alleys, parks, abandoned buildings, and other public settings;

[†] refers to activities in the past 6 months;

* all cells don't add to total *n* due to missing data;

[‡] Attacked refers to responding “yes” to the question, “Have you been attacked, assaulted, or suffered any kind of violence in the past 6 months?”; Fisher's exact test used to calculate *p*-value when one or greater cells were ≤ 5.

Table 2

Multivariate logistic regression analysis of factors associated with public injecting among a cohort of injection drug-using street-involved youth ($n = 162$).

Characteristic	Adjusted Odds Ratio (95%CI)	<i>p</i> - value
Homeless [†] (yes vs. no)	7.52 (2.83 – 19.99)	<0.001
Crack Cocaine Use [†] (yes vs. no)	3.59 (1.45 – 8.89)	0.006
Inject Heroin [†] (yes vs. no)	4.45 (1.76 – 11.27)	0.002
Unprotected Intercourse [†] (yes vs. no)	2.54 (1.02 – 6.32)	0.046

Notes: Public spaces are defined as public lavatories, streets, alleys, parks, abandoned buildings, and other public settings;

[†] refers to activities in the past 6 months; variables selected for inclusion in multivariate model based on AIC and type III *p*-values as described in Lima et al. (2008).