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HIGH PREVALENCE OF ASSISTED INJECTION AMONG STREET-INVOLVED YOUTH IN A CANADIAN SETTING

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Abstract

Many people who inject illicit drugs receive manual assistance when injecting, and this practice has been linked to increased risk of HIV infection and other harms. Little is known, however, about this practice among youth. This study uses a multivariate generalized estimating equation to identify factors associated with receiving assistance with injecting among a cohort of street-involved youth aged 14–26 in Vancouver, Canada. A total of 253 participants reported injecting drugs during the study period, and 49% ($n = 125$) of these youth reported receiving assistance with injecting in the past six months. In multivariate analysis, younger age, female gender, binge drug use, heroin injecting, cocaine injecting, crystal methamphetamine injecting, and syringe sharing were positively and independently associated with assisted injection (all $p < 0.05$). These findings underscore the need for expanding substance abuse treatment alongside HIV prevention and health promotion interventions to empower youth to enact safer injection practices.

Keywords

injection drug use; street-involved youth; HIV risk behaviour; substance use

INTRODUCTION

Injecting illicit drugs is a complex multi-stage process requiring technical skill and manual dexterity. A sub-set of people who use injection drugs are unable to inject themselves and turn to others to provide manual assistance with injecting. This practice, known as ‘assisted injecting,’ is associated with many health-related harms, which include increased risk of overdose (1), missed and damaged veins (1), and HIV (2) as well as Hepatitis C (HCV) (3) infection, and are mediated through social and structural factors, such as syringe sharing (4,

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5), and violence (6). Many of these dangers and risks are introduced by the individuals who provide assistance with injecting, commonly called ‘hit doctors,’ who are more likely to use contaminated syringes and to engage in high intensity drug use that may compromise their ability to safely inject others (4).

The risk environment framework, as articulated by Tim Rhodes, suggests that health-related harms resulting from drug use, such as those arising from receiving assistance injecting, are often produced by intersecting social, structural, and intrapersonal risk factors that comprise the “risk environment” (7). Social factors affecting the risk of HIV transmission through assisted injecting are most prevalent among vulnerable groups, such as those with physical disabilities and female individuals (1, 6, 8). Female drug users are particularly at-risk because assisted injecting often occurs in the context of complex power relations and intimate gendered relationships. Male partners may control drug use and administration as a form of power (9), whereas some women may perceive that receiving injecting assistance from a romantic partner is a symbol of trust and intimacy (1).

The risks and dynamics surrounding assisted injection are also aggravated by structural factors, such as a lack of safe spaces to receive help injecting. A potentially safer space for receiving assistance injecting is North America’s only government-sanctioned supervised injection site located in Vancouver (Insite); however, strict rules require individuals to self-administer injections and do not allow peers or nurses to provide manual assistance with injections (10, 11). This creates a barrier for those who require help injecting who would otherwise utilize Insite as a safer place to inject drugs (1). Until recently, an unsanctioned injection room in the same downtown Vancouver neighbourhood as Insite routinely provided assistance with injections from trained peers (6), however, this facility has closed (12). This leaves few options for people to receive assistance from trained peers or medical professionals, and studies have found that assisted injecting frequently occurs in public spaces (13), which is itself a marker for increased HIV-risk behaviour among street-involved youth (14). A number of other social and structural risk factors have also been linked with HIV infection among street-involved youth, such as older age, sexual risk behaviours (e.g. unprotected sex and multiple sex partners), engaging in sex work, and incarceration (15, 16). In addition, previous research findings indicate that housing instability, which is a key element of street-involvement, is independently associated with sexual risk behaviours (17).

Although the prevalence of HIV infection and HIV-related risks associated with assisted injecting have been well documented among adult drug-using populations, little is known about this practice among street-involved youth. Given these gaps in the literature and what is known about environmental factors that influence HIV risk among street-involved youth, this study investigates the prevalence and correlates of assisted injecting among street-involved youth within Rhodes’ risk environment framework (7).

METHODS

Data for this study were obtained from the At-Risk Youth Study (ARYS), a prospective cohort study of street-involved youth in Vancouver, Canada. The cohort began in 2005 and has been described in detail previously (18). In brief, snowball sampling and extensive

street-based outreach methods were employed. To be eligible, participants at recruitment had to be aged 14–26 years, use illicit drugs other than marijuana in the past 30 days, provide written informed consent, and be “street-involved”. In this cohort, “street-involved” was defined as being absolutely, periodically or temporarily homeless (e.g., having no fixed address, sleeping on the street, couch surfing, or staying in a shelter or hostel). This definition also includes those who are not homeless and have used services designated for street-youth in the last year (16, 18–20). Youths’ street-involvement and eligibility to participate was assessed during a semi-structured in-person interview with an ARYS staff member. At enrolment, and on a bi-annual basis, participants completed an interviewer-administered questionnaire that included questions related to demographic information and drug use patterns. At each study visit, participants were provided with a stipend (\$20 CDN) for their time. The University of British Columbia’s Research Ethics Board has approved the study.

The relevant survey questions for this analysis were available on questionnaires from June 2008 to November 2012, and ARYS participants who reported injecting drugs in the last six months were eligible for the present analysis. Assisted injecting was identified based on answers to the question “in the last 6 months, did someone help you inject?” Those who reported receiving help injecting were compared with those who indicated that no one helped them inject drugs. Participants were also asked how often they received injection assistance in the past six months; possible responses included: always (100% of the time), usually (more than 75% of the time), sometimes (26% to 74% of the time), occasionally (less than 25% of the time), or rarely. Additional questions asked participants their reasons for receiving help injecting (having bad veins or no veins, being too high or drug sick, needing help performing a jugular injection, preferring it when someone else does it, being a new user, having shaky hands, not knowing how to inject, being afraid of or hating needles, or other), and who helped them to inject drugs (close friend, casual friend or acquaintance, family member, regular sex partner, casual sex partner, stranger, or other) in the past six months.

To identify factors associated with receiving help injecting, we considered a number of potential explanatory variables of interest. Unless otherwise specified, all variables refer to behaviours in the prior six months and were treated as time-updated based on semi-annual study follow up visits. The following socio-demographic variables of interest included: younger age (dichotomized at the median age: <23 vs. 23 years); gender (female vs. male); ethnicity (Caucasian vs. other); being in a stable relationship, defined as being legally married, common law, or having a regular partner (yes vs. no); syringe sharing, defined as borrowing or lending a used syringe (yes vs. no); incarceration, defined as living in detention, prison or jail (yes vs. no); engaging in sex work, defined as exchanging sex for money, drugs, gifts, food, clothes, shelter or favours (yes vs. no); and drug dealing, defined as selling drugs as a source of income (yes vs. no). This study also included homelessness as a variable of interest, defined as having no fixed address, sleeping on the street, couch surfing, or staying in a shelter or hostel in the last six months (yes vs. no). Although, most youth were homeless at their first study visit (given that street-involvement was a criteria to be eligible for the study), previous research has found that street-involved youths’ housing status changes frequently over time (21). As a time-updated longitudinal measure, this

homelessness variable captures changes in youths' housing status over years of study follow-up.

Multiple drug-use variables were included in this analysis to account for potential variation in injection practices associated with different drugs, given that previous research in this setting found that injection patterns differ by substance (5, 13). Drug-use variables were dichotomized based on "any drug use" versus "no drug use" to be consistent with prior studies from our cohort (22, 23). Drug-use related variables included: binge drug use, defined as a period of using injection drugs more often than usual (yes vs. no); any injection heroin use (yes vs. no); any injection cocaine use (yes vs. no); any injection crystal methamphetamine use (yes vs. no); any injection crack cocaine use (yes vs. no); and experiencing a non-fatal drug overdose (yes vs. no). All drug-use and behavioural variables refer to activities in the past six months.

First, a descriptive analysis of the study sample was conducted using data from only one study visit. Baseline characteristics for individuals who reported receiving help injecting over the study period were measured at their first visit (during the study period), which involved a report of assisted injecting. Baseline characteristics for all other participants were measured from the first study visit during the study period that included a report of injection drug use. The frequencies of the baseline characteristics between the two groups were compared using Pearson's chi-square test for categorical variables and the Mann-Whitney test for continuous variables. **Second**, to model factors associated with receiving help injecting drugs over time and to analyse longitudinal correlated within-subject data (24, 25), a generalized estimating equation (GEE) analysis was conducted. These methods provided standard errors adjusted by multiple observations per person using an exchangeable correlation structure. Therefore, data from every participant's follow-up visit were considered in this analysis. Missing data were addressed through the GEE estimating mechanism which uses all available pairs method to encompass the missing data from dropouts or intermittent missing data. All non-missing pairs of data are used in the estimators of the working correlation parameters. As a first step, GEE bivariate analyses were used to determine factors associated with receiving help injecting. To adjust for potential confounding variables and to identify factors that were independently associated with our outcome of interest, variables significant at the $p < 0.10$ threshold in bivariate analyses were entered in a multivariate GEE model using a backwards model selection process. The model with the best overall fit was determined using the lowest quasiliikelihood under the independence model criterion (QIC) value (26). All statistical analyses were performed using SAS software version 9.3 (SAS, Cary, NC). All p-values are two sided.

RESULTS

Among 585 street-involved youth recruited into ARYS during the study period, 253 (43%) participants reported injection drug use at some point and were therefore included in the current analyses. Among this sample of young injection drug users, 93 (37%) were female, 179 (71%) were of Caucasian ethnicity, and the median age was 23 years (inter-quartile range [IQR] = 21–24). The number of participants with at least one study follow-up visit was 186 (73.53%), and participants attended a median of 3 study visits (IQR = 1 – 6). Study

participants contributed to 932 observations, of which 182 (20%) included a report of recent assisted injecting. At baseline and over study follow-up, 125 (49%) participants reported receiving assistance injecting drugs.

The baseline characteristics of the study sample stratified by assisted injection (yes vs. no) are presented in Table I. The bivariate and multivariate GEE analyses of socio-demographic, behavioural, and other risk variables associated with receiving assistance injecting drugs are presented in Table II. In the bivariate analyses, several differences were observed between those who received assistance injecting drugs and those who did not receive assistance. The following risk factors were significantly and positively associated with assisted injecting: younger age than the median (Odds Ratio [OR] = 1.59, 95% Confidence Interval [CI]: 1.14–2.22, $p = 0.006$), female (OR = 1.64, 95% CI: 1.13–2.39, $p = 0.010$), homeless (OR = 1.72, 95% CI: 1.22–2.44, $p = 0.002$), injection binge drug use (OR = 2.78, 95% CI: 2.02–3.84, $p = <0.001$), any injection heroin use (OR = 3.62, 95% CI: 2.45–5.37, $p = <0.001$), any injection cocaine use (OR = 3.84, 95% CI: 2.55–5.79, $p = <0.001$), any injection crystal methamphetamine use (OR = 3.21, 95% CI: 2.21–4.67, $p = <0.001$), any injection crack cocaine use (OR = 1.95, 95% CI: 1.40–2.72, $p = <0.001$), nonfatal drug overdose (OR = 1.60, 95% CI: 1.04–2.45, $p = 0.031$), share syringes (OR = 3.39, 95% CI: 2.39–4.79, $p = <0.001$), sex work (OR = 2.45, 95% CI: 1.52–3.96, $p = <0.001$), and drug dealing (OR = 1.88, 95% CI: 1.31–2.68, $p = 0.001$). In multivariate analysis, factors that were positively associated with assisted injecting included: younger age than the median (Adjusted Odds Ratio [AOR] = 1.56, 95% CI: 1.05–2.31, $p = 0.026$), female gender (AOR = 2.34, 95% CI: 1.50–3.64, $p = <0.001$), injection binge drug use (AOR = 1.98, 95% CI: 1.35–2.89, $p = <0.001$), any injection heroin use (AOR = 2.26, 95% CI: 1.46–3.52, $p = <0.001$), any injection cocaine use (AOR = 2.22, 95% CI: 1.36–3.64, $p = 0.002$), any injection crystal methamphetamine use (AOR = 2.93, 95% CI: 1.90–4.51, $p = <0.001$), any injection crack cocaine use (AOR = 1.46, 95% CI: 0.96–2.22, $p = 0.073$), and syringe sharing (AOR = 1.65, 95% CI: 1.07–2.54, $p = 0.023$).

Among the participants who received help injecting in the previous six months, 27% reported “always” receiving help injecting ($n = 34$), 29% reported “occasionally” receiving help injecting ($n = 36$), and 18% “rarely” received help injecting ($n = 22$). The most frequent reasons for receiving help injecting included: having bad veins or no veins ($n = 26$, 30%), being a new user ($n = 22$, 26%), and having shaky hands ($n = 11$, 13%). When asked who helps them to inject, the majority of participants reported that a close friend helped them ($n = 54$, 44%), 40% received help from a casual friend or acquaintance ($n = 49$), and 23% received help from a regular sex partner ($n = 29$).

DISCUSSION

Our study found that receiving assistance with injecting is common among street-involved youth in our study setting, with 49% of participants reporting that they received assistance with injecting at some point during study follow-up. Receiving assisted injections was more frequent among vulnerable sub-groups of our sample, namely younger injectors and female injectors, and it was associated with binge drug use and syringe sharing. Study findings also

indicate that youth primarily receive assistance injecting from close friends, casual acquaintances and sex partners.

The prevalence of assisted injecting in this sample of street-involved youths (49%) is considerably higher than among adults who use injection drugs, where previous research has found prevalence rates of 23–41% (2, 5, 27). This is concerning given the links between this practice and increased HIV risk through syringe sharing (4, 5), which was also associated with assisted injecting in this study.

The relationship between assisted injecting and vulnerable sub-groups of youth is alarming, and points to potential social factors that may facilitate transmission of HIV in this setting. Specifically, female youth were more likely to receive assistance injecting, and this practice has previously been linked to a complex system of gendered power relations (1, 9) and a lack of safe injection knowledge (5). Supervised injecting sites can potentially play an important role in reducing females' reliance on untrained peers to provide injection assistance, as such sites would provide a safer space for women to learn proper injection technique and/or receive assistance from trained personnel (6, 28).

Younger participants in this study were also more likely to have received assistance injecting, which suggests inexperience with drug use. Younger youth who are new to street-life are especially at-risk for risky drug use and blood borne infections, as newcomers to the street scene tend to be assimilated into street life through pervasive drug use (9, 29). This is consistent with our finding that being a new user was the second most frequent reason for receiving help injecting. Studies have found that a person's first injection episode often involves another person (30), which happens in spite of a reported ethic among street-youth which prohibits helping someone initiate injection drug use (31). Although a comprehensive range of early interventions are required to ensure that at-risk youth are connected with appropriate supports and services to prevent them from initiating injection drug use or becoming street-involved, our findings strongly indicate that HIV prevention and harm reduction services must also be in place for youth who still end up engaging in high-risk drug use. Specifically, interventions that empower youth and give them the opportunity to adopt safer injection practices are needed. Amendments to current federal policies that prohibit assisted injecting within Canadian supervised injection sites may be appropriate. Previous research on an unsanctioned injecting site in Vancouver showed that providing injecting assistance and education is feasible and can help individuals develop competency in the self-administration of injections (32). Indeed, peer-delivered harm reduction interventions such as syringe-distribution, street-based injection support teams, and HIV risk education have been successful at reaching marginalized people who use drugs and reducing HIV risk behaviours in this study setting (33, 34) and the United States (35). Given the potential risks and harms associated with untrained individuals administering injections, there is strong evidence for allowing injections to be delivered by nurses or trained peers as a crucial component of youth and adult HIV prevention and other health promotion programs.

Other study findings indicate that while cocaine, heroin, and crystal methamphetamine use were independently associated with assisted injection, youth who reported crystal

methamphetamine use had the greatest odds of receiving assistance injecting. The additional risk associated with crystal methamphetamine use may be related to a common practice where users go on “runs” of crystal methamphetamine use by maintaining a high for days (36), which likely decreases manual dexterity and ability to self administer injections. This is consistent with our finding that binge drug use was associated with assisted injecting, which is particularly concerning since binge drug use has previously been associated with HIV seroconversion in adult drug-using populations (37). As a result, low barrier access to sterile syringes is critical for this group. These findings underscore the importance of ensuring access to appropriate and effective drug treatment for street-involved youth.

There are several limitations to this study. First, the ARYS cohort is a community-recruited sample of street-involved youth in Vancouver, and therefore the generalizability of this study may be limited. However, the demographics of the sample are consistent with other samples of street-involved youth in Vancouver (38, 39). Second, due to the use of self-report data, our findings are subject to response biases (40). Previous research has found, however, that self-report data provided by drug-using populations is generally congruent with actual behaviour (41–43). Third, it is possible that our analysis was affected by a historical bias due to events that occurred in the study setting between 2008 and 2012. The most notable event in this time period was the 2010 Winter Olympics hosted by the city of Vancouver, although research on street-policing in Vancouver during the Olympics suggest it had only limited effects on people who are street-involved (44). Overall the political and socio-structural landscape of Vancouver has not been dramatically altered, given that federal, provincial, and municipal elections were held during this time period and the incumbent party was re-elected for each.

CONCLUSIONS

In summary, assisted injecting is common among street-involved youth in Vancouver and is associated with a range of factors that increase the risk of HIV and Hepatitis C infection among particularly vulnerable sub-groups such as younger youth and females. Our findings indicate that appropriate policy responses to reduce or eliminate assisted injecting are critical for reducing the risk of blood borne infections and potentially other serious health hazards among this group and especially among vulnerable sub-groups, such as younger youth and females. Evidence-based approaches that help provide youth with control and agency over the injection process are critical to minimize the effect of contextual factors associated with this practice, and to ensure they are able to adopt safer injection practices. Educating injecting drug youth about safer injection practices and permitting trained personnel to perform injections in supervised settings are two approaches that have potential to reduce assisted injecting and associated harms including risk of HIV transmission, among street-involved youth. Implementing these approaches may also help engage youth and facilitate their entry into addiction treatment (45).

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TABLE I

Baseline characteristics of street-involved youth who use injection drugs (n = 253)

Characteristic	Total (%) (n = 253)	Assisted Injecting		OR (95% CI)	p - value
		Yes (%) (n = 125)	No (%) (n = 128)		
Younger age (<23 years)	125 (49.41)	70 (56.00)	55 (42.97)	1.69 (1.03–2.78)	0.038
Gender (female)	93 (36.76)	58 (46.40)	35 (27.34)	2.30 (1.36–3.88)	0.002
Ethnicity (Caucasian)	179 (70.75)	87 (69.60)	92 (71.88)	0.90 (0.52–1.54)	0.691
Homeless ^a	175 (69.17)	87 (69.60)	88 (68.75)	1.13 (0.66–1.94)	0.659
Stable relationship (currently)	87 (34.39)	50 (40.00)	37 (28.91)	1.65 (0.97–2.79)	0.062
Binge drug use ^{a,b}	114 (45.06)	67 (53.60)	47 (36.72)	1.99 (1.20–3.29)	0.007
Any heroin use ^{a,b}	177 (69.96)	89 (71.20)	88 (68.75)	1.12 (0.66–1.92)	0.671
Any cocaine use ^{a,b}	73 (28.85)	40 (32.00)	33 (25.78)	1.35 (0.78–2.34)	0.275
Any crystal meth use ^{a,b}	135 (53.36)	75 (60.00)	60 (46.88)	1.70 (1.03–2.80)	0.036
Any crack cocaine use ^{a,b}	162 (64.03)	82 (65.60)	80 (62.50)	1.14 (0.68–1.91)	0.607
Drug overdose ^a	31 (12.25)	20 (16.00)	11 (8.59)	2.01 (0.92–4.39)	0.076
Syringe sharing ^a	97 (38.34)	54 (43.20)	43 (33.59)	1.49 (0.89–2.47)	0.128
Incarceration ^a	59 (23.32)	27 (21.60)	32 (25.00)	0.82 (0.46–1.47)	0.500
Sex work ^a	36 (14.23)	21 (16.80)	15 (11.72)	1.52 (0.74–3.11)	0.247
Drug dealing ^a	117 (46.25)	59 (47.20)	58 (45.31)	1.08 (0.66–1.77)	0.763

Characteristics for those who reported receiving assistance injecting were measured at their first visit (during the study period: June 2008 and November 2012), which involved a report of assisted injecting. Characteristics for all other participants were measured from the first study visit that included a report of injection drug use.

^aRefers to activities, behaviours, and diagnoses in the past six months.

^bInjection use.

TABLE II

Bivariate and multivariate GEE analysis of factors associated with requiring assistance injecting (n = 253)

Characteristic	Unadjusted		Adjusted	
	Odds Ratio (95 CI)	p - value	Odds Ratio (95% CI)	p - value
Younger age (<23 years vs. ≥23 years)	1.59 (1.14 – 2.22)	0.006	1.56 (1.05 – 2.31)	0.026
Female gender (yes vs. no)	1.64 (1.13 – 2.39)	0.010	2.34 (1.50 – 3.64)	<0.001
Caucasian ethnicity (yes vs. no)	1.03 (0.69 – 1.55)	0.871		
Homeless^a (yes vs. no)	1.72 (1.22 – 2.44)	0.002		
Stable relationship^b (yes vs. no)	1.23 (0.88 – 1.70)	0.221		
Binge drug use^{a,c} (yes vs. no)	2.78 (2.02 – 3.84)	<0.001	1.98 (1.35 – 2.89)	<0.001
Any heroin use^{a,c} (yes vs. no)	3.62 (2.45 – 5.37)	<0.001	2.26 (1.46 – 3.52)	<0.001
Any cocaine use^{a,c} (yes vs. no)	3.84 (2.55 – 5.79)	<0.001	2.22 (1.36 – 3.64)	0.002
Any crystal meth use^{a,c} (yes vs. no)	3.21 (2.21 – 4.67)	<0.001	2.93 (1.90 – 4.51)	<0.001
Any crack cocaine use^{a,c} (yes vs. no)	1.95 (1.40 – 2.72)	<0.001	1.46 (0.96 – 2.22)	0.073
Drug overdose^a (yes vs. no)	1.60 (1.04 – 2.45)	0.031		
Syringe sharing^a (yes vs. no)	3.39 (2.39 – 4.79)	<0.001	1.65 (1.07 – 2.54)	0.023
Incarceration^a (yes vs. no)	1.26 (0.84 – 1.88)	0.258		
Sex work^a (yes vs. no)	2.45 (1.52 – 3.96)	<0.001		
Drug dealing^a (yes vs. no)	1.88 (1.31 – 2.68)	0.001		

^a Refers to activities, behaviours, and diagnoses in the past six months.^b Refers to current relationship status.^c Injection use.