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A comparison of drug use and risk behavior profiles among younger and older street youth

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Abstract

Among 559 street youth recruited between 2005 and 2007 in Vancouver, Canada, young drug users (<21years of age) were compared with older drug users (≥21 years) with regard to recent drug use and sexual practices using multiple logistic regression. Older youth were more likely to be male and of Aboriginal ancestry, to have more significant depressive symptoms, to have recently engaged in crack smoking, and to have had a recent history of injection drug use. Young drug users, by contrast, were more likely to have engaged in recent binge alcohol use. Efforts to reduce drug use-related harm among street youth may be improved by considering the highly prevalent use of "harder" drugs and risk for depression among older youth.

Keywords

street youth; adolescents; injection; drug use; sex; HIV/AIDS

INTRODUCTION

Efforts to prevent or reduce drug use-related harm among youth require an understanding of the particular patterns of substance use and other risk behaviors in which such youth engage (Public Health Agency of Canada, 2006; UNICEF, 1997). Although much is known about the prevalence of these behaviors among mainstream youth—as obtained by, for example, national surveys of school-enrolled youth—substantially less is known about street youth, a socially and economically disadvantaged population that often eludes population-based study (Farrow, Deisher, Brown, Kulig, & Kipke, 1992). The term "street youth" refers to young people who spend some or all of their time living and working on the streets (UNICEF, 1997), and in many settings worldwide, street youth represent a population characterized by a high prevalence of homelessness (Brannigan & Caputo, 1993), non-injection and injection drug use (Greene, Ennett, & Ringwalt, 1997; Kerr et al., 2009; Roy et al., 2003), sex trade involvement (DeMatteo et al., 1999; Greene, Ennett, & Ringwalt,

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1999), and human immunodeficiency virus (HIV) infection (Kissin et al., 2007; Pfeifer & Oliver, 1997; Roy et al., 2000). Of these, drug use is particularly prevalent among Canadian street youth, with surveillance data from seven urban centers revealing a lifetime prevalence of illicit drug use of 95.3% (Public Health Agency of Canada, 2006).

Although risk behaviors remain poorly understood among street youth relative to their mainstream peers, even less is known about how these behaviors may vary within street youth populations. It is well known, for example, that within groups of mainstream youth who engage in drug use and unsafe sexual behaviors, patterns of risk behaviors can vary substantially by age (Eaton et al., 2008). Because youth who live and work on the street range in age from early adolescence to early adulthood, it may be that risk behavior patterns differ greatly between younger and older street youth (Greene et al., 1997,1999). There is good reason to hypothesize why this may be so. Street youth—who may be early in their second decade of life or midway through their third—span multiple stages of development. They are therefore likely to engage in varying degrees of risk-taking and novelty-seeking (Rolison & Scherman, 2002; Steinberg, 2004), a fact that has important relevance for the initiation and maintenance of drug use and sexual behaviors. Additionally, continued exposure to street life is likely to change youth's perceptions regarding high-risk behaviors. Evidence is emerging that within the street environment, social influences ultimately push youth toward harm until it becomes difficult to avoid engaging in risky activities (Fast, Small, Wood, & Kerr, 2009; Mayock, 2005), with the result that older youth are likely to have very different behavior profiles from that of younger youth (Fennema, Van Ameijden, Van Den Hoek, & Coutinho, 1997; Miller, Strathdee, Li, Kerr, & Wood, 2007).

Uncovering differences in risk profiles among street youth of different ages would have great relevance to policy aimed at preventing the transmission of HIV and other blood-borne infections, as these efforts could be more carefully tuned to the divergent needs of younger and older youth. In the present analyses, therefore, we aim to investigate possible differences that may exist between younger and older street youth with regard to substance use and sexual behaviors.

METHODS

The ARYS follows a cohort of extensively street-involved youth in Vancouver, Canada, and has been described in detail previously (Wood, Stoltz, Montaner, & Kerr, 2006). Youth included in the present analysis were recruited from October 2005 to November 2007. Inclusion criteria for ARYS were: (1) age 14 to 26 years at the time of enrollment, and (2) use of an illicit drug other than or in addition to marijuana during the month prior to enrollment. Participants were recruited through snowball sampling and extensive street-based outreach methods. Although no explicit inclusion criterion required that youth spend a minimum amount of time on the street or actually live on the street to qualify for the study, in practice, the street-based recruitment produced a sample of youth who spent all or most of their time on the street, the majority of whom (75.5%) were homeless. This sample is therefore in keeping with the definition of street youth as outlined by several early seminal statements by international and domestic organizations and other high-quality studies of street youth (Farrow et al., 1992; Roy et al., 2004; UNICEF, 1997). At the time of study enrollment, participants completed a baseline interviewer-administered questionnaire assessing a range of characteristics, including sociodemographic information, substance use, and sexual behaviors. All interviewers underwent extensive training regarding participant confidentiality and the discussion of sensitive manners such as drug use and sexual behaviors. Similarly, trained staff obtained informed consent. Certain medical and mental health survey components were recorded by a registered nurse. ARYS was approved by the University of British Columbia/Providence Health Care Research Ethics Board.

The present analysis examined the associations between age and a series of substance use and sexual behaviors occurring during the six months prior to study enrollment. Age at the time of enrollment was dichotomized a priori into younger age (defined as <21 years) and older age (defined as ≥21 years). This age cut-off was chosen to be consistent with the opinions of several large organizations, including the American Academy of Pediatrics (2008) and the American Medical Association (AMA, 1997), which define adolescence as a period extending until the age of 21 years. This cut-off is also consistent with previous related research papers on street youth that limit their analyses to 21 years and under or use this age threshold as a cut-off in analyses (Fuller et al., 2001; Klein et al., 2000). Age was treated as a dichotomous variable for ease of interpretation of results. Although it is true that age represents a continuum along which social and emotional development occur, in practice, funding for services in many jurisdictions requires that such services employ often arbitrary cut-offs for the age at which services are no longer delivered, such as 18 or 21 years (e.g., age of majority) (Hagan & McCarthy, 2005). Because additional information may be lost when converting a continuous variable into a dichotomous one, we also ran a parallel analysis treating age as a continuous variable.

Associations between age and substance use and between age and sexual behavior variables were examined in univariate analyses. Each variable was defined a priori and was selected on the basis of its known (i.e., from the literature) or hypothesized relationship with age (Doherty, Garfein, Monterroso, Latkin, & Vlahov, 2000; Fennema et al., 1997; Miller, Strathdee, Kerr, Li, & Wood, 2006; Miller et al., 2007; Sherman et al., 2005). Substance use-related variables considered included binge alcohol use (defined as at least five drinks on any given occasion, regardless of gender), non-injection crack use, non-injection heroin use, non-injection crystal methamphetamine use, use of any injection drug, dealing drugs, overdose, and spending on average at least $50 CAN on drugs daily. Sexual behavior variables included unprotected vaginal or anal intercourse, sexual activity with at least one sexual partner, and involvement in the sex trade (i.e., trading sex for money, drugs, shelter, clothing, or any other gift). In order to gain an appreciation of recent behaviors in which youth had engaged, we ensured that all behavioral variables listed above concern the activities of youth during the six months prior to their baseline interview only and all are dichotomized into affirmative (“yes”) and negative (“no”) responses.

In our univariate analyses, we also examined sociodemographic and other non-behavioral variables that, based on earlier studies or our prior hypotheses, could confound the relationship between age and the behavioral variables examined. These variables included gender (male vs. female), ethnicity (Aboriginal vs. all other ethnicities), prior completion of or current enrollment in high school (yes vs. no), history of homelessness (ever vs. never), and a score of at least 16 on the Center for Epidemiological Studies Depression (CES-D) scale (yes vs. no), a 20-item survey measuring depressive symptoms that is both valid and reliable when administered to young people, and that is relatively sensitive for depression when a cut-off score of at least 16 is used (Radloff, 1991). All sociodemographic variables relied on self-report.

All univariate analyses employed Pearsons chi-square test. Covariates significant at a p value of less than .05 in univariate analyses were then included in a multiple logistic regression model to examine the adjusted associations of these variables with age. As mentioned above, a parallel analysis in which age was treated as a continuous variable was also conducted. This was done to ensure that results were not affected by dichotomizing the age variable. Multiple linear regression was employed in this analysis, drawing on the same set of variables as for the multiple logistic regression model, and the results from the two analyses compared. Statistical analyses were performed using SAS version 9.1 (SAS

Institute, Inc., Cary, North Carolina, USA). All reported p values are two-sided and considered significant at a p value of less than .05.

RESULTS

Between September 2005 and November 2007, 559 youth were recruited in the ARYS cohort. Among study enrollees, the median age was 22 years (interquartile range [IQR]: 20–24 years), 380 (68.0%) were male, and 397 (71.0%) were white. Of the remaining 163 non-white participants, 131 (78.4%) were of Aboriginal ethnicity. All 559 (100%) participants included in the analysis reported spending time on the street on a daily basis in the last six months, and 422 (75.5%) of all participants reported actually being homeless during this time. Participants spent a median of 12 hours on the street per day (IQR: 6–24 hr).

Of all 559 participants, 222 (39.7%) were under 21 years of age at the time of enrollment and 337 (60.3%) were 21 years of age or older. Univariate associations between age category (i.e., <21 vs. ≥21 years) and sociodemographic, substance use, and sexual behavior variables in which youth engaged in the six months prior to study enrollment are demonstrated in Table 1. Older (≥21-year-old) street youth were significantly more likely to be male, to be Aboriginal, to have had more depressive symptoms according to the CES-D scale, to have engaged in non-injection crack use, to have engaged in non-injection heroin use, to have injected drugs, to have dealt drugs, and to have spent on average more than $50 CAN on drugs daily. During the six months prior to study enrollment, younger (<21-year-old) street youth were significantly more likely to have engaged in binge alcohol use, to have had at least one instance of unprotected vaginal or anal intercourse, and to have had more than one sexual partner.

Table 2 provides unadjusted odds ratios (ORs) for all covariates examined in the univariate analyses. All variables significant at a p value of less than .05 in the univariate analyses (i.e., the 11 listed in the preceding paragraph) were included in the multivariate analysis; for these variables, adjusted ORs (AORs) obtained from multiple logistic regression are also included in Table 2. Of the variables included in the multivariate model, six remained significant following covariate adjustment. These results revealed that street youth aged 21 years and older were more likely to be male, to be Aboriginal, to have had more depressive symptoms on the CES-D scale, to have engaged in non-injection crack use, and to have injected drugs. By contrast, street youth younger than 21 years were more likely to have engaged in binge alcohol use.

As outlined earlier, age was treated as a dichotomous variable for ease of interpretation of results, but to ensure that information was not lost in the conversion of age as a continuous variable to a dichotomous one, we ran a parallel multiple linear regression model in which age was considered continuous. This analysis produced the same subset of six significant variables listed above.

DISCUSSION

We have shown that certain risk behaviors are associated with older or younger age among street youth, a finding that has important implications for interventions aimed at reducing drug use-related harm. Although it has been well described previously that adolescents and young adults differ in terms of drug use and sexual behavior, these studies have focused primarily on mainstream groups rather than on street youth, who commonly elude traditional population-based study (Eaton et al., 2008; Greene et al., 1997,1999). In the present study, nearly three-quarters of participants were homeless, thus likely to elude standard sampling methods. Older street youth (i.e., those aged ≥21 years), who tended to be male (AOR =

4.20, 95% confidence interval [CI]: 2.66–6.67) and of Aboriginal ethnicity (AOR = 2.16, 95% CI: 1.31–3.54), were significantly more likely to have recently smoked crack (AOR = 1.86, 95% CI: 1.22–2.83) and to have injected drugs (AOR = 2.24, 95% CI: 1.39– 3.63). Younger street youth (i.e., those aged <21 years), by comparison, tended to have recently binged on alcohol (AOR = 1.92, 95% CI: 1.23–3.03). Quite surprisingly, after covariate adjustment, we found no difference between older and younger street youth with regard to sexual risk behaviors, with the two groups demonstrating no significant difference in odds of having unprotected intercourse (AOR = 0.80, 95% CI: 0.53–1.22) or of having more than one sexual partner (AOR = 0.84, 95% CI: 0.55–1.27). Finally, older street youth also demonstrated significantly more depressive symptoms when administered to the CES-D scale (AOR = 1.67, 95% CI: 1.11–2.52).

Here, we propose two explanations as to why patterns of drug use may differ by age within a given population of street youth. First, within a defined population of street youth, attributes internal to the population may change as these youth age. For example, in the population sampled in our study, it may be that younger street youth begin their years on the street with less intensive patterns of drug use but, as they age, progress to substance use patterns that incorporate “harder” drugs and new routes of administration (such as injection), thus accounting for higher risk substance use profiles when sampled in a cross-sectional study (van Ameijden, van den Hoek, Hartgers, & Coutinho, 1994). This transition to more concerning patterns of drug use is strongly supported by two recent qualitative studies of street youth in Canada (Roy, Nonn, & Haley, 2008; Small, Fast, Krusi, Wood, & Kerr, 2009). These studies suggested that youths perceptions of drug use evolve as they spend more time on the street, with negative perceptions of “hard” drugs and injection as a route of administration becoming less important as a result of social influences. These qualitative findings, combined with our observation that older street youth are more likely to engage in riskier patterns of substance use (particularly injection drug use), highlight the importance of intervening early with street youth to prevent the transition to these behaviors (Fuller et al., 2002).

Second, circumstances external to the cohort may change as a population of street youth ages. In a given geographic location, trends in drug use can evolve with time and represent an important secular change affecting the prevalence of certain substance use behaviors. This has been observed, for example, through the increasing popularity of methamphetamine among street youth in Western Canada (Wood et al., 2008). Although the introduction or reintroduction of drugs into a population of youth may affect the entire population equally (i.e., with youth of all ages demonstrating approximately equal prevalence of usage of that drug), some age groups may be disparately affected (i.e., with older drug users being more likely to engage in heavy use of the drug than younger drug users, or vice versa). Again, the result of the latter of these scenarios would be to observe different drug use profiles between younger and older youth in a cross-sectional study. Alternatively, old drug trends may prevail among older members of a population as that population ages. In the 1990s, for example, cocaine usage was popular (Irwin et al., 1996), and now in some settings, cocaine remains popular among older users who were part of this earlier trend while being much less commonly used among younger drug users (Wood et al., 2006). Policymakers might therefore heed how the street environment affects the prevalence of drug use behaviors among younger and older street youth, as policy, when well informed and properly executed, may have the ability to alter the state of the local drug market (UNODC, 2000; Wood et al., 2003) and encourage effective prevention and treatment programs aimed at reducing drug use-related harm (Cartwright, 1988; Davis et al., 1994; Ensign & Gittelsohn, 1998).

The finding that depressive symptoms were observed more frequently among older street youth in our study has important implications. Street youth often have extensive histories of childhood abuse and neglect (Stoltz et al., 2007), which are intricately related to the high risk of depression in this population (Public Health Agency of Canada, 2006; Whitbeck, Johnson, Hoyt, & Cauce, 2004). Compounding this problem, continued exposure to the street environment may also be detrimental to the psychological well-being of youth; in particular, sustained drug use is associated with greater depressive symptoms (Nwakeze, Magura, & Rosenblum, 2002). These findings are particularly relevant given the recent observation among methamphetamine-using youth that drug use cessation was associated with resolution of depressive symptoms (Sutcliffe et al., 2009). The sum of these results suggests that it may be opportune to intervene with youth early during their exposure to street life to prevent the subsequent development of depression. Moreover, our results highlight the need to re-examine the effectiveness of mental health services targeted at older street youth, who appear to be disproportionately burdened by symptoms of depression.

How gender relates to the findings of our study is less clear. Although our older study participants were more likely to be male, our results do not specifically address how risks and harms may differ between male and female youth. It has been shown previously, for example, that the entry into injection drug use among street youth differs between young men and women, with females more likely to enter into injection use at a younger age, to have a sexual partner present at first injection, and to become a regular injector (Hadland et al., 2010). It is likely that the entry into other risk behaviors, such as non-injection drug use and sexual risk-taking, follows different trajectories for male and female street youth, and future research should attempt to identify and address such differences.

There are several important limitations to the present study. First, as has been addressed above, our study is limited by the constraints of a cross-sectional design. Although our results have important implications for hypothesis generation, they are not sufficient for drawing definitive conclusions about temporality and causation. Second, because street youth are a “hidden” population that eludes population-based sampling procedures (such as those based on voters lists or other registries), our methods employed snowball sampling, an approach that does not produce a truly random sample. However, it is noteworthy that the characteristics of our sample are similar to those of other studies of street youth conducted in Western Canada (Ochnio, Patrick, Ho, Talling, & Dobson, 2001). Third, because our data were compiled from self-reported information and because survey questions often touched on behaviors that youth may not have felt comfortable discussing, there may have been some degree of socially desirable reporting among our sample. If this source of bias was indeed relevant to our study, the effect of this would be to underestimate the true prevalence of some of the risk behaviors examined. Fourth, because our analyses demonstrated confounding of the relationship between age and drug or sexual risk behaviors by gender, ethnicity, and depressive symptoms, it is important to consider the effects of these variables when interpreting our findings. Still, the use of multiple logistic regression in our multivariate analysis should help to reduce the effects of these variables on the primary relationships of interest. Indeed, although sexual risk behaviors tended to be more prevalent among younger cohort members (but ultimately not significant in our multivariate model), after adjusting for drug use, which was highly comorbid with sexual risk behaviors, they were ultimately non-significant in the final multivariate model.

In summary, this study has built on previous observations of substance use patterns among street youth by highlighting concerning drug use profiles, including the use of injection drugs and non-injection crack, and higher rates of depressive symptoms among older street youth when compared with their younger peers. Future longitudinal studies should further explore the hypothesis that these risk profiles evolve and depressive symptoms increase as

youth age and spend more time on the street, and whether more extensive street exposure results in poorer mental health outcomes. Regardless, our work calls attention to a possible critical period for early intervention—that is, when street youth are younger and may not have yet engaged in the use of "harder" street drugs. Such windows of opportunity have important ramifications for efforts to prevent or reduce the harms of substance use. Evidence-based evaluations should also be conducted to examine how well these harm reduction and treatment strategies specifically address the particular concerns of street youth (Hadland, Kerr, Li, Montaner, & Wood, 2009), who despite excess risk when compared with their peers in the mainstream youth population remain vastly underserved by the public health sector.

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Table 1

Sociodemographic factors and behaviors among younger (<21 years of age) and older (≥21 years) street youth in the last six months.

		Age			
Characteristic	**Total (%) *n* = 559**	**< 21 years (%) *n* = 222**	**≥ 21 years (%) *n* = 337**	**Unadjusted OR (95% CI)**	***p***
Sociodemographic data					
Male sex	380 (68.0)	118(53.2)	262 (77.7)	3.08(2.13–4.45)	< .001
Aboriginal ethnicity	131 (23.4)	37(16.7)	94 (27.9)	1.93 (1.26–2.96)	.002
High school education *	232 (41.5)	97 (43.7)	135(40.1)	0.86(0.61–1.21)	.394
Homeless	422 (75.5)	175(78.8)	247 (73.3)	0.74(0.49–1.10)	.137
CES-Dscore≥16 **	293 (55.7)	103(49.1)	190(60.1)	1.57(1.10–2.23)	.012
Substance use behaviors					
Binge alcohol use	348 (62.3)	158(71.2)	190(56.4)	0.52 (0.36–0.75)	< .001
Non-injection crack use	316(56.5)	98(44.1)	218(64.7)	2.32 (1.64–3.28)	< .001
Non-injection heroin	111 (19.9)	31 (14.0)	80 (23.7)	1.92 (1.22–3.02)	.005
Non-injection crystal methamphetamine	244 (43.7)	98(44.1)	146(43.3)	0.97(0.69–1.36)	.848
Injected drugs (any)	163(29.2)	42(18.9)	121 (35.9)	2.40(1.60–3.59)	< .001
Dealt drugs	250 (44.7)	84 (37.8)	166(49.3)	1.59(1.13–2.25)	.008
Overdosed	64 (11.5)	28(12.6)	36(10.7)	0.83(0.49–1.40)	.483
≥ $50 spent on drugs daily	252 (47.0)	82(39.1)	170(52.2)	1.70 (1.20–2.42)	.003
Sexual behaviors					
Unprotected vaginal or anal intercourse	312(55.8)	138(62.2)	174(51.6)	0.65 (0.46–0.92)	.014
> 1 sexual partner	273 (48.8)	120(54.1)	153(45.4)	0.71 (0.50–0.99)	.045
Sex trade involvement	63 (11.3)	20 (9.0)	43(12.8)	1.48 (0.84–2.59)	.170

* Prior completion of or current enrollment in high school.

** Center for Epidemiological Studies Depression scale (Radloff, 1991).

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Table 2

Risk behaviors and other factors associated with being of older age (≥ 21 years) among street youth in the last six months.

	Odds ratio (OR)		
Characteristic	**Unadjusted OR (95% CI)**	**Adjusted OR (95% CI)***	***p***
CES-D score≥16**	1.57(1.10–2.23)	1.67(1.11–2.52)	.014
Binge alcohol use	0.52 (0.36–0.75)	0.52 (0.33–0.81)	.004
Non-injection crack use	2.32(1.64–3.28)	1.86 (1.22–2.83)	.004
Non-injection heroin	1.92 (1.22–3.02)	1.43 (0.84–2.44)	.183
Injected drugs (any)	2.40(1.60–3.59)	2.24(1.39–3.63)	.001
Dealt drugs	1.59(1.13–2.25)	1.10(0.73–1.65)	.660
≥ $50 spent on drugs daily	1.70 (1.20–2.42)	1.20(0.79–1.81)	.387
Unprotected vaginal or anal intercourse	0.65 (0.46–0.92)	0.80(0.53–1.22)	.307
> 1 sexual partner	0.71 (0.50–0.99)	0.84(0.55–1.27)	.402

*Multiple logistic regression model included all variables listed above, and was additionally adjusted for gender and ethnicity; only variables significant at $p < .05$ in univariate analyses were included in multiple logistic regression.

**Center for Epidemiological Studies Depression scale (Radloff, 1991).