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DRUG DEALING CESSATION AMONG A COHORT OF DRUG USERS IN VANCOUVER, CANADA

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Abstract

Introduction—Drug dealing among drug users has been associated with elevated risk-taking and negative health outcomes. However, little is known about the cessation of drug dealing among this population.

Methods—We assessed time to cessation of drug dealing using Cox regression. We also used generalized estimation equation (GEE) analysis and chi-square analysis to examine factors associated with willingness to cease drug dealing.

Results—In total, 868 participants reported drug dealing between November 2005 and March 2009. Among 381 participants dealing drugs at baseline, 194 (51%) ceased dealing. Incidence of dealing cessation was positively associated with spending less than \$50 per day on drugs (Adjusted Hazard Ratio [AHR] = 1.88, 95% Confidence Interval [CI]: 1.14 - 3.10) and negatively associated with buying drugs from the same source (AHR = 0.60, 95% CI: 0.37 - 0.98). In a GEE analysis, willingness to cease dealing was positively associated with older age (Adjusted Odds Ratio [AOR] = 1.02, 95% CI: 1.01 - 1.03), crack use (AOR = 2.00, 95% CI: 1.44 - 2.79), public injecting (AOR = 1.95, 95% CI: 1.55 - 2.43), and reporting that police presence affects drug purchases (AOR = 1.53, 95% CI: 1.22 - 1.91), and negatively associated with crystal methamphetamine injection (AOR = 0.62, 95% CI: 0.47 - 0.83).

Discussion—Intensity of drug use and acquisition method were predictive of dealing cessation. Willingness to cease dealing was associated with a range of risky drug-related activities. Interventions to reduce drug dealing should be conceived in tandem with addiction treatment strategies.

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Keywords

drug dealing; crack use; crystal methamphetamine; drug markets; Vancouver

1. INTRODUCTION

Illegal activity is often the primary income generating activity of drug-using populations in urban settings (Centers and Weist, 1998; Kerr et al., 2008; Ross, 2002; Werb et al., 2008). Indeed, studies from diverse settings have observed high levels of drug dealing among various samples of illicit drug users. In the 1997 US National Longitudinal Survey of Youth, 17% of the sample reported drug dealing in at least one of the first 5 survey follow-ups (Bellair and McNulty, 2009), while in New York City, more than half of a cohort of homeless youth reported engaging in this activity (Gwadz et al., 2009). Similarly, among a cohort of injection drug users in Vancouver, 17% of participants reported drug dealing in the past 6 months (Kerr et al., 2008), while among a sample of street-involved youth in the same setting, 58% of participants reported dealing drugs in the past 6 months (Werb et al., 2008).

Street-based drug dealing involves a high risk of violence, including gun-related violence and homicide, because of a lack of formal dispute resolution mechanisms and the substantial profits associated with this trade (Levitt and Venkatesh, 2000; Maher and Dixon, 2001; Ross, 2002; Werb et al., 2011). In Los Angeles, for instance, 43% of the 1,343 murders that took place between 1994 and 1995 were a result of violence between drug-selling gangs (Hutson et al., 1995). Despite the serious risk for violence and death that accompanies drug dealing, street-involved drug users nevertheless continue to initiate this activity at high rates (Gallupe and Baron, 2010; Kerr et al., 2008; McCarthy and Hagan, 2004).

Researchers have long noted that drug dealing is related, in a variety of complex ways, with drug use among street populations and at-risk youth (Bouchard and Spindler, 2010; Decker, 2000; Skolnick et al., 1990). Among heavily drug-dependent populations, such as street-based illicit drug users, motivations for drug dealing are often linked to the need to pay for personal drug use or to fulfill basic needs (e.g., food or shelter) (Bretteville-Jensen and Sutton, 1996; Cross et al., 2001; DeBeck et al., 2007). Dealing drugs may also be accompanied by other income generation activities, such as sex trade work or the selling of sterile syringes (Bruneau et al., 1997; Clatts and Davis, 1999). Participation in an illicit drug market as a user-dealer may also extend an individual's drug-using career and create barriers to reducing or ceasing drug use (Anglin and Speckart, 1986). Finally, individuals that both use and deal drugs may occupy entrenched positions within street-based social hierarchies, potentially making it more difficult to exit such a scene (Dunlap et al., 2010). Of particular concern is that these social hierarchies may act within a broader risk environment framework (Rhodes, 2002), in which the range of choices available to individuals may be limited, even in cases where individuals are willing to cease participation in a drug market.

The negative synergies of using and dealing generate serious public and personal health harms, most notably high risks for HIV transmission, fatal overdose and incarceration (Bargagli et al., 2001; Caulkins and Chandler, 2006; Mathers et al., 2008), which all become more acute as drug use is prolonged (DeBeck et al., 2009; Gómez et al., 2000; Kerr et al., 2007). Thus, the cessation of drug dealing among drug users may be a critical step in reducing drug-related health harms. Since little is known regarding the trajectories of drug dealing careers among vulnerable urban populations, we conducted a preliminary investigation of the factors associated with the cessation of drug dealing, as well as with reported willingness to cease this activity, among a cohort of street-based illicit drug users in Vancouver.

2. METHODS

2.1 Study sample

The analyses for this study were conducted with data obtained from a combined prospective cohort of injection drug users (IDU) and street-involved youth in Vancouver, Canada that includes the Vancouver Injection Drug Users Study (VIDUS), a cohort of HIV-negative IDU; the AIDS Care Cohort to Evaluate Access to Survival Services (ACCESS), a cohort of HIV-positive IDU; and the At-Risk Youth Study (ARYS), which is restricted to drug using street-involved youth aged 14 to 26. The study methods for each cohort have been described in detail in previous studies (Palepu et al., 2006; Strathdee et al., 1997; Wood et al., 2006). All cohort participants were recruited through street outreach, word of mouth and self-referral mechanisms, and data were collected using identical measures to allow for combined assessment. Once recruited, participants completed an interviewer-administered baseline questionnaire, a nurse-administered questionnaire (focused on health status), and provided blood samples for diagnostic testing. Follow-up questionnaires were undertaken at six-month intervals, and participants were offered a \$20 CND honorarium for all questionnaires.

2.2 Measures

The baseline and follow-up surveys solicited detailed demographic data, various behavioural information (including a number of measures of both injection and non-injection drug use), as well as self-perceived health status, income sources (including drug dealing and commercial sex work), incarceration experiences and interactions with police. These measures were validated through the use of multiple questions related to the demographic data or behaviours of interest, which were embedded in the questionnaire and allowed for triangulation of data. Any reported inconsistencies were excluded from the analysis. Measures were also validated by comparing results from our study with independent studies of Vancouver's drug-using populations (Buxton et al., 2007; Public Health Agency of Canada, 2006; Remis et al., 1998; Wood et al., 2002). The current study has been approved by the University of British Columbia/ Providence Health Care Ethics Review Board, and all study participants provided written consent prior to enrolment.

2.3 Data Analysis

Data were collected from eligible participants for the present study between November 1, 2005 and March 16, 2009. As part of this effort, we prospectively collected data on the number of participants reporting drug dealing, the median weekly hours reportedly spent on this activity, and the number of participants reporting dealing by type of drug. For our primary analysis, we used Cox proportional hazards regression to examine the time to the cessation of drug dealing among individuals who reported this activity at baseline (defined as reporting drug selling as an income source in the last 6 months). Consistent with earlier reports (Werb et al., 2010), we controlled for the possibility of reverse causation (i.e., where variables potentially associated with drug dealing cessation are coded as antecedent outcomes rather than as risk factors) by examining variables of interest ascertained six months prior to the first report of drug dealing cessation.

We also performed a secondary analysis that investigated correlates of reported willingness of participants to cease selling drugs if income was not needed for personal drug use. Because this analysis investigated the impact of serial measures for each subject on a dichotomous outcome, we employed generalized estimating equation (GEE) logistic regression for binary outcomes with logit link for the analysis of correlated data. This approach allows for the determination of factors independently associated with willingness to cease selling drugs among participants throughout the study period. It also provides

modified standard errors adjusted by multiple observations per person using an exchangeable correlation structure (Liang and Zeger, 1986), and has been used in previous analyses of vulnerable urban populations (Kerr et al., 2005; Shah et al., 2000). We restricted this analysis to those individuals that reported selling drugs at least once during the study period. Among this group, we defined our dependent variable of interest as reporting being willing to cease selling drugs if income was not needed for personal drug use.

Finally, as a sub-analysis, we carried out a cross tabulation among those participants that reported willingness to cease selling drugs at baseline in order to determine the percentage that abstained completely from dealing drugs, stopped dealing drugs intermittently, or continued to deal drugs throughout the study period. We also conducted a chi-square analysis in order to determine whether a difference existed in levels of drug dealing cessation among those participants that, at baseline, reported either a willingness or an unwillingness to cease this activity.

All baseline results refer to the six month period from Nov 1, 2005 through April 30, 2006. All multivariate models described were fit using backward selection. All statistical analyses were performed using SAS software version 9.1 (SAS, Cary, NC). All *p* values are two sided.

2.4 Variable selection

We based our selection of independent variables of interest on previous investigations of drug market involvement and drug-related risk behaviours among illicit drug users in our study setting (Kerr et al., 2008; Werb et al., 2008). As such, we included the following independent variables in both our Cox and GEE regression analyses: age, gender, Aboriginal ancestry, residency in Vancouver's downtown eastside, homelessness, amount of money spent on drugs per day (\$50 or more *vs.* less than \$50), injecting in public, having experienced physical assault, having committed physical assault, involvement in the commercial sex trade, participating in drug treatment, reporting that police presence affects the location of drug purchases, being stopped or detained by police, non-injection crack use, non-injection crystal methamphetamine use, injection heroin use, injection cocaine use, injection crystal methamphetamine use, and HIV serostatus. For the Cox regression analysis, we also included the following additional variables as potential markers of drug dealing based on previous analyses of street-based drug scenes (Dermody et al., 2009; McCarthy and Hagan, 2001): pooling money for drugs and buying drugs from the same source (always or usually *vs.* occasionally, sometimes or never), which indicates a capacity to find and maintain a reliable supply source within respondents' social network. Unless otherwise noted, in both analyses, all independent variables of interest were defined as time-updated covariates based on semi-annual follow-up data and refer to the prior 6-month period.

3. RESULTS

3.1 Characteristics

Between November 1, 2005 and March 16, 2009, 868 illicit drug users that reported dealing drugs at least once anytime during the study period were followed, including 297 (34%) women and 277 (32%) individuals who self-identified as being of Aboriginal ancestry. Among this cohort, 381 participants reported drug dealing at baseline, among whom 194 (51%) reported subsequently ceasing dealing drugs during the study period. At baseline, dealers reported primarily dealing crack cocaine (272, 71%), heroin and/or methadone (183, 48%), and cocaine (163, 43%). Among those that reported drug dealing at baseline, the median hours spent dealing per week were 15 (interquartile range: 3 – 40).

3.2 Association between drug-related variables and drug dealing cessation

While 381 participants dealt drugs at baseline, 264 of these participants had at least one follow-up interview and were considered in multivariate Cox regression analyses focused on predictors of the cessation of dealing. After adjustment for a variety of potential confounders, two predictors were found to be independently associated with time to drug dealing cessation: spending less than \$50 per day on personal drug use (Adjusted Hazard Ratio [AHR] = 1.88, 95% Confidence Interval [CI]: 1.14 – 3.10, $p = 0.013$) and not buying drugs from a regular source (AHR = 0.60, 95% CI: 0.37 – 0.98, $p = 0.039$).

3.3 Association between drug-related variables and willingness to cease dealing

We subsequently analyzed respondents' willingness to cease dealing drugs if income was not needed for personal drug use in a GEE analysis. This analysis included all participants that reported dealing drugs at baseline or during any follow-ups during the study period ($n = 868$). We analyzed 1,475 observations during this time and in 641 (43.5%) of these observations, participants reported being willing to cease selling drugs. As shown in Table 1, older age (Adjusted Odds Ratio [AOR] = 1.02, 95% CI: 1.01 – 1.03, $p = 0.003$), recent crack use (AOR = 2.00, 95% CI: 1.44 – 2.79, $p < 0.001$), recent public injecting (AOR = 1.95, 95% CI: 1.55 – 2.43, $p < 0.001$), and reporting that police presence affects the location of drug purchases (AOR = 1.53, 95% CI: 1.22 – 1.91, $p < 0.001$), were positively associated with being willing to cease selling drugs if income was not needed for drug use, while recent injection crystal methamphetamine (AOR = 0.62, 95% CI: 0.47 – 0.83, $p = 0.001$) was negatively associated with being willing to cease selling drugs if income was not needed for drug use.

Additional analyses were conducted to examine whether respondents who reported willingness to cease selling drugs at baseline actually ceased doing so at any follow-up interview. Among participants who were selling drugs at baseline and had at least one follow-up ($n = 264$), 121 (46%) reported at baseline that they would be willing to cease selling drugs if they did not need income for personal drug use. We found that only 65 (54%) of these participants subsequently reported actually fully ceasing drug dealing during this period, 29 (24%) did not cease selling drugs and 27 (22%) only ceased selling drugs intermittently. However, a chi-square analysis revealed there were no significant differences in the levels of drug selling activity (i.e., selling drugs consistently, intermittent cessation, and prolonged cessation) between participants that, at baseline, reported either a willingness or unwillingness to stop selling drugs if they did not need income for personal drug use.

4. DISCUSSION

Among a cohort of illicit drug users in Vancouver, the incidence of cessation of drug dealing was associated with spending less than \$50 per day on personal drug use and not having a regular source for drug purchases. Participants that stated a willingness to cease selling drugs if income was not needed for personal drug use were more likely to report that police presence affected the location of drug purchases, to have recently injected in public, and to have recently used crack, and were less likely to report having recently injected crystal methamphetamine. Finally, levels of drug dealing activity, including prolonged and intermittent cessation of this activity, were similar among those that reported being willing to and those that reported not being willing to stop selling drugs. The similarities in patterns of drug dealing cessation between these two groups raise the possibility that continued drug dealing is likely explained by factors other than individual-level willingness or unwillingness to deal drugs.

Our study findings suggest that drug dealing is associated with a variety of behaviours that increase the vulnerability of drug users within a street-based market (Bourgois, 2003; Maher, 2000). In this regard it is noteworthy that having a regular source for drug purchases was associated with lower incidence of drug dealing cessation. While this finding is open to multiple interpretations, it may imply that such individuals have a modicum of social capital within the specific context of a street-based drug market. Specifically, the fact that user-dealers that can secure such relationships are less likely to cease drug dealing is consistent with prior literature on street-related social capital and drug selling (Dermody et al., 2009; McCarthy and Hagan, 2001), as well as with research on social networks in conventional (i.e., licit) contexts (Burt, 1995; Lin, 2002). Social capital may be defined as the ability of actors to secure benefits by virtue of their membership in social networks or other social structures (Bourdieu, 1986; Portes, 2003), and is defined through relationships, as when individuals collaborate with others in order to facilitate common goals (Coleman, 1994; Lin, 2002; Rhodes et al., 2005). We note that our analysis is limited with respect to the measurement of social capital within our cohort, and this research area requires further investigation (Bourdieu, 1986; Rhodes, 2002). Nevertheless, the possibility exists that higher social capital within this context may have the paradoxical effect of reducing the mobility of user-dealers motivated to exit such a setting, as is consistent with our subanalysis on willingness to cease dealing, and prior research (Burt, 1995; McGloin and Kirk, 2010).

In addition, our finding that spending less than \$50 per day on drug use was associated with a higher incidence of drug dealing cessation confirms previous observations that the intensity of drug dealing is correlated with the intensity of personal drug use among street-based drug market participants in a variety of ways (Bretteville-Jensen and Sutton, 1996; Cross et al., 2001; DeBeck et al., 2007; Werb et al., 2008). For instance, drug use can propel the need to generate income through dealing; dealers may subsequently become users; or both activities may be undertaken simultaneously (Fast et al., 2009). To that end, that the type of drug used by participants (i.e., crack or crystal methamphetamine) was the strongest determinant of reported willingness to cease dealing drugs has a number of implications, particularly given the apparent low predictive value of willingness itself in determining drug dealing cessation. First, drug-dependent individuals involved in the drug trade often report consuming the same drug that they deal (Decker, 2000; Fast et al., 2009). Second, among participants in our setting, crack is often used by individuals later in their drug use careers (Fast et al., 2010), while crystal methamphetamine has been shown to be associated with younger and less experienced drug users (Fairbairn et al., 2007; Wood et al., 2008; Wood et al., 2006). This is consistent with the small association between older age and willingness to cease selling drugs that we observed and suggests that inexperienced individuals may be less likely to leave the drug trade (Fast et al., 2009; Mayock, 2005; Skager, 2007; West and O'Neal, 2004; Degenhardt et al., 2008; Wagner and Sundar, 2008).

As noted, approximately half of those that reported a willingness to cease dealing drugs at baseline in the present study nevertheless dealt drugs either continuously or intermittently throughout the study period. Further, in a chi-square analysis, reporting a willingness to cease dealing at baseline did not predict future cessation. This observation underlines the fact that intersecting social, economic and drug use factors – including drug dependence, a need for illicit income generation, and the nature of drug dealing relationships – work to restrict the range of choices within the risk environment that drug market participants experience (Rhodes, 2002), and undermine the effect of individual-level decision-making and deterrents. The fact that crack users were more likely to report a willingness to cease dealing drugs may therefore reflect a higher intensity of street entrenchment rather than an increased capacity of this subpopulation to actually cease drug dealing. Our findings also indicate that police presence, which works as an individual-level deterrent, may be

ineffective in increasing the cessation of drug dealing among drug-using populations. Specifically, we found that while reporting being affected by police presence was associated with an increased willingness to cease dealing drugs, those participants that actually ceased dealing were not more likely to report being willing to cease dealing at baseline. This suggests that factors other than willingness to cease dealing, such as the intensity of drug dependence, likely have a more powerful influence on whether individuals continue to deal drugs. Given that many of those factors associated with continued drug dealing in our study have also been recognized as heightening the risk of HIV transmission among street-based illicit drug users (DeBeck et al., 2009; Fairbairn et al., 2007; Rhodes et al., 2006; Small et al., 2007), this activity should be considered within a public health framework. We therefore propose that policymakers work towards scaling up addiction treatment and structural interventions such as harm reduction-focused social housing, low-threshold employment, and peer-led education interventions to reduce the impact of social network influence and poverty among drug-using individuals (Fast et al., 2009; Krüsi et al., 2010; DeBeck et al., 2009; Fairbairn et al., 2007; Rhodes et al., 2006; Small et al., 2007).

Our study has limitations. First, our cohort is not a random sample and this may limit the generalizability of our findings to other urban settings, though data from surveillance systems and previous studies in our setting suggest that this cohort is representative of the broader population of illicit drug users in Vancouver (Buxton et al., 2007; Public Health Agency of Canada, 2006; Remis et al., 1998; Wood et al., 2002). Nevertheless, drug use and drug dealing are highly stigmatized, and our cohort participants may therefore have underreported these activities, as has been observed elsewhere (Des Jarlais et al., 1999). Second, while we endeavored to adjust for potential confounders, the possibility remains that we were unable to identify all factors that may have affected our analyses. To that end, our dichotomous measure of daily amount spent on drugs may have been confounded by the informal economic transactions that are common within street-level illicit drug markets (Colón et al., 2001). Finally, our discussion of social capital within the context of a drug market was preliminary, and more research is needed to quantitatively assess the potential impact of this phenomenon through well-validated measurement tools.

Among a Canadian cohort of street-involved illicit drug users, the incidence of drug dealing was associated with spending less than \$50 per day on drugs and not having a regular source for purchasing drugs. Further, while reporting a willingness to cease dealing drugs was positively associated with recent crack use, older age, and reporting that police presence affected the location of drug purchases, willingness to cease dealing was not itself a significant predictor of cessation. As such, we conclude that drug policies targeting street-based drug dealing should focus on the provision of addiction treatment in tandem with structural interventions, rather than on individual-level deterrents such as drug market policing. Specific structural interventions could include harm reduction-based housing and low-threshold employment. These would reduce the impact of both drug dependence and the need for income generation in motivating drug-using individuals to deal drugs. Reorienting drug policies towards these determinants of illicit drug activity and implementing targeted interventions based on scientific evidence, as experts have suggested (Wood et al., 2010), may contribute to substantive reductions in drug market involvement among at-risk populations.

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Table I

Multivariate logistic regression (GEE) analysis of factors associated with reporting willingness to cease selling drugs during follow-up ($n = 868$).

Characteristic	Adjusted Odds Ratio* (95% CI)	<i>p</i> value
Age		
Per year older	1.02 (1.01 – 1.03)	0.003
Gender		
Male vs. Female	0.99 (0.77 – 1.26)	0.909
Recent Crack Use		
Yes vs. No	2.00 (1.44 – 2.79)	< 0.001
Recent Injection Crystal Methamphetamine		
Yes vs. No	0.62 (0.47 – 0.83)	0.001
Recent Public Injection		
Yes vs. No	1.95 (1.55 – 2.43)	< 0.001
Police Presence Affects Drug Purchase Location		
Yes vs. No	1.53 (1.22 – 1.91)	< 0.001

Note: GEE = Generalized Estimating Equation; CI = Confidence Interval

* Adjusted for ethnicity, residency in Vancouver's downtown eastside, homelessness, amount of money spent on drugs per day, having experienced physical assault, having committed physical assault, involvement in the commercial sex trade, drug treatment, being stopped or detained by police, injection heroin use, injection cocaine use, and HIV serostatus