



Associations between childhood trauma and non-fatal overdose among people who inject drugs



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ABSTRACT

Introduction: Although people who inject drugs (IDU) remain at a high risk of accidental overdose, interventions that address overdose remain limited. Accordingly there is a continuing need to identify psychological and social factors that shape overdose risk. Despite being reported frequently among IDU, childhood trauma has received little attention as a potential risk factor for overdose. This study aims to evaluate relationships between non-fatal overdose and five forms of childhood maltreatment among a cohort of IDU in Vancouver, Canada.

Methods: Data was obtained from two prospective cohorts of IDU between December 2005 and May 2013. Multivariate generalized estimating equations (GEEs) were used to explore relationships between five forms of childhood trauma and non-fatal overdose, adjusting for potential confounders.

Results: During the study period, 1697 IDU, including 552 (32.5%) women, were followed up. At baseline, 1136 (67.0%) participants reported at least one form of childhood trauma, while 4–9% reported a non-fatal overdose at each semi-annual follow-up. In multivariate analyses, physical [adjusted odds ratio (AOR): 1.36, 95% confidence interval (CI): 1.08–1.71], sexual (AOR: 1.48, CI: 1.17–1.87), and emotional abuse (AOR: 1.54, CI: 1.22–1.93) and physical neglect (AOR: 1.28, CI: 1.01–1.62) were independently associated with non-fatal overdose (all $p < 0.05$).

Conclusions: Childhood trauma was common among participants, and reporting an experience of trauma was positively associated with non-fatal overdose. These findings highlight the need to provide intensive overdose prevention to trauma survivors and to incorporate screening for childhood trauma into health and social programs tailored to IDU.

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1. Introduction

Overdose is a leading cause of premature mortality among people who inject drugs (IDU) (Evans et al., 2012; Gossop, Duncan, Treacy, & Marsden, 2002; Mathers et al., 2013), while non-fatal overdose is a major contributor to morbidity among this population. The health consequences of non-fatal overdose are often severe and can include aspiration pneumonia, peripheral neuropathy, temporary limb paralysis, renal failure, rhabdomyolysis, seizures, and hypoxic brain injury (Darke & Hall, 2003; Warner-Smith, Darke, & Day, 2002). As lifetime prevalence of non-fatal overdose among IDU populations is typically around 45–60% (Kerr et al., 2007; Milloy et al., 2008), identifying its risk factors remains an important area of investigation.

In an effort to inform prevention strategies, research has focused on a variety of behavioral and sociodemographic risk factors specific to IDU (Darke, Williamson, Ross, & Teesson, 2005; Fischer et al., 2004; Hakansson, Schlyter, & Berglund, 2008; Havens et al., 2011; Kerr et al., 2007; Milloy et al., 2008). Recent research has focused on various psychological risk factors for overdose, such as depression, posttraumatic stress disorder, and suicidal behavior (Bohner, Roeder, & Ilgen, 2011; Bradvik, Frank, Hulenvik, Medvedeo, & Berglund, 2007; Havens et al., 2011; Pabayo, Alcantara, Kawachi, Wood, & Kerr, 2013; Tobin & Latkin, 2003). While evidence suggests that experiences of childhood trauma are strong predictors of depression and suicide in IDU (Marshall, Galea, Wood, & Kerr, 2013; Walton et al., 2011), childhood trauma has received little attention as a risk factor for non-fatal overdose, despite being reported at a high rate within IDU and at-risk (i.e. substance abusing) populations (Kerr et al., 2009; Marshall et al., 2013; Medrano, Zule, Hatch, & Desmond, 1999; Stoltz et al., 2007; Walton et al., 2011; Wang et al., 2010). For example, in a cohort of drug using youth in Vancouver, Canada, 26.8%, 40.7%, 49.6%, 45.7%,

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and 35.7% of participants reported experiences of sexual abuse, physical abuse, emotional abuse, physical neglect, and emotional neglect, respectively (Kerr et al., 2009). Other research exploring the relationship between childhood trauma and overdose tends to be restricted to one type of trauma (e.g. sexual or physical abuse). To our knowledge, no previous research has assessed the full spectrum of childhood trauma – which includes emotional abuse, and physical and emotional neglect – using a standardized screening tool. Evidence suggests, however, that these more subtle forms of trauma can be strong predictors of various poor health and mental outcomes in IDU (Marshall et al., 2013; Stoltz et al., 2007) and other populations (Spertus, Yehuda, Wong, Halligan, & Seremetis, 2003).

The present study therefore aims to examine the potential association between five forms of childhood trauma – physical, sexual, and emotional abuse, and physical and emotional neglect – and non-fatal overdose in an open prospective cohort of adult IDU in Vancouver, Canada.

2. Methods

2.1. Study sample

The Vancouver Injection Drug Users Study (VIDUS) and the AIDS Care Cohort to evaluate Exposure to Survival Services (ACCESS) are ongoing open prospective cohorts of adult drug users recruited through self-referral and street outreach in Vancouver. The studies have been described in detail previously (Tyndall et al., 2003; Wood et al., 2008). Briefly, VIDUS enrolls HIV-negative persons who reported injecting an illicit drug at least once in the previous month; ACCESS enrolls HIV-positive persons who reported using an illicit drug other than marijuana in the previous month. For both cohorts, other eligibility criteria included being aged 18 years or older, residing in the greater Vancouver region and providing written informed consent. The study instruments and all other follow-up procedures for each study are essentially identical to allow for combined analyses.

At baseline and semi-annually, participants completed an interviewer-administered questionnaire eliciting sociodemographic data as well as information pertaining to drug use patterns, risk behaviors, and health care utilization. Nurses collected blood samples for HIV and hepatitis C serology and also provided basic medical care and referrals to appropriate health care services. Participants received a \$30 (CDN) honorarium for each study visit. The University of British Columbia/Providence Healthcare Research Ethics Board provided ethical approval for both studies.

2.2. Measures

The present analysis included participants who completed the baseline questionnaire between December 2005 and May 2013 and reported having injected drugs in the previous six months at baseline. The outcome of interest was non-fatal overdose in the previous six months. The goal was to capture overdoses from various substances, and since poly-drug injection is a regular occurrence within the cohort (Kerr et al., 2007), we used a broad definition. Specifically, we asked study participants “In the last six months, have you ever overdosed by accident (i.e. where you had a negative reaction from using too much drugs)?”. This question was successfully pilot-tested during questionnaire development and has been used successfully in previous analyses (Milloy et al., 2008; Pabayo et al., 2013).

The main exposures of interest, the five forms of childhood trauma, were measured at baseline using the Childhood Trauma Questionnaire (CTQ): A 28-item validated instrument used to retrospectively assess childhood sexual, physical, and emotional abuse and physical and emotional neglect (Bernstein & Fink, 1998). The CTQ has been used successfully in several studies of illicit drug-using populations (Bernstein & Fink, 1998; Ducci et al., 2009; Lake et al., In Press; Walton

et al., 2011), and has demonstrated good validity and reliability (Bernstein et al., 2003; Scher, Stein, Asmundson, McCreary, & Forde, 2001). The questionnaire provides a score ranging from 5 to 25 for five subscales that correspond to each type of abuse and neglect. We used recommended and pre-determined cut-off scores to translate subscale scores into one of the four levels of childhood trauma (Bernstein & Fink, 1998): None or minimal (5–8), low to moderate (9–12), moderate to severe (13–15), and severe to extreme (>15). Consistent with previous studies (Lake et al., In Press; Stoltz et al., 2007), we collapsed these four trauma levels into two: None/low, and moderate/severe. We opted not to dichotomize variables into ‘abuse’ vs. ‘no abuse’ as such dichotomization has been shown to produce few significant findings in previous studies involving drug-using populations (Medrano, Hatch, Zule, & Desmond, 2002).

Based on their known or a priori hypothesized relationship with both childhood trauma and non-fatal overdose, additional variables were included in the analysis: Age (per year older), gender (male vs. female), ethnicity (Caucasian vs. other), living in unstable housing (yes vs. no), sex work involvement (yes vs. no), years injecting (per year longer), cocaine injection (\geq daily vs. < daily), heroin injection (\geq daily vs. < daily), crack smoking (\geq daily vs. < daily), benzodiazepine use (yes vs. no), heavy alcohol use (> 14 drinks per week or > 4 drinks on one occasion for men, and > 7 drinks per week or > 3 drinks on one occasion for women (National Institute on Alcohol Abuse and Alcoholism, 2014); yes vs. no), requiring help injecting (yes vs. no), binge drug use (yes vs. no), injecting in public (yes vs. no), injected alone (yes vs. no), incarceration (yes vs. no), enrolling in addiction treatment (yes vs. no), being denied access to addiction treatment (yes vs. no), and HIV serostatus (positive vs. negative). All behavioral variables refer to the participant's behavior in the six months prior to the interview. Unless otherwise specified, variable definitions are consistent with those described in previous studies (Kerr, Marsh, Li, Montaner, & Wood, 2005; Kerr et al., 2007; Stoltz et al., 2007).

2.3. Analysis

First, bivariate associations between all potential explanatory variables and non-fatal overdose measured at baseline were explored using Pearson's Chi-square (for binary measures) and Wilcoxon rank sum test (for continuous measures). As multiple measures for the dependent variable yielded serial measures for each subject, we used a generalized estimating equation (GEE) with logit link function and exchangeable correlation structure to determine whether childhood trauma was independently associated with non-fatal overdose through the entire follow-up period (Lee, Herzog, Meade, Webb, & Brandon, 2007). This approach is often used in longitudinal studies involving a repeated measure binary dependent variable, and has been used successfully in studies of non-fatal overdose in IDU (Kerr et al., 2007; Milloy et al., 2008).

Based on previous studies using the CTQ (Stoltz et al., 2007), and in an effort to avoid issues of collinearity, we built five separate multivariate GEE models in which each of the five trauma types was considered as key independent variable of interest: Physical abuse (model 1), sexual abuse (2), emotional abuse (3), physical neglect (4), and emotional neglect (5). Additional variables considered in each of the full models were those associated with non-fatal overdose at $p < 0.10$ in bivariate GEE analysis, including: Age, \geq daily cocaine injection, \geq daily heroin injection, \geq daily crack smoking, heavy alcohol use, requiring help injecting, binge drug use, injecting in public, injecting alone, incarceration, and being denied access to addiction treatment. For each model, we used a stepwise approach to fit a series of reduced models (Maldonado & Greenland, 1993). We compared the coefficient value associated with the main explanatory variable of interest (i.e., the CTQ subscale) in the full model to the coefficient value in each of the reduced models, and dropped the secondary variable associated with the smallest relative change. We continued this iterative process until the

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