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Prevalence and correlates of prescription opioid residue injection

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ABSTRACT

Background: There is growing evidence of intravenous administration of prescription opioids (POs) in several countries. Preparation of POs for injection may leave residues in containers and filters used by people who inject drugs and may lead to adverse health outcomes if they are injected.
Methods: This exploratory study used cross-sectional data from the COSMO study, a prospective cohort of out-of-treatment cocaine users carried out in Montréal (Canada) between October 2010 and August 2015. For this analysis, only one visit per participant was selected, that is, the first time the participant reported PO injection during the study. The outcome of interest, "injection of PO residues", was defined as having injected PO residues from a filter and/or a container in the last month. Correlates of this outcome were identified using logistic regression analyses.
Results: Of the 122 participants who reported PO injection during the study period, 41.8% had injected PO residues. Reporting an unstable source of income (AOR = 4.26; 95% CI: 1.03-17.69), a recent overdose (AOR = 5.45; 95% CI: 1.50-19.88) and a preponderant use of opiates (mostly opiate use versus other drugs excluding alcohol and cannabis) (AOR = 2.46; 95% CI: 1.08-5.63) increased the risk of PO residue injection. The odds of reporting PO residue injection rose by 7% per unit increase in the score of psychological distress (AOR = 1.07 per unit increase; 95% CI: 1.01-1.12).
Conclusions: The findings of this study suggest that PO residue injection is associated with markers of vulnerability. Further investigation is needed in order to better understand this understudied drug injection practice.

1. Introduction

Amidst the significant increase of prescription opioid (PO) misuse in recent years, there is growing evidence of intravenous PO administration in several countries. Reports of PO injection have risen worldwide, including in the United States (Davis and Johnson, 2008; Young et al., 2010; Surratt et al., 2011; Lankenau et al., 2012; Black et al., 2013; Mateu-Gelabert et al., 2015), Europe (Partanen et al., 2009; Keijzer and Imbert, 2011; Roux et al., 2011), South Asia (Larance et al., 2011) and Australia (Degenhardt et al., 2006). In Canada, over the past decade, PO injection has gained in popularity among drug users across the country (UHRI, 2013; Leclerc et al., 2013; Firestone and Fischer, 2008; Roy et al., 2011, 2013; Bruneau et al., 2012; Fischer et al., 2006; PHAC, 2014). Data from I-Track, a multisite surveillance system that monitors HIV and hepatitis C virus (HCV) infection rates and associated risk behaviors among persons who inject drugs (PWID) in Canada, revealed that hydromorphone, morphine and oxycodone, either in tablet or capsule form, were injected more often than heroin. These prescription drugs were respectively the second, third and fourth most commonly reported injection drugs used in the last six months (PHAC, 2014). Only cocaine surpassed them as it was the most reported injected drug.

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While PO injection has been observed in several parts of the world, its specific injection practices are not well documented. Now, it is generally acknowledged that injection practices may vary depending on the types of substances injected, resulting in more or less serious consequences for the health of users (Gordon and Lowy, 2005). The ethnographic work we carried out in downtown Montréal has allowed us to examine the injection techniques used by PWID to prepare PO tablets or capsules that are designed for oral use (Roy et al., 2011). The study findings showed that, due to the physical composition of the two most available forms of POs in the area (Dilaudid® and Hydromorph Contin®), dissolution was complex and required large amounts of water. This constrained many PO injectors to inject themselves repeatedly during a single injection episode, generally using the same material several times. Also, as opposed to powder cocaine and the white/beige powder heroin available in Montréal, which are easily dissolvable, these PO formulations tended to leave significant amounts of residue in the containers and filters used for injection. The containers and filters were often kept for further use, a practice referred to by users as "doing a wash", as it implies rinsing the used equipment with water to extract the drug residues for injection. Washes were often shared among users who considered them valuable goods they could exchange or offer to other users (Roy et al., 2011).

Injection of drug residues has been previously described among heroin users in the western United States, where black tar was the most prevalent form of heroin (Bourgois, 1998; Koester et al., 2005; Bourgois and Schonberg, 2009). Ethnographers observed that similar to some PO formulations, black tar heroin was not easily dissolvable and left significant amounts of residues in filters used for injection. Overall, ethnographic studies highlighted the vulnerability of PWID who inject residues, showing that this behaviour was mainly practiced by individuals who had unsuccessful income-generating strategies and, consequently had to rely on their own or others' drug residues to relieve opioid withdrawal symptoms (Bourgois, 1998; Bourgois and Schonberg, 2009; Roy et al., 2011).

Drug residue injection entails several serious medical complications including bacterial and fungal infections due to re-use of injection equipment (Gordon and Lowy, 2005; Hope et al., 2008; Kaushik et al., 2011). With respect to PO specifically, residue injection could increase the risk of injecting insoluble particles found in pharmaceutical tablets or capsules destined for oral use. Injection of such particles can cause serious health consequences such as pulmonary emboli and ischaemic necrosis (Ng et al., 2015; Roberts, 2002). Finally, drug residue injection can be problematic due to the risks of HCV transmission when drug residues are shared with other users (Roy et al., 2012). It should be noted that PO residue injection was stated as a possible hypothesis explaining the association between PO injection and HCV transmission in a cohort study of PWID in Montréal (Bruneau et al., 2012). Thus, from a public health perspective, there is a need to document this injection practice and characterize residue injectors in order to better inform harm reduction strategies.

To date, only four studies have looked at the prevalence of drug residue injection, focusing on injecting someone else's drug residue (Koester et al., 2005; Evans et al., 2009; Roy et al., 2012; Le Marchand et al., 2013). To our knowledge, PO residue injection has never been measured or discussed explicitly in epidemiological studies. Yet, in addition to our ethnographic study, PO drug residue injection has been recently qualitatively reported in New York (Mateu-Gelabert et al., 2015), which suggests PO residue injection is not an isolated phenomenon.

The goal of this exploratory study was to estimate the prevalence and correlates of injection of PO residue (either one's own or someone else's) among PO injectors. Secondary analyses were carried out using data from a prospective cohort study on mental health, drug use and HIV/HCV among out-of-treatment (OOT) cocaine users. Informed by ethnographic studies suggesting higher degrees of social and health vulnerabilities among residue injectors, we examined the relationship between PO residue injection and socio-demographic characteristics, psychological states and drug use patterns.

2. Material and methods

2.1. The COSMO study

The COSMO study is a prospective cohort study conducted among OOT cocaine users in Montréal, Canada, between October 2010 and August 2015. The methodology was described in detail elsewhere (Lévesque et al., 2014). Briefly, to be eligible for the COSMO study, participants had to have used cocaine in the last month, either by smoking crack or by injection. They also had to speak French or English, be able to provide informed consent and be at least 14 years old. Study participants were mainly recruited in community-based programs located in downtown Montréal. After providing informed consent and contact information, participants completed interviewer-administered questionnaires at baseline and during five consecutive follow-up visits, scheduled at three-month intervals. Detailed contact information was updated at each interview and thorough follow-up procedures were used. Participants were paid $30 financial compensation for their time, at each interview. This research was approved by the ethical boards of the Faculty of Medicine and Health Sciences at Université de Sherbrooke and of Centre Hospitalier de l'Université de Montréal.

2.2. Study sample

The sample included in this analysis was drawn from the COSMO study. Questions about injection of PO residues among participants reporting PO injection in the month prior to interviews were added to the baseline and follow-up questionnaires on May 1, 2012. COSMO participants who completed questionnaires at that date or thereafter during the study period were eligible for this analysis if they had injected PO in the month prior to interview. For this paper, only one visit per participant was selected, that is, the first time the participant answered yes to the question about PO injection during the study.

2.3. Measurements

The outcome of interest for this study was "injection of PO residues," which was defined as having ever injected PO residues from a filter and/or a container in the last month. This included one's own material and material already used by someone else. Based on the literature, correlates of injection of PO residues examined include age (younger than 25 years old vs. older), sex, ethnicity (born in Canada vs. outside), level of education (less than high school vs. higher level), unstable housing (defined as having lived or slept at least once in a shelter or in any place not intended for housing in the past 3 months), reporting a marginal or criminal source of income in the past 3 months (e.g., panhandling, theft, drug dealing), sex work (defined as having vaginal, oral or anal sexual relations with a client in the past month) and recent drug overdose (past 3 months). The preponderant use of opiates, defined as having POs or heroin as the most commonly used drug in the previous month as opposed to any other drug excluding alcohol and cannabis, was also assessed as a surrogate marker of opiate dependency. Additional information was collected to describe patterns of PO injection in the past month, including number of days of injection in a typical week, number of injections during a day and main PO injected. Finally, psychological distress, assessed using the K10 scale (Kessler et al., 2002), was used as a continuous variable. K10