



## Research paper

## Prevalence and correlates of nonmedical prescription opioid use among a cohort of sex workers in Vancouver, Canada

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## ABSTRACT

**Background:** The nonmedical use of prescription opioids (POs) is a major public health concern, causing extensive morbidity and mortality in North America. Canada has the second highest consumption rate of POs globally and data indicate nonmedical PO use (NPOU) is growing among key populations and increasingly available in street-level drug markets. Despite accumulating evidence documenting the rise of NPOU, few studies have systematically examined NPOU in Canada among key vulnerable populations, such as sex workers. This study prospectively evaluated the prevalence and correlates of NPOU within a Vancouver cohort of sex workers over three-years follow-up.

**Methods:** Data were drawn from an open prospective cohort, AESHA (An Evaluation of Sex Workers Health Access) in Metro Vancouver, Canada (2010–2013). Women were recruited through outreach from outdoor street locations and indoor venues. Bivariate and multivariable logistic regression using Generalized Estimating Equations (GEE) were used to examine social and structural correlates of NPOU over 36 months.

**Results:** Of the 692 sex workers at baseline, close to one-fifth ( $n = 130$ , 18.8%) reported NPOU (injection or non-injection) in the last six months. In multivariable GEE analyses, factors independently correlated with recent NPOU were: exchanging sex while high (AOR 3.26, 95%CI 2.29–4.64), police harassment/arrest (AOR 1.83, 95%CI 1.43–2.35), intimate partner injects drugs (AOR 1.66, 95%CI 1.11–2.49), and recent physical/sexual intimate partner violence (AOR 1.65, 95%CI 1.21–2.24).

**Conclusion:** Our results demonstrate that nearly one-fifth of sex workers in Metro Vancouver report NPOU. Factors independently statistically associated with NPOU included exchanging sex while high, police harassment/arrest, a drug injecting intimate partner and recent physical/sexual intimate partner violence. The high prevalence of NPOU use among sex workers underscores the need for further prevention and management strategies tailored to this key population. The correlates of NPOU uncovered here suggest that structural interventions may be further implemented to ameliorate this growing concern.

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## Introduction

The nonmedical use of prescription opioids (POs) has emerged as a major public health concern, especially in North America where it has reached epidemic proportions, causing extensive morbidity and mortality (Dhalla et al., 2009; Fischer & Argento, 2012; Manchikanti, Boswell, & Hirsch, 2013). POs, pharmaceutical analgesic drugs (such as oxycodone and hydrocodone) designed

for the treatment of moderate to severe chronic pain, are the most commonly misused class of prescription drugs (Fischer & Argento, 2012; Substance Abuse and Mental Health Service Administration, 2010). In the United States, PO-related deaths are now the second leading cause of unintentional death, after motor vehicle accidents and overdoses from POs cause more deaths than heroin and cocaine combined (Centers for Disease Control and Prevention, 2012; Volkow & McLellan, 2011). Emergency room visits involving PO misuse with oxycodone and hydrocodone increased dramatically by 242.2% and 124.5%, respectively, between 2004 and 2009 (Substance Abuse and Mental Health Service Administration, 2010).

Canada has the second highest PO consumption rate in the world (International Narcotics Control Board, 2012). It has been estimated that the harms from PO misuse in Canada now constitute the third

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highest overall substance use burden (after alcohol and tobacco) and that up to 1.25 million Canadians use POs for nonmedical purposes (Fischer & Rehm, 2011). There has been significant variation in the estimated prevalence of PO misuse among the general adult population in Canada; an updated 2010 survey in Ontario estimated the prevalence of nonmedical PO use (NPOU) to be as high as 7.7% (95%CI: 6.3–9.2%), while the 2008/2009 Centre for Addiction and Mental Health (CAMH) Monitor survey found NPOU to be much lower at 2.0% (95%CI: 1.2–2.8%) (Shield, Ialomiteanu, Fischer, & Rehm, 2013). Canada has seen PO-related deaths rise substantially; over a five-year period (1994–1999) oxycodone-related mortality in Ontario rose four fold ( $p < 0.01$ ) (Dhalla, Mamdani, Gomes, & Juurlink, 2011).

A growing body of literature documents trends in increasingly problematic PO use and street-level availability in Canada: data indicate that rates of NPOU are rising in general adult and student populations (Boak, Hamilton, Adlaf, & Mann, 2013; Health Canada, 2013) and NPOU is emergent among key marginalized populations, including street-drug users (Popova, Patra, Mohapatra, Fischer, & Rehm, 2009), First Nations/Aboriginal people (Dell et al., 2012; Katt et al., 2012), and correctional populations (Johnson, MacDonald, Cheverie, Myrick, & Fischer, 2012). Local Vancouver studies of youth and adults who use drugs have seen a marked rise in the availability of POs, particularly oxycodone and hydrocodone, in street-level drug markets between 2006 and 2010, despite the high and stable availability of other illicit drugs (Nosyk et al., 2012), and injection and non-injection PO use has surpassed heroin use among some drug-using populations in Canada (Fischer, Rehm, Patra, Firestone Cruz, Leclerc, Morissette, & Roy, 2010).

Given the overlap between street-based drug use and sex work scenes, female sex workers represent a particularly vulnerable population to drug use and yet data on NPOU among sex workers are rare. A study among drug involved female sex workers (sex workers) in Miami found that 12.2% of the sample used at least one PO in the past 90 days without having a legitimate prescription and that those who were recently physically abused/victimized or currently used cocaine or heroin were more likely to abuse POs (Surratt, Inciardi, & Kurtz, 2006). Sex workers already suffer a high burden of poverty, disease, and violent victimization, which may be exacerbated by adverse health consequences and correlates of NPOU. Women in general represent a large and growing fraction of the NPOU population (Cicero, Lynskey, Todorov, Inciardi, & Surratt, 2008; Green, Grimes Serrano, Licari, Budman, & Butler, 2009; Tetrault et al., 2008). Emergency room visits related to NPOU among women in the US doubled between 2004 and 2010 and the percentage increase in overdose deaths since 1999 was significantly greater among women (151%) than men (85%) (Centers for Disease Control and Prevention, 2013). In Canada, First Nations communities in northwestern Ontario are experiencing alarming increases in the rates of NPOU among pregnant women; the incidence of oxycodone abuse during pregnancy rose from 8.4% in 2009 to 17.2% in 2010 (Kelly et al., 2011). Research indicates that NPOU is highly correlated with mental health comorbidities (Amari, Rehm, Goldner, & Fischer, 2011; Katz, El-Gabalawy, Keyes, Martins, & Sareen, 2013; Martin, Woodall, & McLellan, 2006; Sproule & Li, 2009), which tend to be higher among females than among men (Cicero et al., 2008; Wu, Woody, Yang, & Blazer, 2011).

Despite accumulating evidence of increasing NPOU and related harms, few studies have systematically examined the prevalence and correlates of PO use in subpopulations, particularly among marginalized groups such as sex workers. Therefore, the objective of this study was to provide a prospective analysis of the prevalence and correlates of NPOU among a cohort of female sex workers in Vancouver, Canada over three years of follow-up.

## Methods

### *Study design and sample*

Data for this study were drawn from an ongoing open prospective cohort of female sex workers, AESHA (An Evaluation of Sex Workers Health Access) that initiated recruitment in January 2010. Eligibility criteria at baseline included being female (trans\*-inclusive) older than 14 years of age, having exchanged sex for money within the last 30 days (at baseline and at follow-up), and providing written informed consent. Eligibility for the current prospective analyses included completing at least one baseline and one follow-up visit between January 2010 and February 2013.

In the context of hard-to-reach populations, sex workers were recruited through community mapping and time-location sampling. As executed previously, outdoor and indoor venues were identified through participatory mapping strategies conducted with current/former sex workers (and continuously updated by the outreach team) to identify sex work locations (Shannon et al., 2007). Using systematic time-location sampling, considered a useful method of recruitment for mobile/hidden populations (Stueve, Duran, Doval, & Blome, 2001), sex workers were recruited through day and late night outreach to both outdoor (i.e. streets, alleys) and indoor sex work venues (i.e. massage parlors, micro-brothels, and in-call locations) across Metro Vancouver. In addition, online recruitment was used to reach sex workers working through online solicitation spaces.

At enrolment and bi-annually, participants complete an interviewer-administered questionnaire by a trained interviewer and HIV/STI/HCV serology testing by a project nurse. The main interview questionnaire elicits responses related to socio-demographics (e.g. sexual identity, ethnicity, housing), the sex industry (e.g. work environment, solicitation, social cohesion, access to services, violence/safety, incarceration), clients (e.g. number/type of clients, types of services, condom use), intimate partners (e.g. sexual history, cohabitation, financial support), trauma and violence (e.g. lifetime and childhood trauma, exposure to intimate partner and workplace violence), and drug use patterns (injection and non-injection). In addition, a clinical questionnaire is administered relating to overall physical, mental and emotional health, sexual and reproductive health, and HIV testing and treatment experiences. Sex workers have the option to visit one of two study offices or complete the questionnaire and clinical component at a safe location identified by them, including work or home locations. All participants receive an honorarium of \$40CAD at each bi-annual visit for their time, expertise and travel.

### *Ethics statement*

The AESHA study holds ethical approval through Providence Health Care/University of British Columbia Research Ethics Board and has a community advisory board of over 15 agencies.

### *Study variables*

#### *Nonmedical prescription opioid use outcome*

Our dependent variable of interest was recent NPOU, defined as responding 'yes' to any nonmedical injection or nonmedical non-injection PO use in the last six months (i.e. responded 'yes' to street methadone, dilaudid, morphine, oxycontin, or T3s/T4s). Probing questions were asked to determine whether the POs were prescribed to the participant or not. If the POs were either diverted by the participant (i.e. purchased from an acquaintance or on the street) or prescribed to the participant being interviewed, but not taken as prescribed (i.e. either injected or taken more frequently/in greater quantity than as prescribed) then they were considered

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