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# Risk factors for stimulant use among homeless and unstably housed adult women

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ABSTRACT

*Background:* One of the most common causes of death among homeless and unstably housed women is acute intoxication where cocaine is present. While correlates of stimulant use have been determined in prior research, few studies have assessed risk factors of use specifically in this high-risk population.
*Methods:* We sampled biological women with a history of housing instability from community-based venues to participate in a cohort study. Baseline and 6-month follow-up data were used to determine the relative risk of stimulant use (crack cocaine, powder cocaine or methamphetamine) among individuals who did not use at baseline.
*Results:* Among 260 study participants, the median age was 47 years, 70% were women of color; 47% reported having unmet subsistence needs and 53% reported abstinence from stimulants at baseline. In analyses adjusting for baseline sociodemographics and drug treatment, the risk of using stimulants within 6 months was significantly higher among women who reported recent sexual violence (Adjusted Relative Risk [ARR] = 4.31; 95% CI:1.97–9.45), sleeping in a shelter or public place (ARR = 2.75; 95% CI:1.15–6.57), and using unprescribed opioid analgesics (ARR = 2.54; 95% CI:1.01–6.38).
*Conclusion:* We found that almost half of homeless and unstably housed women used stimulants at baseline and 14% of those who did not use began within 6 months. Addressing homelessness and sexual violence is critical to reduce stimulant use among impoverished women.


## 1. Introduction

While stimulant use has declined in the general population, it remains a major problem in impoverished North American urban areas (Fischer et al., 2006; Substance Abuse and Mental Health Services Administration (SAMHSA), 2014a). Women are especially affected, with higher rates of dependence than men (Lejuez et al., 2007; Sterk et al., 2002), more severe forms of addiction (Fernandez-Montalvo et al., 2014b) and lower rates of treatment (Haller et al., 2003). Research conducted with homeless women living in San Francisco and across British Columbia, Canada (Vancouver, Victoria and Prince George), suggest nearly half of homeless and unstably housed women in these areas use crack cocaine, often with concomitant use of other substances (Riley et al., 2014; Torchalla et al., 2011).

Stimulant use among women has been linked to younger age, Caucasian race, extreme poverty (Stahlman et al., 2013; Torchalla et al., 2011), risky sexual practices (Neblett et al., 2011; Torchalla et al., 2011) and violence (Falck et al., 2001; Riley et al., 2014). It is also associated with psychiatric co-morbidity, such as bi-polar disorder, anxiety and psychiatric distress (Kolodziej et al., 2005; Velasquez et al., 2007). Methamphetamine dependent women entering drug treatment report more psychiatric symptoms than men and non-methamphetamine dependent women (Polcin et al., 2012).

Availability of pharmacotherapies for stimulant use is more limited than agonist maintenance for opiate addiction (Ersche et al., 2010; Mariani and Levin, 2012; Stoops and Rush, 2013); however, therapeutic approaches, including cognitive behavioral therapy (Penberthy et al., 2010), community reinforcement approaches (Higgins et al., 2003), contingency management (Farronato et al., 2013; Lussier et al., 2006; Petitjean et al., 2014; Prendergast et al., 2006), pharmacotherapy (Karila et al., 2011), vaccines (Kosten et al.,

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2014) and gene therapy (Brimijoin and Gao, 2012), show potential for reducing or discontinuing use (Penberthy et al., 2010). Treatment programs that target other drug types (e.g., methadone and buprenorphine for opioid dependence) have been shown to also reduce stimulant use (Curcio et al., 2011; Fareed et al., 2009, 2010). Despite these treatment options, drop out and relapse serve as central barriers to drug cessation. Treatment dropout rates among cocaine users are estimated to be 42% in meta analyses of controlled clinical trials (Dutra et al., 2008). In parallel, the Substance Abuse and Mental Health Services Administration's (SAMHSA) Treatment Episode Data Set (TEDS) indicates that 44% of all persons being discharged from drug treatment in 2011 had successfully completed treatment (Substance Abuse and Mental Health Services Administration (SAMHSA), 2014b). Only one-third of cocaine users maintain abstinence during treatment observation (Dutra et al., 2008), which makes the influence of treatment on future use important but uncertain.

In addition to issues related to mental health and drug treatment, stimulant use has been consistently linked with a variety of serious physical health consequences, including HIV and hepatitis C infections (Fischer et al., 2008; Ivy et al., 2013; Novak et al., 2013; Nyamathi et al., 2002), poor clinical outcomes among HIV and HCV-infected women (Carrico et al., 2011; Operskalski et al., 2008; Riley et al., 2011), arrhythmias and sudden death caused by stimulant-induced arrhythmia occurring in the absence of traditional risk factors like infarction (Hsue et al., 2007; Lange and Hillis, 2001). We recently reported a 3% annual mortality rate among 300 homeless women living in San Francisco over a four-year observation period (Riley et al., 2013). The most common cause of death was acute intoxication where cocaine was present, which emphasizes the continued need to better understand stimulant use in this population.

Here we sought to extend prior research, first by recruiting a community-based sample of homeless and unstably housed women, which restricts the population by gender and socioeconomic status to allow more focus on stimulant use in a population known to be at especially high risk. We considered several factors known to be disproportionately common in impoverished populations that have been linked with negative health outcomes among unstably housed women, including unmet subsistence needs and mental health comorbidity (Riley et al., 2014). In addition, while studies in the general population indicate that social isolation predicts intimate partner violence (Goodman et al., 2009; Hankin et al., 2010), our recent work with unstably housed women conversely shows that the odds of violence increase as social isolation decreases and drug use increases (Riley et al., 2014). Our qualitative research in the same sample confirms that this finding reflects socio-structural situations in which impoverished women use social isolation to extricate themselves from dangerous or drug-using environments (Knight et al., 2014).

Understanding that more than 85% of unstably housed women from this population have a history of substance-related disorders (Riley et al., 2014) and that the social context of poverty makes consistent care and treatment challenging (Riley et al., 2007), we sought a "real world" understanding of stimulant use that included various types of use (e.g., first use, continued casual use, use after multiple years of abstinence, and relapse after recent use or dependence). This broad approach offers the providers most likely to interface with homeless women, such as emergency department physicians and social service providers, population-level information to inform services. Based on our prior work, we hypothesized that unmet subsistence needs and multiple mental health conditions would increase the risk of stimulant use, and that social isolation would decrease the risk of stimulant use. We also hypothesized that drug treatment would confound associations between stimulant use and poverty-related factors.

## 2. Methods

### 2.1. Study population

The goal of this study was to determine risk factors for stimulant use in the very near future, thus the first 6-month follow up visit was chosen as the time point to assess the outcome. Baseline data were collected between June, 2008 and August, 2010 for "Shelter, Health and Drug Outcomes among Women" (SHADOW), a community-based cohort study examining violence and health risks among HIV-infected and uninfected homeless and unstably housed women living in San Francisco, CA. As previously described (Riley et al., 2014), recruitment was accomplished by a mobile outreach team that systematically screened women for study participation at free meal programs, homeless shelters, and a probability sample of low-cost single room occupancy (SRO) hotels. This recruitment methodology recognizes the realities of frequent transitions between literal homelessness and unstable housing (Riley et al., 2005; Surratt and Inciardi, 2004). Potential study participants were tested for HIV antibody during screening procedures. HIV-infected women were oversampled on additional recruitment days to accomplish HIV-specific aims of the cohort study regarding violence and risk behaviors. Inclusion criteria included female sex (biological), age $\geq$18 years and a history of housing instability (slept in public or a homeless shelter, or stayed with a series of acquaintances because there was no other place to sleep ["couch-surfed"]). Reimbursement of $15 was given for each study interview. Study procedures were approved by the Institutional Review Board at the University of California, San Francisco.

### 2.2. Instrument

All questionnaires and study procedures were pilot tested to ensure appropriateness for the target population. Answers to sensitive questions about drug use were obtained via Audio Computer-Assisted Self-Interviews (ACASI) during which participants listened to questions through headphones and entered responses into a computer.

Demographic, social, structural and behavioral topics were addressed. Regarding socioeconomic status, we included employment status, unmet subsistence needs (insufficient access to food, clothing, a restroom, a place to wash or a place to sleep; Gelberg et al., 1997) and homelessness (sleeping in a shelter or public place). Regarding social connections and support, we measured marital status and extreme social isolation (i.e., "very socially isolated," defined by the Hawthorne Friendship Scale; a 6-item multidimensional scale designed to measure a quantitative spectrum between social isolation and social connection; Hawthorne, 2006). Considering substance use in the prior 6 months, we included at-risk alcohol use (>1 drink/day for women (NIAAA, 1995), use of stimulants (crack cocaine, powdered cocaine and methamphetamine), use of heroin and unprescribed opioid analgesics (Oxycontin, Vicodin, morphine or other opioid painkillers). Physical and sexual violence in the past 6 months were assessed by questions based on the Severity of Violence Against Women Scales (Marshall, 1992), which were tested previously in this population (Riley et al., 2014). Violence variables indicated whether the individual was hit, slapped, kicked, bitten, choked, shot, stabbed or struck with an object (physical violence), or forced to have sex of any kind (sexual violence).

Covariates assessed prior experience in residential, inpatient or outpatient drug treatment, and self-help abstinence groups (e.g., Alcoholics Anonymous and Narcotics Anonymous). Prior studies indicate that different types of drug treatment, as well as treatment frequency, total duration and quality influence future drug