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Correlates of non-medical prescription drug use among a cohort of injection drug users in Baltimore City

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ABSTRACT

Despite reports of increasing non-medical prescription drug use, relatively few studies have systematically evaluated the prevalence and correlates of non-medical prescription drug use, particularly in populations that might be especially vulnerable (e.g., injection drug users [IDUs]). We examined factors associated with non-medical prescription drug use among a community-based cohort of current and former IDUs in Baltimore (The ALIVE Study). We conducted a cross-sectional analysis of data from cohort participants that responded to a survey that included questions on non-medical prescription drug use between 2005–06 (n = 1320). Non-medical prescription drug use was considered to be use of any of the following: Opiates (Oxycontin, Percocet), Benzodiazepines or Clonidine, purchased on the street and taken orally within the last six months. Data on other covariates of interest (e.g., demographics, substance use, general health) was obtained through a standardized interview. The median age was 46 years; 66% were male, 85% were African-American. Twenty one percent reported any non-medical prescription drug use; 12% reported using more than one drug. Non-medical use of opiates was most common (17%). In multivariate analysis, non-medical prescription drug use was significantly associated with Caucasian race (prevalence ratio [PR]: 1.79), self-reported bodily pain (PR: 1.58), hazardous alcohol use (PR: 1.47), marijuana use (PR: 1.65), non-injection cocaine/heroin use (PR: 1.70), diverted use of buprenorphine (PR: 1.51) or methadone (PR: 2.51), and active injection drug use (PR: 3.50; $p<0.05$ for all). The association between bodily pain and non-medical prescription drug use was stronger among persons that were not using substances (marijuana, injecting drugs, snorting/smoking heroin, cocaine, using crack) as compared to those using these substances. The high prevalence of non-medical prescription drug use among this population warrants further research and action. Information on the risks of nonmedical prescription drug use especially overdose, should be incorporated into interventions targeted at IDUs.

1. Introduction

Non-medical prescription drug use has been defined as, "…use without a prescription of the individual's own or simply for the experience or feeling the drugs cause" (SAMHSA, 2009). In recent years, non-medical prescription drug use has reached epidemic proportions in the United States. Data suggest that the incidence of non-medical use of prescription opioids alone increased from 628,000 in 1990 to 2.7 million in 2000 an increase of more than 400% (Sigmon, 2006). Data from the Substance Abuse and Mental Health Services Administration (SAMHSA) estimated that in 2009, there were 7.0 million (2.8%) persons aged 12 or older who reported non-medical prescription drug use in the past month (SAMHSA, 2009) representing a slight increase from 2008 (6.2 million or 2.5%) (SAMHSA, 2009). The increases in non-medical prescription drug use may be due in part to rising prescription rates of opioids for non-disease-based pain (Pawl, 2008) as well as increased availability on the street.

Non-medical use of prescription drugs can result in adverse health outcomes including respiratory distress, withdrawal symptoms, feelings of hostility, irregular heartbeat and in some extreme cases, death (NIDA, 2005; SAMHSA, 2007) and can have legal, economic and social costs. In 2002, it was estimated that non-medical prescription drug use cost the US $181 billion including both medical costs as well as law enforcement expenses (Davis & Johnson, 2008).

Non-medical prescription drug use has been characterized in college students (McCabe, 2008; McCabe, Teter, & Boyd, 2004), populations suffering from chronic pain (Kirsh & Smith, 2008), the general population (Blazer & Wu, 2009; Novak, Herman-Stahl, Flannery, & Zimmerman, 2009; SAMHSA, 2009) and vulnerable populations including sex workers(Surratt, Inciardi, & Kurtz, 2006); adolescent arrestees (Alemagno, Stephens, Shaffer-King, & Teasdale, 2009) and drug-dependent populations (Brands, Blake, Sproule, Gourlay, & Busto, 2004; Davis & Johnson, 2008; Fischer et al., 2005; Fischer, Rehm, Patra, &

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Cruz, 2006; Green, Grimes Serrano, Licari, Budman, & Butler, 2009; Inciardi, Surratt, Kurtz, & Cicero, 2007; Obadia, Perrin, Feroni, Vlahov, & Moatti, 2001; Rosenblum et al., 2007; Sigmon, 2006; Vlahov et al., 2007). Among vulnerable populations including injection drug users (IDUs), the adverse health consequences of non-medical prescription drug use may worsen the already high burden of poverty, disease and social disadvantage. Further, among IDUs where polysubstance use may be common, the risk of drug overdose may be exacerbated by concomitant use of prescription drugs. The risk for overdose is further heightened given that some users perceive prescription drugs to be more pure, safe, respectable, legal and less likely to induce withdrawal symptoms than illicit drugs (Inciardi et al., 2007). Some have even suggested that prescription drugs may be preferred by IDUs as there is a lower likelihood of getting arrested for possession (versus illicit opioids); the formulation is standard and provides consistent results; the effect is easier on the body and provides a false sense of well-being (Cicero, Inciardi, & Munoz, 2005; Firestone & Fischer, 2008).

We characterized the prevalence and correlates of non-medical prescription drug use in a cohort of former and current IDUs in Baltimore, Maryland, USA.

2. Methods

2.1. Study population and procedures

The study population derives from the AIDS Linked to the IntraVenous Experience (ALIVE) study, an ongoing, longitudinal study on the natural history of HIV infection among IDUs in Baltimore (Vlahov et al., 1991). The study was approved by the Johns Hopkins University Institutional Review Board and all participants provided written informed consent. The initial recruitment for this study was conducted in 1988–1989; 2946 IDUs from the Baltimore metropolitan area were enrolled, 707 of whom were HIV-positive. Additional recruitment was done in subsequent years to replenish the cohort (1994–95, 433; 1998, 244; 2000, 51 and 2005–07, 537). Individuals have been followed semi-annually; at each visit, a questionnaire on drug use, sexual practices, health status is administered to the participants and blood is collected for serologic testing and repository storage.

From 1998 until July 2005, persons were not specifically queried about non-medical prescription drug use, but they were asked to report any other drug use beyond the drugs specifically included in the questionnaire (e.g., cocaine, heroin, crack, marijuana). These data revealed that many IDUs were using prescription drugs purchased on the street. In response, questions on non-medical prescription drug use were added to the standard questionnaire in July 2005. We included only prescription drugs that were most commonly mentioned in the prior 10 years. We present data from the first available study visit after July 2005. 1397 cohort members who were still in follow up in July 2005 were eligible for inclusion in the analysis ($n = 1397$), 77 of whom were excluded due to missing data on key covariates of interest. We present data for the remaining 1320 subjects.

2.2. Instruments and measures

"Non-medical use of prescription drugs" was measured by asking respondents if they had purchased on the street and taken orally any of the following in the prior six months: opiates (Oxycontin, Percocet), benzodiazepines (Klonipin, Valium, Ativan, Xanax), or Clonidine. We also asked about methamphetamine but as the prevalence of use was low (1.3% individuals ever reported), we excluded methamphetamine. Respondents were considered to have used prescription drugs for non-medical reasons if they answered yes to any of the above drugs or drug categories.

Exposure variables of interest were captured through questionnaires that were both interviewer-administered and through audio computer-assisted self interview (ACASI). Fixed characteristics of interest (e.g., age, gender and race) were captured at baseline. All other information was collected at the follow-up interview where information on non-medical prescription drug use was collected and reflected behaviors and perceptions in the prior six months. Information on health care utilization, including consistency of care from the same physician and emergency room visits, was captured through the interviewer-administered questionnaire. All information that was considered more sensitive was captured via ACASI including information on types and frequency of injection drug use (heroin, cocaine) and non-injection drug use (heroin, cocaine, marijuana, crack), alcohol use via a screening test: Alcohol Use Disorders Identification Test (AUDIT) (Saunders, Aasland, Babor, de la Fuente, & Grant, 1993), cigarettes as well as buprenorphine and methadone purchased on the street. Information on general health status, depressive symptoms, experienced bodily pain and self-perceived risk for HIV based on their drug use and sexual behaviors were also captured via ACASI. Pain was measured by asking respondents, "During the last 4 weeks, how much did pain interfere with your normal work (including work outside the home and housework)?" This question is a validated item drawn from the Short Form Health Survey (SF-12) (Ware, Kosinski, & Keller, 1996). Depressive symptoms were measured using the Center for Epidemiological Studies-Depression Scale (CES-D) (Radloff, 1977). A cut-off of 23 (versus 16 that is typically used) was used to classify respondents as having depressive symptoms since the base rate of depression is expected to be higher in this population (Perdue, Hagan, Thiede, & Valleroy, 2003).

2.3. Statistical analysis

We first evaluated the prevalence of non-medical prescription drug use by correlates of interest. The outcome (non-medical prescription drug use) was analyzed as a count variable according to the number of prescription drugs (clonidine) or drug categories (opiates, benzodiazepines) reportedly used (values from 0 to 3). We used negative binomial regression with robust variance estimation to directly estimate prevalence ratios (PR). This method was used to account for excess zeroes (79% were zeroes) as well as the high prevalence of outcome (Gardner, Mulvey, & Shaw, 1995). Since the data is cross-sectional, coefficients are interpreted as prevalence ratios.

Variables were included in multivariate models if they were associated with the outcome variable at $p<0.05$. In addition, we included several demographic variables of interest (e.g., age, gender, race and income) regardless of statistical significance. In cases where more than one predictor of a theoretical construct was significant, predictors with the strongest point estimate were entered first into the multivariate model. Additionally, to further explore overlap between variables measuring the same theoretical construct, checks for collinearity were done by assessing the correlation between pairs of independent variables. No pairs were highly correlated (none with $r>0.5$). The final model was chosen based on a combination of variables deemed important a priori (e.g., demographics), statistical significance ($p<0.05$) and AIC values. We examined effect modification by substance use (injection frequency); non-injection drug use (snorting cocaine or heroin, crack use or smoking heroin); marijuana use; use of street methadone; use of street buprenorphine and depressive symptoms on the association between bodily pain and non medical use of prescription drugs by fitting regression models with interaction terms. Finally, sensitivity analyses were performed to determine if any of the observed associations differed when analyses were restricted to a particular drug class (e.g., opiates). All analyses were conducted using STATA (version 10, College Station, TX) (STATA, 2007).