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Research paper

High prevalence of non-fatal overdose among people who inject drugs in Malaysia: Correlates of overdose and implications for overdose prevention from a cross-sectional study

Alexander R. Bazazi [a,b,*], Alexei Zelenev [b], Jeannia J. Fu [a,b,c], Ilias Yee [c], Adeeba Kamarulzaman [b,c,d], Frederick L. Altice [a,b,c]

[a] Department of Epidemiology of Microbial Diseases, Yale School of Public Health, New Haven, CT, USA
[b] Department of Internal Medicine, Section of Infectious Diseases, AIDS Program, Yale School of Medicine, 135 College St., Suite 323, New Haven, CT 06510, USA
[c] Centre of Excellence for Research in AIDS (CERiA), Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia
[d] Infectious Diseases Unit, Faculty of Medicine, University of Malaya, Lembah Pantai, 50603 Kuala Lumpur, Malaysia

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ABSTRACT

Background: Overdose is the leading cause of death among opioid users, but no data are available on overdose among people who inject drugs in Malaysia. We present the first estimates of the prevalence and correlates of recent non-fatal overdose among people who inject drugs in Malaysia.
Methods: In 2010, 460 people who inject drugs were recruited using respondent-driven sampling (RDS) in Klang Valley to assess health outcomes associated with injection drug use. Self-reported history of non-fatal overdose in the previous 6 months was the primary outcome. Sociodemographic, behavioral and structural correlates of non-fatal overdose were assessed using multivariable logistic regression.
Results: All 460 participants used opioids and nearly all (99.1%) met criteria for opioid dependence. Most injected daily (91.3%) and were male (96.3%) and ethnically Malay (90.4%). Overall, 20% of participants had overdosed in the prior 6 months, and 43.3% had ever overdosed. The RDS-adjusted estimate of the 6-month period prevalence of overdose was 12.3% (95% confidence interval [CI] 7.9–16.6%). Having injected for more years was associated with lower odds of overdose (adjusted odds ratio [AOR] 0.6 per 5 years of injection, CI: 0.5–0.7). Rushing an injection from fear of the police nearly doubled the odds of overdose (AOR 1.9, CI: 1.9–3.6). Alcohol use was associated with recent non-fatal overdose (AOR 2.1, CI: 1.1–4.2), as was methamphetamine use (AOR 2.3, CI: 1.3–4.6). When adjusting for past-month drug use, intermittent but not daily methadone use was associated with overdose (AOR 2.8, CI: 1.5–5.9).
Conclusion: This study reveals a large, previously undocumented burden of non-fatal overdose among people who inject drugs in Malaysia and highlights the need for interventions that might reduce the risk of overdose, such as continuous opioid substitution therapy, provision of naloxone to prevent fatal overdose, treatment of polysubstance use, and working with police to improve the risk environment.

Background

Worldwide, opioids contribute greatest to drug-related morbidity, mortality and age-adjusted disability (Degenhardt et al., 2013b). Mortality among opioid users is 14-fold greater than among those in the general population. In Asian countries, mortality rates among opioid users are estimated to be at least double those found in other parts of the world (Degenhardt et al., 2011; Quan et al., 2011). Overdose is responsible for approximately one third of all deaths among regular opioid users, making it the leading cause of death in this population (Degenhardt et al., 2011). While the majority of opioid overdoses do not result in death (Darke, Mattick, & Degenhardt, 2003; Neale, 2003), non-fatal overdose may cause significant morbidity (Warner-Smith, Darke, & Day, 2002) and strongly predicts future fatal overdose (Stoové, Dietze, & Jolley, 2009).

Risk for opioid overdose is influenced by factors related to individual biology and behavior as well as social and structural factors. Pharmacologically, other central nervous system depressants, such as alcohol or benzodiazepines, can interact

* Corresponding author at: AIDS Program, Yale School of Medicine, 135 College St., Suite 323, New Haven, CT 06510, USA. Tel.: +1 203 737 2883; fax: +1 203 737 4051.
E-mail address: alexander.bazazi@yale.edu (A.R. Bazazi).

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synergistically with opioids to depress respiration, resulting in overdose (Brugal et al., 2002; Darke & Hall, 2003; Darke, Ross, & Hall, 1996; Dietze, Jolley, Fry, & Bammer, 2005; Kinner et al., 2012). Biological risk, however, is shaped by the social and structural context of substance use (Green et al., 2009). The combinations and quantities of drugs people use and their impact on overdose risk are influenced by physiological tolerance, by drug cost and availability in legal and illegal markets, as well as by individual preferences (Darke, Duflou, & Torok, 2010; Degenhardt, Conroy, Gilmour, & Hall, 2005). Opioid use in periods of decreased individual tolerance increases the risk of overdose. This risk is pronounced when individuals undergo periods of forced abstinence during incarceration and are released without medication-assisted therapy (Binswanger et al., 2007; Bird & Hutchinson, 2003). Receiving evidence-based treatment for opioid dependence greatly reduces overdose risk (Davoli et al., 2007; Schwartz et al., 2013), but treatment engagement and retention can be limited by the availability, accessibility and cost of services. Additionally, law enforcement practices can influence individual injection behaviors, potentially facilitating drug use in situations that decrease the risk of police detection but increase the risk of overdose (Bohnert et al., 2011; Dovey, Fitzgerald, & Choi, 2001; Kinner et al., 2012; Milloy et al., 2008). Overdose risk is thus produced at the intersection of biological, behavioral, social and structural vulnerabilities.

Research on opioid overdose among people who inject drugs (PWID) in Southeast Asia has been limited (Bergenstrom et al., 2008; Milloy et al., 2010; Quan et al., 2011). Convenience samples of PWID from Vietnam (2003) and Thailand (2008) found a 36% one-year period prevalence and 30% lifetime prevalence of non-fatal overdose, respectively (Bergenstrom et al., 2008; Milloy et al., 2010). A longitudinal study in Thailand (2005–2007) found that 27% of all deaths in the cohort were due to overdose (Quan et al., 2011). Opioid overdose has not previously been examined in Malaysia, despite Malaysia being home to an estimated 200,000 PWID (Mathers et al., 2008), the majority of which use opioids (Bachireddy et al., 2011; Vicknasingam, Narayanan, & Navaratnam, 2009). In 2005, Malaysia introduced harm reduction to reduce HIV transmission among PWID with needle and syringe exchange programs (NSEPs) and methadone maintenance therapy (Kamarulzaman, 2009); however, overdose prevention education and naloxone distribution programs are not available, and no national system for recording overdose fatalities exists. Given the absence of data on overdose fatalities and the strong association between non-fatal overdose and future fatal overdose (Stoové et al., 2009), we present the first estimates of the prevalence and correlates of recent non-fatal overdose among PWID in Malaysia.

Methods

Study design and recruitment

From July to October in 2010, 460 individuals were recruited for a cross-sectional study of drug use behaviors, health outcomes associated with drug use, and risk factors for these outcomes. Eligibility criteria included: (1) being ≥18 years; (2) living in Klang Valley (greater Kuala Lumpur area); (3) drug injection in the previous 30 days, as evidenced by physical examination of injection sites and knowledge of drug preparation methods; and (4) willingness to undergo rapid HIV testing and counseling and urine toxicology testing. Participants were recruited using respondent-driven sampling (RDS), a form of chain-referral sampling designed to efficiently recruit hidden populations (Heckathorn, 1997), and were interviewed at three different research sites located at opioid maintenance therapy clinics. Two initial participants (“seeds”) were recruited by outreach workers from each of three interview sites. Participants were encouraged to recruit up to three PWID from their social network and received RM50 ($16 US) for their participation and RM25 ($8 US) for each eligible peer recruited. Trained interviewers administered the questionnaires in Bahasa Malaysia and conducted rapid HIV testing, counseling and referral. No personal identifiers were collected. This study was approved by Institutional Review Boards at the University of Malaya Medical Centre and Yale University School of Medicine.

Study definitions

The primary outcome was self-reported recent (previous 6 months) non-fatal overdose. The Bahasa Malaysia term “*dos berlebihan*” and the English term “*overdose*” (used by some urban PWID) were used to describe the primary outcome; interviewers were trained to probe responses to distinguish from a “heavy nod.” Whether participants received medical attention for a recent overdose and whether they had ever experienced an overdose in their lifetime were also measured.

In the primary analysis (Table 1), alcohol, methadone, buprenorphine, benzodiazepine, methamphetamine and heroin use in the previous 6 months (yes/no) were selected as key explanatory variables to match the 6-month timeline over which the outcome was assessed. In a secondary analysis (Supplementary Table S1), we examine associations between overdose and drug use frequency, which was only assessed for the previous 30 days. For this secondary analysis, participants’ frequency of use for each drug in the prior 30 days was coded as no use (0 days), intermittent use (1–27 days), or daily use (≥28 days). Substance use through injection or other routes of administration were combined in the analysis. Our results were not sensitive to this decision: for substances that some participants reported administering via injection, we ran separate models replacing substance use variables with injection variables, and the direction and significance of associations in logistic regression were nearly identical (data not shown).

Supplementary Table S1 related to this article can be found, in the online version, at http://dx.doi.org/10.1016/j.drugpo.2014.11.010.

After consultation with local colleagues and former and active drug users, “*morfin*” use was combined with heroin use, since “*morfin*” is a term used locally to refer to higher purity heroin. Buprenorphine and buprenorphine/naloxone use were also combined in the analysis, given the similar pharmacological risk of overdose associated with each and the larger standard errors that resulted from separating them. Alternative models that separated buprenorphine from buprenorphine/naloxone and heroin from “*morfin*” showed that combining these variables does not substantially alter the results of the analysis and reduces the standard errors of the coefficients (data not shown).

Opioid dependence was defined using the Mini International Neuropsychiatric Interview (Sheehan et al., 1998). Addiction severity was assessed using the 10-item Drug Abuse Screening Test (DAST-10) (Bohn, Babor, & Kranzler, 1991; Yudko, Lozhkina, & Fouts, 2007).

Statistical analysis

Logistic regression was used to assess correlates of reporting a non-fatal overdose in the previous 6 months. Explanatory variables were selected for inclusion in a preliminary model if they had a biologically plausible or documented association with overdose, if they were associated ($p < 0.10$) in bivariate logistic regression, or if they were identified as variables of interest regardless of bivariate association (e.g. all substance use variables and NSEP use). The