International Journal of Drug Policy 41 (2017) 80–88

Contents lists available at ScienceDirect

International Journal of Drug Policy

journal homepage: www.elsevier.com/locate/drugpo

Research paper

Social mixing and correlates of injection frequency among opioid use partnerships

Christopher Rowe[a,*], Glenn-Milo Santos[a,b], Henry F. Raymond[a,b], Phillip O. Coffin[a,b]

[a] San Francisco Department of Public Health, 25 Van Ness Avenue, Suite 500, San Francisco, CA 94102, USA
[b] University of California, San Francisco, 500 Parnassus Avenue, San Francisco, CA 94143, USA

ARTICLE INFO

Article history:
Received 15 April 2016
Received in revised form 17 November 2016
Accepted 18 November 2016

Keywords:
Opioid use
Social network
Injection drug use
Overdose

ABSTRACT

Background: As resources are deployed to address the opioid overdose epidemic in the USA, it is essential that we understand the correlates of more frequent opioid injections—which has been associated not only with HIV and HCV transmission, but also with overdose risk—to inform the development and targeting of effective intervention strategies like overdose prevention and naloxone distribution programs. However, no studies have explored how characteristics of opioid use partnerships may be associated within injection frequency with opioid partnerships.

Methods: Using baseline data from a trial of a behavioural intervention to reduce overdose among opioid users in San Francisco, CA, we calculated assortativity among opioid use partnerships by race, gender, participant-reported HIV- and HCV-status, and opioids used using Newman's assortativity coefficient (NC). Multivariable generalized estimating equations linear regression was used to examine associations between individual- and partnership-level characteristics and injection frequency within opioid use partnerships.

Results: Opioid use partnerships (n = 134) reported by study participants (n = 55) were assortative by race (NC = 0.42, 95%CI = 0.33–0.50) and participant-reported HCV-status (NC = 0.42, 95%CI = 0.31–0.52). In multivariable analyses, there were more monthly injections among sexual/romantic partnerships (β = 114.4, 95%CI = 60.2–168.7, $p < 0.001$), racially concordant partnerships reported by white study participants (β = 71.4, 95%CI = 0.3–142.5, $p = 0.049$), racially discordant partnerships reported by African American study participants (β = 105.7, 95%CI = 1.0–210.5, $p = 0.048$), and partnerships in which either member had witnessed the other experience an overdose (β = 81.8, 95%CI = 38.9–124.6, $p < 0.001$).

Conclusion: Social segregation by race and HCV-status should potentially be considered in efforts to reach networks of opioid users. Due to higher injection frequency and greater likelihood of witnessing their partners experience an overdose, individuals in sexual/romantic opioid use partnerships, white individuals in racially homogenous partnerships, and African American individuals in heterogeneous partnerships may warrant focused attention as part of peer- and network-based overdose prevention efforts, as well as broader HIV/HCV prevention strategies. Developing and targeting overdose prevention education programs that provide information on risk factors and ways to identify overdose, as well as effective responses, including naloxone use and rescue breathing, for more frequently injecting networks may help reduce opioid morbidity and mortality in these most at risk groups.

Introduction

Drug related deaths increased 92.7% globally between 1990 and 2013 and drug overdose is now the leading cause of injury-related death among adults in the United States (Drug Enforcement Administration, 2015; GBD Mortality and Causes of Death Collaborators, 2015). In 2014, there were more drug overdose deaths in the U.S. than in any other year on record and 61%, or nearly 30,000 were opioid-related overdose deaths (Rudd, Aleshire, Zibbell, & Gladden, 2016). As a result, the opioid overdose epidemic has garnered unprecedented attention and resources, including a proposed $1.1 billion in new funding in the President's Budget for Fiscal Year 2017 (The White House Office of the Press Secretary, 2016), a bipartisan and joint effort to tackle the issue by the National Governors Association and the American Medical Association (Baker, Hassen, & Harris, 2016), a comprehensive

* Corresponding author.
E-mail addresses: chris.rowe@sfdph.org, http://mailto:kalayaan82@gmail.com (C. Rowe).

http://dx.doi.org/10.1016/j.drugpo.2016.11.016
0955-3959/

internal review of the Food and Drug Administration's opioid policies (Furlow, 2016), and new Centers for Disease Control and Prevention opioid prescribing guidelines that aim to reduce the risks associated with long-term opioid therapy (Dowell, Haegerich, & Chou, 2016). As resources are deployed to address opioid use and mortality, it is essential that we work to better understand the communities and networks most at risk so as to inform effective intervention strategies.

Opioid-related overdoses commonly occur in the presence of witnesses, including persons who use drugs and who are also using at the time of the overdose (Baca & Grant, 2007; Bohnert, Tracy, & Galea, 2012; Davidson et al., 2003; Kaye & Darke, 2004; Pollini et al., 2006; Tracy et al., 2005). This tendency forms the basis of network-based interventions that aim to reduce overdose related morbidity and mortality by equipping potential witnesses, including persons who use drugs, with the knowledge and tools to intervene. A key example is the distribution of naloxone to lay persons, which facilitated over 8000 overdose reversals in 2013 (Wheeler, Jones, Gilbert, Davidson, & Centers for Disease Control and Prevention). Persons who use drugs performed more than 80% of these reversals, a clear demonstration that interventions can effectively leverage social networks of drug users to prevent overdose morbidity and mortality (Wheeler et al., 2015).

The characteristics of social networks and injection partnerships have been examined extensively in relation to HIV and HCV risk, suggesting that the structure of one's social network and the characteristics and behaviours of one's injection partners is associated with the sharing of injection equipment (Barnard, 1993; Costenbader, Astone, & Latkin, 2006; Friedman et al., 1997, 2003; Hunter, Donoghoe, Stimson, Rhodes, & Chalmers, 1995; Latkin, Mandell, Vlahov, Oziemkowska, & Celentano, 1996; Mandell, Vlahov, Latkin, Oziemkowska, & Cohn, 1994; Miller & Neaigus, 2001; Neaigus et al., 1995, 1996; Rothenberg et al., 1998). For example, data from various nationally representative US surveys indicate that assortative networks may help explain persistently higher prevalence rates of HIV and sexually transmitted infections in young African American adults (Morris, Kurth, Hamilton, Moody, & Wakefield, 2009). Other studies have also observed greater homophily within networks of populations at risk for HIV, such as racial and ethnic minority men who have sex with men, and these studies have posited that these racially assortative network characteristics may exacerbate disparities HIV infection rates. (G. Phillips, 2nd, Birkett, Hammond, & Mustanski, 2016; Raymond & McFarland, 2009) While findings on social networks' characteristics have informed the development of peer- and network-based interventions that aim to reduce injection-related risk of HIV and HCV transmission (Friedman et al., 1992; Latkin, Sherman, & Knowlton, 2003; Madray & van Hulst, 2000; Simons et al., 1996; Weeks et al., 2009), there is a dearth of research investigating the social context of overdose risk. For example, it remains unclear whether racial assortativity in drug using networks explain the disproportionate burden of overdose mortality observed among racial minorities observed in the literature (Hart, 2013; U.S. Census Bureau, 2014; Visconti, Santos, Lemos, Burke, & Coffin, 2015).

Furthermore, no quantitative studies have explored how characteristics of opioid use partnerships may be associated with drug use behaviours that are related to overdose risk, though qualitative studies have previously explored how partnership dynamics may play a role in drug using behaviours. For example, a qualitative study among women has previously observed that closer relationships with partners, particularly intimate romantic relationships, were associated with needle sharing (MacRae & Aalto, 2000). Furthermore, qualitative studies among drug users in primary relationships found that these relationships can involve pooling of resources and sharing of drugs, leading to an increase in drug use for both partners (Rhodes & Quirk, 1998; Simmons & Singer, 2006). In addition, drug users in partnerships had reported avoiding reductions in their drug use out of the belief that because doing so would negatively impact their relationship with their drug-using partners (Rhodes & Quirk, 1998).

Additionally, frequent injecting has been associated with both higher risk of overdose and lower perceived risk among opioid users (Brugal et al., 2002; Rowe, Santos, Behar, & Coffin, 2016). Additionally, social network studies within opioid networks have found that those with larger network may be at higher risk for overdose (Havens et al., 2011; Latkin, Hua, & Tobin, 2004). Taken together, these data suggest that opioid use partners who inject together frequently may especially benefit from overdose prevention interventions. Moreover, greater injection frequency has been linked to both HIV and HCV risk as well as other medical sequelae, such as skin abscesses and endocarditis (Des Jarlais & Friedman, 1987; Phillips & Stein, 2010; Spijkerman, van Ameijden, Mientjes, Coutinho, & van den Hoek, 1996; Stein & Anderson, 2003; Thorpe, Ouellet, Levy, Williams, & Monterroso, 2000; Thorpe et al., 2002; Wilson, Thomas, Astemborski, Freedman, & Vlahov, 2002). Increasing our understanding of opioid use partnerships and identifying those that may be at heightened risk of overdose and other injection-related complications can inform both the improvement of existing network-based interventions and the development of novel strategies that leverage social networks of drug users. The present study aims to contribute to this understanding by describing the characteristics of opioid use partnerships and examining correlates of opioid injection frequency among pairs of opioid users in San Francisco, CA.

Materials and methods

The present study examines baseline data from a pilot randomized trial of a repeated-dose brief intervention to reduce overdose and risk behaviours among individuals who have previously received naloxone kits (REBOOT Study; ClinicalTrials.gov Identifier: NCT02093559). Enrolled participants were randomized to receive either a multi-session behavioural intervention incorporating motivational interviewing and risk reduction counselling techniques to reduce overdose risk or treatment as usual (i.e. information and referrals). Participants were recruited through print advertisements and active outreach at syringe access programmes in San Francisco, CA. Inclusion criteria included: age 18–65 years, opioid dependence (assessed by the Structured Clinical Interview for DSM-IV-TR Axis I Disorders), urine positivity for opioids during screening, history of prior opioid overdose, and previous receipt of take-home naloxone. All participants provided informed consent and study procedures were approved by the Committee on Human Research, University of California San Francisco.

Trained staff administered computer-assisted personal interviews (CAPI) to participants during their enrollment visit. Participants were asked about themselves as well as up to three individuals with whom they used opioids most recently within the past 30 days. That is, if participants used opioids with one to three partners we collected data on all of those partners or if participants used opioids with more than three partners we collected data on the three partners with whom they used opioids most recently within the past 30 days. Some participants had not used opioids with any partners and so these individuals were excluded from this analysis (n = 8 or 13% of participants in the REBOOT study). A greater proportion of female participants in REBOOT did not use opioids with any partners and were excluded in this analysis, compared to male participants (24% vs. 5%, P = 0.04). Additionally, those without any partners were, on average, significantly older (P = 0.04) compared to those who had partners (mean age were