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Understanding opioid overdose characteristics involving prescription and illicit opioids: A mixed methods analysis

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ABSTRACT

Background: Opioid abuse and misuse are significant public health issues. The CDC estimated 72% of pharmaceutical-related overdose deaths in the US in 2012 involved opioids. While studies of opioid overdoses have identified sociodemographic characteristics, agents used, administration routes, and medication sources associated with overdoses, we know less about the context and life circumstances of the people who experience these events.
Methods: We analyzed interviews ($n = 87$) with survivors of opioid overdoses or family members of decedents. Individuals experiencing overdoses were members of a large integrated health system. Using ICD codes for opioid overdoses and poisonings, we identified participants from five purposefully derived pools of health-plan members who had: 1) prescriptions for OxyContin® or single-ingredient sustained-release oxycodone, 2) oxycodone single-ingredient immediate release, 3) other long-acting opioids, 4) other short-acting opioids, or 5) no active opioid prescriptions.
Results: Individuals who experienced opioid overdoses abused and misused multiple medications/drugs; experienced dose-related miscommunications or medication-taking errors; had mental health and/or substance use conditions; reported chronic pain; or had unstable resources or family/social support. Many had combinations of these risks. Most events involved polysubstance use, often including benzodiazepines. Accidental overdoses were commonly the result of abuse or misuse, some in response to inadequately treated chronic pain or, less commonly, medication-related mistakes. Suicide attempts were frequently triggered by consecutive negative life events.
Conclusions: To identify people at greater risk of opioid overdose, efforts should focus on screening for prescribed and illicit polysubstance use, impaired cognition, and changes in life circumstances, psychosocial risks/supports, and pain control.

1. Introduction

Though use of prescription opioids may be leveling off in recent years (Dart et al., 2015; Frenk et al., 2015), heroin use (Compton et al., 2016) and opioid-related overdoses have been increasing (Centers for Disease Control and Prevention (CDC), 2009, 2011; Chen et al., 2014; Johnson et al., 2013; Warner et al., 2009, 2011), as have emergency department (ED) visits (CDC, 2010b; Substance Abuse and Mental Health Services Administration (SAMHSA), 2013a), and health system costs associated with opioid overdose-related ED and inpatient visits (Yokell et al., 2014). Moreover, demographic shifts in opioid use, overdose rates, and ED visits are also occurring, redefining at-risk populations. For example, the typical individual entering substance use treatment for heroin use is a young, white, middle-class male or female from a rural or suburban community (Cicero et al., 2014). Rates of opioid-related ED visits and deaths have increased among younger (Dasgupta et al., 2014; Hasegawa et al., 2014; Jones and McAninch, 2015),

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non-Hispanic White, non-Hispanic Black, and Hispanic (Jones and McAninch, 2015), men and women (Hasegawa et al., 2014; Jones and McAninch, 2015).

Despite the public health significance of this problem (Centers for Disease Control and Prevention, 2010a; SAMHSA, 2013b), existing epidemiologic and observational studies of opioid-related overdoses are limited in that they frequently classify drugs and events in categories that make it difficult to disentangle characteristics that have very different clinical and prevention implications. For example, individuals with prescribed and illicit opioid-related overdoses are often combined in the same category, while accidental overdoses are combined with those associated with suicidal intent (Johnson et al., 2013). Moreover, these reports typically leave unaddressed the specific circumstances surrounding overdose events themselves, or the lives of the people who experience those overdoses. Increasing the depth of our understanding about opioid overdose events may help clinicians and public health professionals to identify risk and intervene to prevent overdoses and overdose deaths.

As part of a larger study of rates of opioid-related overdoses following the introduction of OxyContin® with abuse-deterrent properties, we examined opioid overdoses among members in a large integrated health system. Using electronic medical records (EMR), we identified overdoses among members with and without active opioid prescriptions, completed chart audits, and conducted in-depth interviews with individuals, or family members of individuals, who experienced overdoses. Analyses reported here are based on all three data sources.

2. Material and methods

2.1. Setting

This study was conducted in Kaiser Permanente Northwest (KPNW), a private, not-for-profit group-model integrated health plan which served about 500,000 members in the Pacific Northwest at study start. KPNW maintains an EMR system that captures most aspects of members' health care (i.e., inpatient and outpatient medical, mental health, and addiction medicine encounters, imaging, labs, prescriptions, and external insurance claims). The KPNW Institutional Review Board reviewed and approved all study procedures. All interview participants provided written informed consent prior to enrollment.

2.2. Case identification process

To select interview candidates, we used diagnostic codes indicating opioid overdoses and poisonings (e.g., 965.xx, E850.xx, X42) combined with pharmacy dispense records. We identified family members of decedents, when possible, by looking for other members in the same health plan subscriber unit.

We reviewed pharmacy records to determine if a member/decedent had an active opioid prescription at the time of the overdose, and then randomly sampled participants from five purposefully derived groups of individuals, stratified on gender. The primary goal of the larger study was to assess the effects of the abuse-deterrent formulation of OxyContin® on overdoses, so patients with OxyContin® prescriptions were of particular interest as a group. We grouped the remaining patients by drug class or no active prescription. When individuals had more than one active opioid we categorized opioids according to a hierarchical structure so that only one active opioid medication category was associated with each overdose event. The 5 groups (in descending hierarchical order) included individuals with: 1) prescriptions for OxyContin® or single-ingredient sustained-release oxycodone, 2) oxycodone single-ingredient immediate release, 3) other long-acting opioids, 4) other short-acting opioids, or 5) no active opioid prescriptions. Individuals in groups 1 and 5 were oversampled to ensure adequate representation; individuals in groups 2–4 were sampled proportionally, based on the number of total overdose events identified in each category.

2.3. Chart audit process

As part of the larger study, we conducted chart audits to assess the validity of using EMR diagnoses to accurately identify and categorize opioid-related overdoses. Chart components reviewed included history, clinical and telephone encounters, discharge summaries, medication activity reports, and other related documentation. When data were unavailable in the EMR we reviewed associated external billing/claims data. Using a chart audit form, we documented the causal opioid(s), concomitant medication(s), contributing alcohol or illicit drug use, prescribed dose and frequency, source and route of administration for each substance, indication of abuse or misuse for each substance and, if available, any indication of suicidal intent. The first 10% and an additional randomly selected 10% of all charts were examined for quality assurance to maintain high inter-rater reliability (>95%). All chart review forms were double data-entered and verified to ensure accurate data entry. We selected interview participants from the pool of individuals whose charts were audited.

2.4. Recruitment process

We mailed recruitment letters and followed up by telephone, inviting participation in a one-time interview with a $50 gift card as compensation. We addressed letters "To the family of [member name]" for deceased health plan members who had no other members associated with their subscriber unit. These letters were mailed to the deceased member's last address.

We mailed recruitment letters to 366 patients or family members, beginning in May, 2012. We were unable to reach nearly half (47%) of those to whom we sent letters: 45 letters were sent to the last known address of the deceased with no response, 66 had no available phone number or message service, and 60 were left messages with no contact or response. Two potential participants were deemed ineligible, one was 13 years old, another was not an overdose event. When recruitment ended 32 cases had not yet been contacted. Among the 203 we attempted to recruit and were able to reach, 35% refused. The most common reasons for refusal were: no reason given (n = 29), lack of interest in study participation (n = 18), logistical/scheduling difficulties (n = 11), denial of overdose event (n = 8) or lack of ability/interest in retelling it (n = 4), criminal investigation (n = 1). We completed 90 interviews (44% participation rate among those reached), 3 (described below) were later excluded.

2.5. Interview process

We interviewed participants about identified overdoses during a single one-hour session. The interview guides (see Supplemental material) included open-ended questions regarding substance use/abuse history, source of substance(s), routes of administration, medical treatment following events, whether or not any substance-abuse treatment was received, and changes made to opioid treatment plans. Interviews were audio recorded and transcribed verbatim.

2.6. Data analysis process

Chart abstraction data were linked to coded interview data, adding to and filling in missing data. For example, if charts did