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Pharmaceutical opioid overdose deaths and the presence of witnesses

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ABSTRACT

Background: In the past two decades, rates of pharmaceutical opioid use and harms resulting from their use (including death) have risen. The present study identified a series of fatal opioid overdoses where there was evidence that witnesses had noted symptoms consistent with overdose, and examined associated contextual factors.

Methods: A retrospective review was undertaken utilising the Coroners Court of Victoria's Overdose Deaths Register for pharmaceutical opioid overdose deaths between 2011 and 2013. Information on the source of pharmaceutical opioids, co-contributing drugs, history of drug dependence, and mental illness was extracted and coded.

Results: Pharmaceutical opioids were involved in 587 deaths, and within these, 125 cases (21%) were witnessed. The majority of these witnessed deaths (77.6%) occurred at the deceased's residence, with the witness being a partner or unrelated acquaintance who did not realise the significance of what they were witnessing. The most common contributing pharmaceutical opioids were methadone (49.6%), codeine (32.0%), and oxycodone (19.2%), with the source more often prescribed than diverted. Co-contributing drugs were involved in 110 cases, with the most common being benzodiazepines. Evidence of current dependence and mental illness was found in 53.6% of cases.

Conclusion: Most pharmaceutical opioid overdose deaths with a witness present occurred in the deceased's home, with symptoms of overdose being noted, but not acted upon. These findings support the trialling of education and/or naloxone to partners and family members of people who use pharmaceutical opioids in order to reduce overdose deaths.

Introduction

Recent trends in many countries, including the United States and Australia, demonstrate increasing abuse of prescription drugs (Dart et al., 2015; Dertadian, Iversen, Dixon, Sotiropoulos, & Maher, 2017; Hollingworth, Gray, Hall, & Najman, 2015), with pain killers and opioids the most commonly abused (AIHW, 2017). For example, in the past two decades, opioid dispensing in Australia has increased 15-fold (Blanch, Pearson, & Haber, 2014), and has been accompanied by increased rates of opioid-related harms. This includes hospitalisations for opioid-related poisoning, which in Australia now outnumber those attributed to heroin (Blanch et al., 2014), as well as deaths, with recent Victorian data identifying an increased rate of opioid-related deaths from 21 per 1,000,000 person years in 2007 to 28.5 in 2011 (Berecki-Gisolf et al., 2017). Similarly, in the United States, there have been substantial increased in opioid-related deaths, which have increased 2.8-fold from 2002 to 2015 (National Institute of Drug Abuse, 2017), with a 15.6% increase from 2014 to 2015 alone, and has been described by the CDC as a continuing epidemic (CDC, 2016). As such, the non-medical use of pharmaceutical opioids has become a major public health issue (Marshall, Green, Yedinak, & Hadland, 2016), and has led to public health policy changes in many countries to curb inappropriate use. Recent initiatives include targeted education of health professionals and the general public regarding appropriate use of pharmaceutical opioids, and the implementation of prescription monitoring programs (Compton, Jones, & Baldwin, 2016).

Another public health approach that is gaining traction in terms of reducing opioid-related harms is through the administration of

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naloxone by non-medical bystanders (see Giglio, Guohua, & DiMaggio, 2015 and Clark, Wilder, & Winstanley, 2014 for reviews), informed by research investigating heroin overdoses (Fairbairn, Coffin, & Walley, 2017). One reason for the effectiveness of naloxone in these situations is that the majority of heroin overdoses are witnessed by family and/or drug-using peers (Bohnert, Tracy, & Galea, 2012; Darke, Ross, & Hall, 1996; Lagu, Anderson, & Stein, 2006; Seal et al., 2003). While the majority of studies conducted to date have considered reducing heroin-related deaths using naloxone (Maxwell, Bigg, Stanczykiewicz, & Carlberg-Racich, 2006; McDonald & Strang, 2016), some recent work has described the impact of the provision of naloxone to other groups. For example, one study reported a decrease in the number of opioid-related emergency department visits in a group of chronic pain patients prescribed naloxone (Coffin et al., 2016), while another reported that methadone clients recruited from substance abuse and HIV prevention clinics were able to successfully administer naloxone in opioid overdose cases, 90% of which also involved heroin use (Walley et al., 2013).

Despite pharmacological similarities in the action of pharmaceutical opioids and heroin, comparatively less is known about the context of pharmaceutical opioid misuse and overdose. Specifically, less data are available on the role of witnesses in pharmaceutical opioid overdoses, and whether this group represents a potential population for helping to reduce opioid harms and/or death. Some studies suggest that the pharmaceutical opioid and heroin using populations are mutually exclusive. For example, pharmaceutical opioid users report lower rates of injecting drug use, less income obtained via illegal sources, and fewer social or relationship problems (Sigmon, 2006). In addition, pharmaceutical opioid users are also more likely to conceal their drug use, leaving family and/or peers ill-prepared to respond in the event of an overdose (Compton & Volkow, 2006; Kim, Irwin, & Khoshnood, 2009). To date, there has been limited investigation on the presence or absence of witnesses in cases of pharmaceutical opioid deaths, and relevant contextual factors which may hinder efforts to intervene. Such factors include the: *(a)* contribution of other drugs to the overdose; *(b)* the context of overdose risk including location and time when overdose symptoms were noted (Latkin, Hua, & Tobin, 2004); and *(c)* presence of mental health diagnoses in the deceased. The latter factor is important given that mental health issues have been consistently related to poorer outcomes including substance dependence among opioid users (Boscarino et al., 2010; Teesson et al., 2015). To address limitations in our current understanding of sociodemographic, contextual, and drug use factors associated with opioid pharmaceutical deaths, the present study identified and examined a series of fatal overdoses involving pharmaceutical opioids that occurred in Victoria, Australia between 2011 and 2013. Cases for this analysis were selected where a witness was present at or after the fatal drug taking, as well as when there was evidence that the witness noted signs consistent with overdose while the deceased was still alive. The present data utilised coronial data which is advantageous given the associated in-depth investigative nature of analysis yielded throughout individual investigations. The present objectives of the paper were to provide a thorough examination of: *(a)* the location and time that overdose symptoms were noted; *(b)* the relationship between the witness and the deceased; *(c)* what actions were taken by the witness prior to death; *(d)* the opioids and other drugs contributing to death; and *(e)* the co-occurrence of mental illness and/or drug dependence in the deceased.

Method

Data source

The data source for this study was the Coroners Court of Victoria's Overdose Deaths Register (ODR), which has been designed and implemented to be consistent with the Substance Abuse and Mental Health Services Administration Consensus Panel recommendations for determining and documenting drug poisoning deaths (Goldberger, Maxwell, Campbell, & Wilford, 2013).

The state of Victoria is located in south-eastern Australia. In June 2017 the estimated population of Victoria was 6.14 million people. In Victoria, all deaths from suspected non-natural causes, including suspected drug overdose, are reported to the Coroners Court of Victoria for investigation. If the expert death investigators (the coroner, forensic pathologist, and forensic toxicologist) determined that the acute toxic effects of a drug or drugs played a causal role in a death, it is added to the ODR as an overdose death. The core ODR record for a death comprises the individual drugs that investigators determined were contributory are recorded, in addition to basic demographic (age and sex), location (residential address and address of fatal overdose) and intent information.

Case identification and coding

The ODR was used to identify every overdose death occurring in Victoria between January 2011 and December 2013 where the contributing drugs included a pharmaceutical opioid or opioids. Pharmaceutical opioid-only overdose deaths were deemed to be relevant, as were deaths resulting from the acute toxic effects of pharmaceutical opioids in combination with other drugs. The full coronial case file for each death was then retrieved. The contents of a coronial case file can vary from death to death, but will usually include statements from friends, family, police investigators, medical practitioners, and witnesses to the death; doctors' notes and medical records; forensic medical reports; and photographs of exhibits (including drugs and prescriptions) seized by police.

Coronial case files were reviewed and a custom ODR interface was used to code the sources of any contributing pharmaceutical drugs (prescribed, diverted, and/or purchased over the counter), as well as the deceased's history of diagnosed mental illness and drug misuse/dependence. The interface also prompted coders to flag any case where there was explicit evidence that a witness *(a)* was present between the fatal drug-taking event and death, and *(b)* noted symptoms consistent with overdose such as being unarousable and/or breathing in an irregular, slow or disrupted way while unconscious. Where any such death was flagged, a free-text narrative account of the relevant circumstances and evidence was included.

Data extraction and analysis

Any death flagged as including a witness who noticed symptoms consistent with overdose, was deemed to be relevant for the project. The following data were extracted from the ODR for each relevant death: deceased age and sex; contributing pharmaceutical opioids; sources of contributing pharmaceutical opioids where known; other contributing drugs; history of diagnosed mental illness; history of clinically documented drug dependence; and the narrative account of evidence regarding witness to overdose.

The free-text accounts of witnessed overdoses were reviewed to record the relationship between the witness and the deceased, as well as the location and time of day where the symptoms of overdose were witnessed, and what action if any the witness took in response to the symptoms. Where there were multiple witnesses, information was coded regarding the witness who appeared to be best known to the deceased. If there was insufficient material available in the free-text narrative, available case file material was further reviewed to clarify the circumstances of the overdose and witness. Separately, a project team member briefly reviewed coding for all deaths where no overdose witness was flagged, to ensure that no relevant deaths had been unintentionally omitted.

Descriptive statistics (frequencies and proportions) are presented on these characteristics of the deaths.

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