Journal of Substance Abuse Treatment 58 (2015) 51–61

Contents lists available at ScienceDirect

Journal of Substance Abuse Treatment

The characteristics of a cohort who tamper with prescribed and diverted opioid medications

Briony Larance, Ph.D. [a,*], Nicholas Lintzeris, Ph.D. [b,c], Raimondo Bruno, Ph.D. [d], Amy Peacock, Ph.D. [d], Elena Cama, B.C.C.J. (Hons.) [a], Robert Ali, Ph.D. [e], Ivana Kihas, B.Psych. (Hons.) [a], Antonia Hordern, M.Health.S.C. (C.D.M.), B.A.App.S.C. (H.I.M.) [a], Nancy White, Ph.D. [e], Louisa Degenhardt, Ph.D. [a,f,g,h]

[a] National Drug and Alcohol Research Centre, UNSW, NSW, Australia
[b] Sydney Medical School, Sydney University, NSW, Australia
[c] The Langton Centre, South East Sydney Local Health District (SESLHD) Drug and Alcohol Services, NSW, Australia
[d] School of Medicine, University of Tasmania, Tasmania, Australia
[e] University of Adelaide, South Australia, Australia
[f] School of Population and Global Health, University of Melbourne, Victoria, Australia
[g] Murdoch Children's Research Institute, Australia
[h] Department of Global Health, School of Public Health, University of WA, USA

ARTICLE INFO

Article history:
Received 27 February 2015
Received in revised form 29 May 2015
Accepted 1 June 2015

Keywords:
Abuse deterrent
Tamper resistant
Pharmaceutical opioids
Opioids
Abuse liability
Cohort

ABSTRACT

Aims: To describe the methods and baseline characteristics of a cohort of people who tamper with pharmaceutical opioids, formed to examine changes in opioid use following introduction of Reformulated OxyContin®.
Methods: Participants were 606 people from three Australian jurisdictions who reported past month injecting, snorting, chewing or smoking of a pharmaceutical opioid and had engaged in these practices at least monthly in the past 6 months. Baseline interviews were conducted prior to introduction of Reformulated OxyContin® in April 2014. Patterns of opioid use and cohort characteristics were examined according to whether participants were prescribed opioid medications, or exclusively used diverted medication.
Results: The cohort reported high levels of moderate/severe depression (61%), moderate/severe anxiety (43%), post-traumatic stress disorder (42%), chronic pain or disability (past 6 months, 54%) and pain (past month, 47%). Lifetime use of oxycodone, morphine, opioid substitution medications and codeine were common. Three-quarters (77%) reported ICD-10 lifetime pharmaceutical opioid dependence and 40% current heroin dependence. Thirteen percent reported past year overdose, and 70% reported at least one past month opioid injection-related injury or disease. The cohort displayed complex clinical profiles, but participants currently receiving opioid substitution therapy who were also prescribed other opioids particularly reported a wide range of risk behaviors, despite their health service engagement.
Conclusions: Findings highlight the heterogeneity in the patterns and clinical correlates of opioid use among people who tamper with pharmaceutical opioids. Targeted health interventions are essential to reduce the associated harms.

1. Introduction

Pharmaceutical opioids have a legitimate role in medicine and make a positive contribution to the health of many people, yet they are not always used in the manner in which they were intended when prescribed (Larance, Degenhardt, Lintzeris, Winstock, & Mattick, 2011). Pharmaceutical opioids are a significant contributor to drug-related morbidity and mortality in many countries (Chen, Hedegaard, & Warner, 2014; Gomes et al., 2014; Larance, Ambekar, et al., 2011; Larance, Degenhardt, et al., 2011; Manchikanti et al., 2012; Roxburgh, Bruno, Larance, & Burns, 2011). These harms are partly attributed to diversion of opioids from those to whom they were prescribed; and tampering for use via routes other than as intended, particularly via injection (Madadi, Hildebrandt, Lauwers, & Koren, 2013). Pharmaceutical companies are consequently developing formulations intended to be less prone to tampering (e.g., crushing, chewing, snorting, smoking, injecting or dissolving/drinking opioid medications intended for oral administration) (Katz et al., 2011), and misuse.

One example of an opioid formulation specifically designed to be tamper-resistant is a reformulated version of controlled-release oxycodone hydrochloride tablets (Reformulated OxyContin®). The tablets are designed to be bioequivalent to the original formulation but employ a controlled-release technology (that makes them difficult to crush) with a hydro-gelling matrix (so the tablet develops into a viscous gel when dissolved in water) (Sellers, Perrino, Colucci, & Harris, 2013), reducing the likelihood of a rapid release of oxycodone following tampering (Cone, Giordano, & Weingarten, 2013). Early US studies indicated lower levels of misuse (Havens, Leukefeld, DeVeaugh-Geiss, Coplan, & Chilcoat, 2014), attractiveness (Sellers et al., 2013) and street price

* Corresponding author at: National Drug and Alcohol Research Centre, University of New South Wales, Sydney NSW 2052. Tel.: +61 2 9385 0241; fax: +61 2 9385 0222.
E-mail address: b.larance@unsw.edu.au (B. Larance).

http://dx.doi.org/10.1016/j.jsat.2015.06.001
0740-5472/

(Severtson et al., 2013) among specific populations, and a decrease in OxyContin® poisonings following introduction of the reformulated product (Severtson et al., 2013).

In April 2014, Reformulated OxyContin® was introduced onto the Australian market. The National Opioid Medications Abuse Deterrence (NOMAD) study was established to monitor potential changes post reformulation introduction (Degenhardt et al., 2015). There are multiple data collections involved in this study, including formation of a prospective cohort of people who regularly tamper with pharmaceutical opioids, interviewed prior to April 2014. Prospective cohort studies have the advantage of collecting reliable and detailed data close to an event of interest, reducing potential recall bias (Euser et al., 2009). This cohort also addresses a significant gap in the existing literature, in that there has been no comprehensive assessment in Australia of the characteristics, patterns and clinical correlates of opioid use among people who tamper with pharmaceutical opioids. We recruited people who reported obtaining varied pharmaceutical opioids from a range of different sources: both prescribed by a doctor, and diverted from other sources. This is particularly important from a public health perspective, in that those who are prescribed opioids have existing health service engagement, offering greater opportunity for direct harm minimization strategies. As such, the specific aims of this paper are to:

1. describe the protocol for recruitment and strategies for retention of the cohort;
2. describe the baseline demographic and clinical characteristics of the cohort; and
3. examine potential differences among cohort participants according to whether participants were prescribed opioids or used exclusively diverted medication.

2. Materials and methods

This study utilizes baseline data collected from the cohort component of the NOMAD study. The broader NOMAD study is detailed elsewhere (Degenhardt et al., 2015).

2.1. Data from people who tamper with pharmaceutical opioids: The NOMAD cohort protocol

2.1.1. Cohort design

The NOMAD cohort is a prospective cohort of 606 people who regularly tamper with opioid analgesics. The cohort included people who reported chewing, snorting, smoking and/or injecting opioid medications (see *Eligibility criteria* below). The cohort was formed and interviewed prior to the introduction of Reformulated OxyContin® (January–March 2014). They will be followed up on two further time points following the change in formulation: 1 to 3 months post-release (May 2014 to July 2014) to capture any changes that occur in the initial period following withdrawal of the old formulation; and 12 to 15 months post-release (May to July 2015), to capture the longer term, more stable patterns of drug use that this group might develop.

2.1.2. Eligibility criteria

Eligibility criteria comprised: (a) English language proficiency, (b) aged 18 years or older, (c) reported extra-medical pharmaceutical opioid use (i.e., use outside the bounds of a doctor's prescription (Larance, Ambekar, et al., 2011; Larance, Degenhardt, et al., 2011)) at least monthly in the past 6 months, and (d) reported past month injecting, snorting, chewing or smoking of a pharmaceutical opioid and had engaged in these practices at least monthly in the past 6 months. Participants were excluded if they reported only using their opioid medication in accordance with a doctor's instructions, had only tampered with an opioid substitution therapy (OST) medication (i.e., methadone or buprenorphine/naloxone for the treatment of opioid dependence), had not been a resident of the city/state for 6 consecutive months prior to the interview, or were in prison for the past month.

2.1.3. Recruitment

The cohort was recruited from three Australian jurisdictions: Sydney, New South Wales (NSW); Adelaide, South Australia (SA); and Hobart and Launceston, Tasmania (TAS). Participants were recruited through a variety of settings including Needle-Syringe Programs (NSPs) (38%), snowballing and word-of-mouth (36%), OST clinics/prescribers (15%), community pharmacies (6%), advertisements in newspapers and street media (4%), and other health/outreach services (1%).

Pharmacy recruitment was conducted utilizing an Australian database of community pharmacies purchased for an existing study (Campbell et al., 2014). The study team telephoned pharmacies in NSW, SA and TAS, and posted packs with flyers and additional information about the study to pharmacists interested in assisting with recruitment. Pharmacists were asked to distribute the flyer to any person filling prescriptions for pharmaceutical opioid medications. All flyers had a unique pharmacy number, and pharmacists were reimbursed $20 for each eligible participant they referred, regardless of whether the person ultimately participated.

Interested participants were referred to the research team by making direct contact (by phone) or by opting to leave their details at the recruiting service/pharmacy so the research team could contact them. All interested participants were provided more information about the study and assessed for eligibility by NOMAD staff. Eligible participants went through a voluntary informed consent process before interview times were arranged.

2.1.4. Interview procedure

Baseline interviews were conducted from December 2013 to March 2014. Participants completed structured face-to-face interviews, with data entered directly onto laptops utilizing computer-assisted interview software. Interviews took approximately 1.5 hours to complete. Medication prompt cards with photographs of all pharmaceutical opioid medications and a range of benzodiazepines were used to help participants identify the correct medication and tablet size in answering questions about recent use. All interviews were completed by trained interviewers with a degree in behavioral sciences and training in suicide response. Participants were reimbursed AUD$50 on concluding the interview for time and out-of-pocket expenses incurred.

2.1.5. Cohort maintenance strategies

A number of methods were used to prevent attrition in the NOMAD cohort. Firstly, the study team attempted to make contact with interested participants within a week of their expression of interest in the study. A follow-up locator form was completed at initial contact, with comprehensive contact details of the participant and at least two secondary contacts (e.g., relatives, friends and medical professionals). Other methods to improve retention included letters thanking the participant for study involvement and regular contact from the study team between time points to check for changes in contact details and provide study updates.

2.2. NOMAD study governance

2.2.1. NOMAD advisory committee

An advisory committee was established for the wider NOMAD study. The group included general practitioners, pain specialists, addiction medicine specialists and researchers. The committee met at the beginning of the study to assist in the design of the study and interview schedule, and assist in developing recruitment strategies.

2.2.2. Ethics approval

This study has approval from the Ethics Review Committee (Royal Prince Alfred Hospital Zone) of the Sydney Local Health District, Australian Department of Health, AIDS Council of New South Wales, Tasmanian Health and Medical Human Research Ethics Committee, University of Adelaide Human Research Ethics Committee and Southern Adelaide Clinical Human Research Ethics Committee. Access and site approvals were obtained from the following local area health ethics