



## The long-term impact of post traumatic stress disorder on recovery from heroin dependence



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### ABSTRACT

The high prevalence of post traumatic stress disorder (PTSD) among people with heroin dependence and its impact on short term outcomes has been well established. The impact of PTSD on long-term recovery is, however, unknown. This paper examines the impact of current and lifetime PTSD on long-term recovery from heroin dependence among participants who took part in the 11-year follow-up of the Australian Treatment Outcome Study (ATOS), a prospective naturalistic longitudinal study of 615 people with heroin dependence recruited from Sydney, Australia, in 2001–2002. Seventy-one percent of the cohort ( $n = 431$ ) were re-interviewed 11-years post study entry. Outcomes examined included heroin and other drug use, dependence, general physical and mental health, depression, PTSD, employment, and the incidence of trauma exposure, overdose, imprisonment, and attempted suicide over the 11-year follow-up. Despite having a poorer profile at baseline, individuals with current PTSD or a history of PTSD at baseline demonstrated similar levels of improvement to those without a history of PTSD in all outcome domains across the 11-year follow-up, PTSD was associated with consistently higher levels of major depression, and attempted suicide, subsequent trauma exposure, and poorer occupational functioning across the 11-year follow-up. These findings highlight the importance of interventions aimed at occupational rehabilitation, reducing the likelihood of re-traumatisation, and addressing PTSD and associated comorbidities among people with heroin dependence.

### 1. Introduction

Studies of both the general population and clinical samples have demonstrated the alarmingly high prevalence of post-traumatic stress disorder (PTSD) among people with heroin dependence. Indeed, the odds of developing PTSD are higher among individuals with an opioid use disorder than any other drug class (Cottler, Compton 3rd, Mager, Spitznagel, & Janca, 1992; Goldenberg et al., 1995; Mills, Teesson, Ross, & Peters, 2006). Epidemiological data indicates that approximately nine in 10 people with opioid dependence experience a potentially traumatic event, with one-third meeting DSM-IV criteria for a diagnosis of current PTSD (Mills et al., 2006). Among people in treatment for heroin dependence, the prevalence of PTSD has been estimated to be as high as 66% (Clark, Masson, Delucchi, Hall, & Sees, 2001; Dore, Mills, Murray, Teesson, & Farrugia, 2012; Hien, Nunes, Levin, & Fraser, 2000; Kingston, Marel, & Mills, 2017; Mancino et al., 2010; Meier et al., 2014; Milby et al., 1996; Mills, Lynskey, Teesson,

Ross, & Darke, 2005; Schiff, Levit, & Cohen-Moreno, 2010; Shand, Slade, Degenhardt, Baillie, & Nelson, 2011; Trafton, Minkel, & Humphreys, 2006; Villagomez, Meyer, Lin, & Brown Jr, 1995).

There are four main hypotheses that seek to explain the aetiology of, and functional associations between, PTSD and substance use disorders: the self-medication, high risk, susceptibility, and common factors hypotheses (Brady, McCauley, & Back, 2015). The self-medication hypothesis postulates that substance use disorders occur as a consequence of the repeated use of psychoactive substances to relieve the symptoms of PTSD. The high-risk hypothesis suggests that intoxication and the lifestyle associated with substance use disorders (particularly that which is associated with the use of illicit substances such as heroin) increases the risk of trauma exposure, thereby increasing the risk of PTSD. The susceptibility hypothesis posits that people who use drugs are more susceptible to PTSD following exposure to a traumatic event due to either a failure to develop effective strategies for coping with stress and/or a neurobiological vulnerability developed as a

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consequence of repeated substance use and withdrawal. Common psychological, biological or environmental factors, may also contribute to their co-occurrence. Irrespective of how these disorders come to co-occur, once established, both may serve to maintain and exacerbate each other in a relationship of mutual influence, leading to considerable harm.

The harms associated with co-occurring PTSD among people with heroin dependence, and other substance use disorders, have been well documented. The presence of comorbid PTSD has been associated with an earlier age of onset, and longer substance use careers, poorer educational and occupational functioning, more extensive polydrug use histories, poorer physical and mental health, greater psychopathology, in addition to higher rates of overdose and attempted suicide (Bonin, Norton, Asmundson, Dicurzio, & Pidlubney, 2000; Brown, Stout, & Mueller, 1999; Clark et al., 2001; Mills et al., 2005; Mills et al., 2006; Najavits et al., 1998; Ouimette, Ahrens, Moos, & Finney, 1998; Read, Brown, & Kahler, 2004; Reynolds et al., 2005; Villagomez et al., 1995; Wasserman, Havassy, & Boles, 1997). Given this clinical profile, it is not surprising that PTSD has been associated with poorer outcomes across a number of domains, particularly with regards to general physical and mental health and psychosocial functioning (Mills, Teesson, Ross, & Darke, 2007; Ouimette, Finney, & Moos, 1999). Studies have also examined the impact of PTSD on a broad range of substance use outcomes including treatment retention and completion, relapse rates and time to relapse, and varying measures of frequency and severity of alcohol and other drug use. The findings from these studies are, however, mixed. While some studies have found a relationship between PTSD and poorer substance use outcomes (Ouimette, Ahrens, Moos, & Finney, 1997; Ouimette et al., 1999), the majority have not (Brown, Stout, & Mueller, 1996; Hien et al., 2000; Mills et al., 2007; Norman, Tate, Anderson, & Brown, 2007; Ouimette et al., 1998; Read et al., 2004; Trafton et al., 2006).

Among the largest and longest of studies conducted to date is our analysis of data collected as part of the Australian Treatment Outcome Study (ATOS), a naturalistic longitudinal study of 615 people with heroin dependence. Forty-one percent of the cohort met criteria for a lifetime diagnosis of PTSD at study entry and 31.1% experienced symptoms in the preceding year (Mills et al., 2005). Over the first two years of follow-up, both those with and without PTSD improved on all outcome domains (heroin and other substance use, physical and mental health, employment) with the majority of improvement seen within the first three months (Mills et al., 2007). However, individuals with PTSD entered the study with poorer physical, mental health and occupational functioning, and continued to demonstrate greater impairment in these domains across the two years (Mills et al., 2007). These findings indicated that despite significant improvements in substance use, the disability associated with PTSD remained.

All studies examining the impact of PTSD on treatment outcome have thus far been limited to the examination of short-term outcomes, with follow-up periods ranging from 3-months to 2-years. No studies have investigated the impact of PTSD on long-term recovery, an understanding of which is essential to inform both individual treatment planning as well as broader health service planning. Extending on our earlier work, the aim of the present study was to conduct the first long-term examination of the impact of lifetime and current PTSD on recovery from heroin dependence. Specifically, we sought to examine the impact of PTSD on heroin dependence and related outcomes over 11 years using data collected as part of the ATOS.

## 2. Methods

### 2.1. Procedure

A cohort of 615 people was recruited, and baseline data collected, between February 2001 and August 2002 (Ross et al., 2005). Participants were predominantly treatment-seeking ( $n = 535$ ), recruited from

19 agencies treating heroin dependence in the greater Sydney region upon entry to treatment (methadone/buprenorphine maintenance:  $n = 201$ ; drug-free residential rehabilitation = 133; and detoxification:  $n = 201$ ). A comparison group of people with heroin dependence who were not currently in treatment were recruited from needle and syringe programs ( $n = 80$ ). Eligibility criteria were: (i) no treatment for heroin dependence in the preceding month; (ii) no imprisonment in the preceding month; (iii) aged 18 years or over; and (iv) agreed to give contact details for follow-up interviews. Criterion (i) and (ii) were required as treatment or imprisonment in the month prior to study entry (the primary time-frame for which outcomes were examined) may have impacted upon a person's typical pattern of use. Seventy percent of the cohort ( $n = 431$ ) were reinterviewed approximately 11 years following study entry (M 10.8 years SD 0.7); 10.1% ( $n = 62$ ) were known to be deceased. Approval from the Human Ethics Review Committees of all participating area health services and the University of New South Wales was obtained. Written consent was obtained, and participants were recompensed A\$20 for completing the baseline and 2-year follow-up interviews and A\$40 for completing the 11-year interview. Details regarding the methods used to follow-up participants have been described by Marel et al. (2015).

### 2.2. Structured interview

Structured interviews were administered at each interview (Ross et al., 2005; Teesson et al., 2015). Demographic characteristics measured included age, sex, and main source of income in the preceding month. The Opiate Treatment Index (OTI) (Darke, Hall, Wodak, Heather, & Ward, 1992) was used to measure heroin and other drug use (including other opiates, alcohol, marijuana, benzodiazepines, amphetamines, cocaine, hallucinogens, and inhalants) in the preceding month. The Composite International Diagnostic Interview version 2.1 (CIDI) (World Health Organisation (WHO), 1996) assessed for DSM-IV diagnoses of current heroin dependence, past-month major depression, and lifetime PTSD. At baseline, participants were classified as having current PTSD if they met criteria for a lifetime diagnosis and had experienced symptoms in the preceding 12 months (Mills et al., 2007). The Short-Form 12 (SF12) (Ware Jr, Kosinski, & Keller, 1996) was utilised to measure general physical and mental health (lower scores indicate poorer health). A modified version of the Diagnostic Interview Schedule (Robins, Helzer, Croughan, & Ratcliff, 1981) assessed for antisocial personality disorder (ASPD), and participants were screened for ICD-10 borderline personality disorder (BPD) using the International Personality Disorders Examination (IPDE) Questionnaire, a screener derived from the IPDE (Loranger, Janca, & Sartorius, 1997).

Participants were readministered the sections of the survey pertaining to demographics, heroin and other drug use, heroin dependence, general physical and mental health, and major depression at each follow-up. Full diagnoses of past year PTSD were assessed at 2- and 11-years using the CIDI. At 11-years, a life-chart technique was employed, in which significant life events are used as anchor points (Hunt & Andrews, 1995), to obtain data on periods of abstinence and episodes of treatment for heroin use (i.e., detoxification, residential rehabilitation, and opiate maintenance therapies). Participants were also asked about any traumatic events they had experienced over the 11-year period using a modified version of the CIDI (World Health Organisation (WHO), 1996).

### 2.3. Statistical analyses

Chi squared, one-way ANOVA, and Kruskal-Wallis tests were conducted (and appropriate measures of central tendency and variance reported) to determine if there were any between-group differences in baseline characteristics, and treatment exposure and experiences of adversity over the 11-year follow-up. Categorical and continuous measures of outcome were examined using generalised estimating

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