



Patterns and correlates of attempted suicide amongst heroin users: 11-year follow-up of the Australian treatment outcome study cohort



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ABSTRACT

Lifetime and recent rates of attempted suicide and suicidal ideation amongst the Australian Treatment Outcome Study cohort of heroin users at 11-year follow-up were examined. The mean elapsed time since heroin initiation was 20.4 years. At 11-year follow-up, 42.2% of the cohort reported ever having made a suicide attempt, 11.1% having made a first attempt subsequent to baseline. In the year preceding 11-year follow-up, 1.6% had made an attempt, suicidal ideation was reported by 10.4%, and 4.2% had a current suicide plan. After controlling for other variables, past 12 month attempts, current ideation or plans were independently associated with a current diagnosis of Major Depression (odds ratios (OR) 1.67) and more extensive polydrug use (OR 1.39), while each standard deviation higher on the SF12 physical health scale (reflecting better health) was associated with reduced odds (OR 0.66). Suicide and suicidal ideation remained a significant clinical issue for heroin users, some 20 years after their heroin use commenced.

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1. Introduction

Opioid dependence is associated with a risk of completed suicide 14 times that of the general population, and is a major contributor to mortality amongst this population (Wilcox et al., 2004). Indeed, studies consistently report that 5–10% of heroin user deaths are due to suicide (Maxwell et al., 2005; Rehm et al., 2005; Stenbacka et al., 2010; Darke, 2011; Darke et al., 2011).

As with completions, heroin users are far more likely to attempt suicide than the general population. Whilst the general population lifetime prevalence of attempted suicide is in the 3–5% range (Borges et al., 2000; Johnston et al., 2009), estimates for heroin users range between 20–50% (Rossow and Lauritzen, 1999; Neaigus et al., 2001; Roy, 2002; Darke et al., 2004, 2005; Maloney et al., 2009; Darke et al., 2010; Roy, 2010; Darke and Torok, 2013). Typical of such studies, we reported that a third of heroin users recruited for the Australian Treatment Outcome Study (ATOS) longitudinal cohort had a history of attempted suicide prior to baseline enrollment (Darke et al., 2004). Such high rates are of clinical importance, as an attempt is a strong predictor of subsequent attempts and completion (Gibbs et al., 2005; Darke et al.,

2007). What is not known, however, is the long-term suicidal ideation or attempts of such a high risk cohort.

It is useful to speculate why suicide rates are so elevated amongst heroin users. First, the dependent use of illicit drugs per se is associated with higher risk of suicide (Petronis et al., 1990; Borges et al., 2000; Lynskey et al., 2004). Moreover, polydrug use, common amongst heroin users, is a strong predictor of suicidal behavior (Rossow and Lauritzen, 1999; Borges et al., 2000; Darke et al., 2004). In relation to this, one might assume that if polydrug use is maintained, suicidal ideation and/or attempts would remain elevated. Heroin users also have elevated levels of psychopathology, social isolation, childhood abuse, and are more likely to come from disadvantaged and/or dysfunctional families (Darke, 2011).

Despite the salience of suicide as a clinical issue for heroin users, there are few longitudinal data on long-term suicide patterns. In earlier work, we have reported on suicide rates amongst the cohort at baseline, and at 1, 2 and 3 year post-baseline follow-ups (Darke et al., 2004, 2005, 2007). While declines in the annual suicide rates across the 3 years of follow-up were seen (baseline 13.3%, 1 year 9.1%, 2 year 5.8%, 3 year 2.3%), rates of attempted suicide and suicidal ideation remained far higher than that of the general population. Consistent with international work, death rates amongst the cohort were more than four times population rates, with 7% due to suicide (Darke et al., 2011).

It is unclear, however, whether the elevated risk for suicide dissipates over extended time periods as, to date, there are no data

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on the long-term heroin user. In this work, we report on long-term patterns of suicide attempts and ideation at the 11-year follow-up of the ATOS cohort, at which some 20 years had elapsed since their initiation of heroin use. Specifically, the study aimed to:

1. Determine the lifetime and recent rates of attempted suicide at 11-year follow-up.
2. Determine the level of current suicidal ideation.
3. Determine the correlates of recent attempts, suicidal ideation or plans.

2. Methods

2.1. Procedure

The data were collected from the New South Wales component of ATOS. Baseline interviews were conducted between February 2001 and August 2002. ATOS is a longitudinal study of heroin users, recruited from randomly selected treatment agencies delivering methadone/buprenorphine maintenance treatment (MT) ($n=201$), drug free residential rehabilitation (RR) ($n=133$) or detoxification (DTX) ($n=201$). Subjects were recruited from 19 agencies treating heroin dependence in the greater Sydney region, randomly selected from within treatment modality. The agencies comprised 10 MT agencies, four RR agencies and nine DTX facilities. In addition, a comparison group of 80 heroin users not currently in treatment (NT) were recruited from needle and syringe programmes. Participants were interviewed at baseline, 3 months, 1, 2, 3 and 11 years. Eligibility criteria at baseline were: i) no treatment for heroin dependence in the preceding month, ii) no imprisonment in the preceding month, iii) agreed to give contact details for follow-up interviews, iv) aged ≥ 18 years, and v) fluent in English. Subjects were paid \$40. Ethical approval was given by the University of New South Wales and all relevant Area Health Services.

At the 3 month follow-up interview hair sampling was conducted on 61 randomly selected participants (approximately 10% of the baseline sample) as a bio-marker for heroin use over the month preceding interview (Ross et al., 2006). The overall agreement between self-reported heroin use and the presence of hair morphine was 75% ($\kappa=0.49$). In 15% of cases heroin use was reported, but morphine not detected, and in 10% recent heroin use denied but morphine detected.

2.2. Structured interviews

At each wave, participants were administered a structured interview that addressed demographics, treatment history, drug use, heroin overdose, criminal behaviors, health and psychopathology. As in previous studies (Darke et al., 2004, 2005, 2007), attempted suicide was defined as deliberate self-harm with the intention of causing death, a definition that excludes the broader category of self-harm without the intention of causing death. At baseline, participants were asked whether they had attempted suicide, and how recently they had made an attempt. Current suicidal ideation, suicidal planning and DSM-IV diagnoses of current Major Depression were obtained using the Composite International Diagnostic Interview 2.1 (World Health Organization, 1998). At follow-up, participants were asked whether they had attempted suicide since last interview and how recently they had last made an attempt. Current Major Depression, suicidal ideation and suicidal planning were re-measured.

At each wave, drug use over the month preceding interview was measured using the Opiate Treatment Index (OTI) (Darke et al., 1992). General physical health was measured using the SF12, in which lower scores indicate poorer health (mean=50, standard deviation=10) (Ware et al., 1996). ICD-10 screens for Borderline Personality Disorder (BPD) and Posttraumatic Stress Disorder (PTSD) were obtained using the International Personality Disorder Examination Questionnaire (Slade et al., 1998), and diagnoses of ASPD were obtained from the Diagnostic Interview Schedule, modified to obtain DSM-IV diagnoses (Robins et al., 1981). Current PTSD was rescreened at 11-year follow-up.

At 11-year follow-up, a life-chart technique was employed, using significant life events as anchor points over the follow-up period (Hunt and Andrews, 1995; Day et al., 2004). Participants were asked how many times they had commenced treatment, in any modality, for heroin dependence since the most recent interview, and the time spent in each treatment episode.

2.3. Statistical analyses

Means and standard deviations (S.D.) were reported for continuous variables. For categorical variables, odds ratios (OR) and 95% confidence intervals (CI) were calculated. The McNemar test for paired proportions was used to examine differences in proportions of recent attempts and current ideation between 3 and

11-year follow-up. In order to determine independent predictors of recent attempts, current ideation or plans at 11-year follow-up, logistic regressions with backwards elimination were performed. The Hosmer–Lemeshow statistic was used to determine the goodness of fit of the final model. All analyses were conducted using IBM SPSS Statistics 22.0 (SPSS INC., 2013).

3. Results

3.1. Cohort characteristics

The initial cohort consisted of 615 current heroin users, full details of which may be found in Ross et al. (2005). At 11-year follow-up, 431 (70.1%) participants were interviewed, 63 (10.2%) were known to be deceased, 7 (1.1%) were incarcerated and 42 (6.8%) did not wish to participate. A further 21 (3.4%) were confirmed to be alive, but were not interviewed due to repeated cancellations. Overall, we could account for 91.6% of participants. The mean age at 11-year follow-up was 40.0 years (S.D. 7.6, range 28–66 years), and 64.5% were male. The main source of income was government benefits (64.5%), with wage/salary as the main source of 27.8%. Criteria for current Major Depression were met by 21.9%, current PTSD by 20.6%, ASPD by 73.1% and BPD by 45.2%. The mean SF12 physical health score was 45.1 (S.D. 10.8, range 15.1–64.2).

There were no baseline differences between cohort members included in this study and other surviving cohort members in terms of age (29.1 vs. 28.8 years, $p=0.67$), percent male (64.5 vs. 73.6%, $p=0.07$), being enrolled in a treatment program (88.2 vs. 81.8%, $p=0.07$), daily heroin use (81.4 vs. 78.5%, $p=0.47$) or suicide histories (31.8 vs. 34.7%, $p=0.54$).

3.2. Drug use and treatment exposure at 11 years

The mean elapsed time since heroin initiation at 11 year follow-up was 20.4 years (S.D. 7.2, range 10–41 years). Heroin had been used in the preceding year by 37.4% of the cohort, 24.8% had used in the month preceding interview, with 9.7% reporting daily use. A mean of 3.2 (S.D. 1.7, range 0–8) drug classes had been used in the month preceding interview. The most commonly used substances, other than heroin, were nicotine (84.9%), alcohol (55.7%), cannabis (41.5%) and benzodiazepines (32.0%) and opiates other than heroin (26.5%).

At the time of interview, 46.6% were currently enrolled in a drug treatment program, overwhelmingly opioid maintenance (45.6%). Mean time enrolled in the current treatment program was 59.4 months (S.D. 54.0, range 1–324 months). By 11-year follow-up, all of the cohort had been enrolled in a drug treatment program at some stage, primarily opioid maintenance (91.0%), residential rehabilitation (68.9%) and detoxification (88.6%). The cohort had a mean of 61.2 months (S.D. 48.3, range 1–165 months) enrolled in a treatment program since baseline, across a mean of 5.3 (S.D. 6.9, range 1–85) episodes.

3.3. Attempted suicide and suicidal ideation

By 11-year follow-up, 42.2% reported having ever made a suicide attempt, 18.6% having made multiple attempts (Table 1). Females were significantly more likely to have ever made an attempt, and to have made multiple attempts. An initial attempt had been made subsequent to baseline by 11.1%.

In the year preceding 11-year follow-up, 1.6% ($n=7$) reported having made an attempt, with no gender difference. While this continued the decline seen across previous waves, the fall was not significantly different from the proportion at 3 year follow-up. For 2 of these 7 participants, this was their first attempt, whilst all of the other 5 made their initial attempt prior to ATOS enrollment. Of these 7 participants, 4 reported current suicidal ideation and 3 had a current plan.

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