Addictive Behaviors 50 (2015) 78–83

Contents lists available at ScienceDirect

Addictive Behaviors

Patterns and correlates of alcohol use amongst heroin users: 11-year follow-up of the Australian Treatment Outcome Study cohort

Shane Darke [a,*], Tim Slade [a,b], Joanne Ross [a,b], Christina Marel [a,b], Katherine L. Mills [a,b], Maree Tessson [a,b]

[a] National Drug and Alcohol Research Centre, University of New South Wales, Australia
[b] NHMRC Centre for Research Excellence in Mental Health and Substances Use, Australia

HIGHLIGHTS

- Alcohol use patterns were examined amongst a heroin using cohort at 11-year follow-up.
- Alcohol was used in the preceding month by 56%, 27% reporting daily use and 11% heavy daily drinking.
- There were high levels of both alcohol abstinence and regular drinking.
- Heavy drinking was associated with recent heroin overdose, criminality, and poorer health.

ARTICLE INFO

Available online 14 June 2015

Keywords:
Alcohol
Heroin
Cohort
Harm
ATOS

ABSTRACT

Introduction: The study aimed to determine long-term alcohol use patterns and correlates amongst heroin users.
Methods: Longitudinal cohort. 11-year post-baseline follow-up of the Australian Treatment Outcome Study cohort.
Results: At 11-year follow-up, 431 (70%) participants were interviewed. Alcohol was used in the preceding month by 56%, with 27% reporting daily use and 11% heavy daily drinking. Alcohol use patterns showed remarkable consistency across waves, with the proportion who drank in the preceding month ranging between 49 and 56%, with no significant trend across time. Daily drinking ranged between 20 and 27%, and heavy daily drinking between 7 and 12%. Both declined slightly from baseline to 3-year follow-up, but by 11 years were at levels similar to baseline. Compared to female referents, males were more likely to drink (OR 1.6, CI 1.3–2.1, $p < .05$), to drink daily (OR 1.8, CI 1.4–2.4, $p < .05$) and to drink heavily (OR 1.7, 1.1–2.5, $p < .05$). Compared to those not in enrolled in a drug treatment programme, those enrolled were significantly less likely to drink (OR 0.7, CI 0.5–0.8, $p < .05$) and to drink daily (OR 0.6, 0.5–0.8, $p < .05$). Compared to those who did not drink heavily, heavy drinking was associated with a higher likelihood of recent overdose (OR 1.6, CI 1.0–2.4, $p < .05$), of criminality (OR 1.9, 1.3–2.7, $p < .001$), and with lower SF12 physical (mean difference −3.0, CI −4.7 to −1.4, $p < .001$) and mental (−2.4, CI −4.3 to −0.5, $p < .001$) health scores.
Conclusions: There were consistently high levels of both abstinence and regular drinking, with drinking patterns staying relatively stable across the decade. From the clinical perspective, the high rates of heavy drinking are of particular relevance, given the observed associations with a poorer clinical profile.

1. Introduction

It is well established that polydrug use is the norm amongst heroin users (Darke, 2011). Apart from tobacco, alcohol is by far the most common non-opioid used by this population (Darke, 2011; Gossop, Marsden, Stewart, & Kidd, 2003; Hubbard, Craddock, Flynn, Anderson, & Etheridge, 1997; Maloney, Degenhardt, Darke, & Nelson, 2009; Stapleton & Comiskey, 2010). Alcohol use usually commences early in the onset sequence of drugs, typically around age 13, and well before the first use of opioids (Abelson et al., 2006; Carpentier et al., 2009; Ompad et al., 2005). It is consistently reported that between a quarter and three quarters of established heroin users drink, and large proportions appear to consume alcohol on a heavy and frequent basis (Brugal et al., 2002; Caputo et al., 2002; Coffin et al., 2007; Hubbard et al., 1997; Maloney et al., 2009; Ross et al., 2005; Stapleton & Comiskey, 2010). Moreover, levels of alcohol dependence, a secondary drug for the heroin user, are many magnitudes higher than in the general population (Cacciola, Alterman, Rutherford, McKay, & Mulvaney, 2001; Darke & Ross, 1997; Kidorf et al., 2004; Maloney et al., 2009). Thus, while a quarter to half of users meet criteria for

* Corresponding author at: National Drug and Alcohol Research Centre, University of New South Wales, NSW 2052, Australia. Tel.: +61 2 9385 0331.
E-mail address: s.darke@unsw.edu.au (S. Darke).

http://dx.doi.org/10.1016/j.addbeh.2015.06.030
0306-4603/

current dependence, population estimates are below 2% (Kessler et al., 2005; Teesson et al., 2010; Wells et al., 2006).

The use of alcohol, and heavy use in particular, poses a serious clinical problem for the heroin user in relation to the major outcome domains of treatment other than drug use. Firstly, the prevalence of hepatitis B (HBV) and C (HCV) are in the order of 70% amongst heroin users, and infection typically occurs early in the injecting career (Coffin et al., 2003). Both HBC and HCV damage the liver, and the use of alcohol may exacerbate the disease process (Darke, Duflou, & Torok, 2010). Secondly, alcohol is a major contributor to heroin overdose (Darke, 2011; Karch, 2009; Kerr et al., 2007; Nelson et al., 2011). Thirdly, alcohol is strongly associated with psychopathology and suicidality (Cranford, Eisenberg, & Serras, 2009; Darke, Duflou, Torok, & Prolov, 2013; Dawson, Grant, Stinson, & Chou, 2005; Ramstedt, 2001), major clinical concerns for heroin users, for whom these are highly prevalent (Abelson et al., 2006; Carpentier et al., 2009; Darke, 2011; Gossop et al., 2003; Hubbard et al., 1997; Maloney et al., 2009; Ompad et al., 2005; Stapleton & Comiskey, 2010). Finally, there is a well-established association between alcohol and crime, of particular relevance to heroin users for whom rates of acquisitive crime are high (Darke, 2011; Marel et al., 2013; Ross et al., 2005).

While cross-sectional studies demonstrate high levels of alcohol use amongst heroin users, there are few long-term longitudinal data on this issue. Treatment outcome studies of heroin users demonstrate reductions in heroin use associated with stable, long-term treatment (Darke, 2011; Gossop et al., 2003; Hubbard et al., 1997; McKeganey, Bloor, Robertson, Neale, & MacDougall, 2006; Salamina et al., 2010; Teesson et al., 2008). Such reductions are also associated with reductions in the use of other drugs, such as benzodiazepines. The situation is less clear with alcohol, with a number of studies reporting no decline in alcohol use amongst treated heroin users, across periods of up to five years (Darke, Williamson, Ross, & Teesson, 2006; Fairbank, Dunteman, & Condelli, 1993; Gossop, Steward, Treacy, & Marsden, 2002; Gossop et al., 2003; Hubbard et al., 1997).

In this work, we report on long-term patterns of alcohol use at the 11 year follow-up of the Australian Treatment Outcome Study (ATOS) cohort of heroin users, a point at which some 20 years had elapsed since the initiation of heroin use. A number of questions arise for the long-term natural histories of alcohol use amongst heroin users. What are the long-term patterns of alcohol use, and heavy alcohol use? Does the prevalence, frequency or amount consumed change over the long-term? Are there demographic factors associated with alcohol use? Is alcohol use, and heavy alcohol use, associated with factors such as physical health, mental health or crime? Specifically, the study aimed to:

1. Determine alcohol use patterns at 11 year follow-up of the ATOS cohort;
2. Determine patterns of alcohol use across the follow-up period; and
3. Determine the clinical correlates of alcohol use across follow-up.

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), drug free residential rehabilitation (RR) or detoxification (DTX). Subjects were recruited from 19 agencies treating heroin dependence in the greater Sydney region, randomly selected from within treatment modality. The agencies comprised ten MT agencies, four RR agencies and nine DTX facilities. In addition, a comparison group of heroin users not currently in treatment (NT) were recruited from needle and syringe programmes. Participants were interviewed at baseline, 3-months (89% followed-up), 1-year (80%), 2-years (76%), 3-years (70%) and 11-years (70%). 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 A$40 for completion of the 11 year interview. Ethical approval was given by the University of New South Wales and all relevant area health services.

2.2. Structured interviews

At each wave, participants were administered a structured interview that addressed demographics, treatment history, drug use, heroin overdose, current health and psychological distress, and criminal behaviours in the preceding month. Drug use over the month preceding interview was measured using the Opiate Treatment Index (OTI) (Darke, Hall, Heather, Wodak, & Ward, 1992; Darke, Heather, Hall, Ward, & Wodak, 1991). The OTI alcohol measure provides estimates of frequency and level of consumption (measured in standard drinks) across the preceding month. Being a "recent use episodes" measure, it also measures use on the most recent drinking day. A standard drink in Australia is 10 g of alcohol. For the purpose of analysis, "heavy" drinking was defined as 5 or more standard drinks, consistent with the Australian National Health and Medical Research Council definition of "binge" drinking (National Health and Medical Research Council, 2009). Crime was also measured using the OTI (Darke et al., 1992). The OTI Crime scale measures the frequency of self-reported criminal behaviours in the preceding month, and examines property crime, fraud, drug dealing and violent crime.

General mental health and physical health were measured using the Short-Form 12 (SF12) (Ware, Kosinski, & Keller, 1996). For each subscale, scores are standardised, with a mean of 50 and a standard deviation of 10, with lower scores indicating poorer health.

2.3. Statistical analyses

Means, standard deviations (SD) and ranges were reported for normally distributed continuous variables, otherwise medians, interquartile range (IQR) and ranges were reported. A series of generalised estimating equation (GEE) models were run to examine the relationship between alcohol use at different time points, and the association of alcohol use (conceptualized as a time-dependent covariate) with clinical correlates. The QIC statistic, a modification of the AIC statistic appropriate for GEE analysis, was used to select the best working correlation structure (Cui, 2007). In all models the unstructured working correlation structure resulted in the lowest QIC value. The chosen correlates were the major domains of heroin treatment discussed above, i.e. treatment enrolment, heroin use, criminality, physical health, mental health and heroin overdose. Specific measures of these domains were: current treatment status at interview (in treatment = 1, not in treatment = 0), heroin use in the preceding month (yes = 1, no = 0), any committed crime in the preceding month (yes = 1, no = 0), SF12 physical health score, SF12 mental health score, and heroin overdose in the preceding year (yes = 1, no = 0). The preceding year was selected as the prevalence of past month overdose was extremely low. GEE offers important advantages, in that it enables examination of the relationship between variables at all time points, and allows the inclusion of subjects with incomplete data. For all GEE analyses, ORs and CIs were reported for dichotomous correlates, and mean differences between groups with 95% confidence intervals for continuous correlates. For each correlate, baseline age (years), sex (males = 1, females = 0) and wave were controlled. The logit link function was used when the correlate was dichotomous and a Gaussian link function was used when the correlate was continuous. GEE analyses with time-independent covariates used an unstructured correlation matrix while those that included at least one time-dependent covariate used an independent correlation matrix (Hu, Goldberg, Hedeker, Flay, & Pentz, 1998). All GEE analyses were conducted using Stata (Release 13)