Exploring mortality among drug treatment clients: The relationship between treatment type and mortality

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Aims: Studies consistently identify substance treatment populations as more likely to die prematurely compared with age-matched general population, with mortality risk higher out-of-treatment than in-treatment. While opioid-using pharmacotherapy cohorts have been studied extensively, less evidence exists regarding effects of other treatment types, and clients in treatment for other drugs. This paper examines mortality during and following treatment across treatment modalities.

Methods: A retrospective seven-year cohort was utilised to examine mortality during and in the two years following treatment among clients from Victoria, Australia, recorded on the Alcohol and Drug Information Service database by linking with National Death Index. 18,686 clients over a 12-month period were included. Crude (CMRs) and standardised mortality rates (SMRs) were analysed in terms of treatment modality, and time in or out of treatment.

Results: Higher risk of premature death was associated with residential withdrawal as the last type of treatment engagement, while mortality following counselling was significantly lower than all other treatment types in the year post-treatment. Both CMRs and SMRs were significantly higher in-treatment than post-treatment.

Conclusion: Better understanding of factors contributing to elevated mortality risk for clients engaged in, and following treatment, is needed to ensure that treatment systems provide optimal outcomes during and after treatment.

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risk following treatment, when compared with clients whose primary
drugs are stimulants (Saitz et al., 2007). Relapse after detoxification re-
represents a specific risk due to a sharp reduction in tolerance.

Opioid-using cohorts receiving pharmacotherapy are the most ex-
tensively studied group in regards to post-treatment mortality. For in-
stance, Degenhardt et al. (2009) found that opioid pharmacotherapy
clients had an in-treatment crude mortality rate (CMR) of 6.0 (95% CI:
5.7–6.4) per 1000 PY compared with an out-of-treatment rate of 11.5
(95% CI: 11.1–12.0) per 1000 PY. Similarly, Ledberg (2017) reported
mortality rates in a sample of opiate users undergoing methadone
maintenance treatment was significantly increased compared to the
general population, both during periods of treatment and when not in
treatment. While mortality risk is higher among opioid pharmacotherapy
clients in the first two to four weeks following treatment cessation
(Clausen, Anchersen, & Waal, 2008; Cousins et al., 2011; Degenhardt
et al., 2009) the initial four weeks of pharmacotherapy induction is
also a time of elevated risk compared with remaining time in treatment.
Similar patterns of elevated mortality risk immediately following treat-
ment cessation have been noted in other drug using cohorts.

In a cohort study of over 10,000 heroin users, mortality was mea-
sured across multiple treatment modalities, including methadone
maintenance, therapeutic communities, pharmacological detoxification
and treatment, and psychosocial treatments, finding most deaths oc-
curred out of treatment, with the highest rate of death occurring in
the first month out of treatment (Davoli et al., 2007). Similarly, when
the effect of medication-free inpatient treatment (detoxification) was
assessed among a Norwegian group of drug users followed for eight
years after treatment cessation, elevated risk of death was experienced
in the first month following treatment discharge (Ravndal & Amundsen,
2010).

For clients seeking treatment for alcohol use problems, both short-
and long-term mortality risks have been identified following treatment
cessation (Costello, 2006; Lloyd, Barratt, Ferris, Best, & Lubman, 2013;
Saitz et al., 2007). Acute alcohol-related contributors to causes of
death (e.g. overdose and fatal injuries) influence short-term survival
following treatment, while chronic conditions (e.g. cancers and liver
disease) contribute significantly to increased mortality rates among cli-
ents followed up over longer periods (Costello, 2006). Ongoing engage-
ment with support services, and identification of groups at elevated risk
have been identified as important to reduce post-treatment mortality
for such populations (Costello, 2006; Timko, DeBenedetti, Moos, &
Moos, 2006).

While opioid-using cohorts receiving pharmacotherapy have been
studied extensively, there is less evidence about mortality risks during
and following other types of treatment and for groups of clients in treat-
ment with drugs of concern (DoCs) other than opioids. This study ex-
amines mortality outcomes for clients engaged in treatment for
alcohol, opioids and other drugs across a range of treatment modalities
other than primary pharmacotherapy, and assesses mortality both dur-
ing treatment and for the 2 years following discharge. Concerns about
safety of treatment can compromise acceptance of treatment in the
community and discourage engagement by drug users. By identifying
periods of elevated risk, when heightened support may be required, as-
associated with different types of drug and alcohol treatment the results
of this study can inform safer clinical practices.

2. Methods

This study integrates client data from the Australian Alcohol and
Drug Information System (ADIS) database (including detailed informa-
tion regarding all specialist treatment) with the National Death Index
(NDI; which includes detailed information regarding cause of death
for all deaths occurring in Australia) to examine mortality outcomes
among a cohort of Alcohol and other drug treatment service clients
from Victoria, Australia. The two databases were linked based on partial
client identifiers.

2.1. Cohort

ADIS is a register of government-funded, specialist alcohol and
other drug (AOD) treatment services (for a full list of services please
see Table 1). The cohort used for the current study were selected
based on three criteria: completion of one or more courses of AOD treat-
ment (for example, counselling, residential withdrawal) in the 12-
month period between 1 July 2000 and 30 June 2001, with first course of
treatment (COT) starting on or after 1 January 2000; records had to
include a valid date of birth (required for linkage purposes) and; records
had to include a start date of first COT. After applying these criteria the
final cohort included 18,686 clients. To enable data linkage, a unique
identifier was created for each individual by combining partial name
identifiers (second two letters of first name and first two letters and
last letter of surname), date of birth and gender (for example John
Doe, 17/01/1969, male would be ohdoe170169m).

2.2. Data sources

2.2.1. ADIS

To ensure full capture of sequential, overlapping and/or embedded
COTs we matched cohort codes across eight years of ADIS data. This
data captured all COTs that terminated between 1 July 2000 and 30
June 2008. Multiple COTs were common among the cohort with the me-
dian of 2 (IQR 1–5) COTs. COTs could be continuous, indicating a change
of treatment type, agency or DoC.

The total number of COTs for this cohort was 89,764. A number of
steps were taken to clean and prepare the data for analyses. COTs
were excluded if they started before 1 January 2000 or after 1 January
2007 and overlapping COTs and consecutive COTs were recoded. Specif-
ically, overlapping courses of treatment were amended so that the first
one finished on the day the subsequent one started; both records were
retained. Where two or more treatments started on the same day the
longest running treatment remained for the analysis and the other
treatments were removed. Data cleaning resulted in the removal of ap-
proximately 15% of records; a total of 76,342 COTs were retained for the
final analysis.

2.2.2. National Death Index (NDI)

Data linkage, between the ADIS cohort and NDI, was conducted by
the Australian Institute of Health and Welfare (AIHW). The first of
three linkage passes used an exact match unique identifier. This process
was repeated matching only on month and year of birth. The final pass
identified cases within ADIS where the client was recorded as deceased
where death occurred after the last ADIS contact date.

Ninety-four percent of deaths (N = 532) were matched with NDI
during the first pass; 10 cases (2%) were matched in the second pass;
the final 23 (4%) cases were matched in the third pass.

2.3. Data analysis

Data were examined using survival analysis. All analyses were con-
ducted using Stata 11.

2.3.1. Predictor variables

Demographic, drug and treatment variables available in ADIS were
included as predictors in survival time analysis. Sex, country of birth
(born in Australia or not) and indigenous status were included as time
constant predictors. Age, employment status (employed or not
employed), living status (alone or with family/others), temporary or
homeless accommodation status, and current involvement in the justice
system (through community based orders, parole, bail, custody, etc.)
were included as time-varying covariates. Other covariates in the
models included primary DoC and injecting drug use at the start of
each COT and medical and psychiatric comorbidities.
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