NHS

National Treatment Agency for Substance Misuse

A psychological autopsy study of non-deliberate fatal opiate-related overdose

Drug-related death publications

This series of publications emanates from the Government Action Plan to Prevent Drug-Related Deaths, a response to the Advisory Council on the Misuse of Drugs' report on drug-related deaths

The research was funded by the Department of Health and the NTA, which administered grants to increase the knowledge base around drug-related deaths.

Phillip Oliver, Michelle Horspool, Georgina Rowse, Mark Parry, Jenny Keen and Nigel Mathers

April 2007 > > Research briefing: 24

The National Treatment Agency for Substance Misuse

The National Treatment Agency for Substance Misuse (NTA) is a special health authority within the NHS, established by Government in 2001, to improve the availability, capacity and effectiveness of treatment for drug misuse in England.

Treatment can reduce the harm caused by drug misuse to individuals' well-being, to public health and to community safety. The Home Office estimates that there are approximately 250,000–300,000 problematic drug misusers in England who require treatment.

The overall purpose of the NTA is to:

- Double the number of people in effective, well-managed treatment between 1998 and 2008
- Increase the percentage of those successfully completing or appropriately continuing treatment year-on-year.

Reader information

Document purpose	The study is intended to provide a more complete understanding of the psychosocial nature of opiate death and to develop a methodology and standardised instruments that can be used for future research.
Title	A Psychological Autopsy Study of Non-Deliberate Fatal Opiate-Related Overdose
Lead authors	Phillip Oliver
Publication date	April 2007
Target audience	Primarily providers and commissioners of drug treatment services in England
Circulation list	Managers and commissioners of treatment services Co-ordinators and chairs of local partnerships (e.g. drug action teams and crime and disorder reduction partnerships) Service user and carer groups Commissioners of pharmaceutical enhanced services local pharmaceutical committees Regional government department leads on drugs Central government department leads on drugs.
Description	The study adapted and described the psychological autopsy methodology to identify psychological and social risk factors associated with fatal opiate overdose. A case-control study was also conducted, in which living heroin users were compared to those who died from opiate overdose, in order to identify the psychological and social risks associated with fatal opiate overdose.
Contact details	Phillip Oliver, Addiction Research Unit, Institute of General Practice and Primary Care, University of Sheffield, UK.
Gateway/ROCR approval	The NTA is a self-regulating agency in relation to the Department of Health Gateway

Disclaimer

This publication is not a journal publication and does not constitute National Treatment Agency or Department of Health guidance or recommendations. The views expressed by this study are not necessarily those of the Department of Health or the NTA, but are based on externally refereed research.

Contents

1 Introduction

1.1 Background

In the United Kingdom and other countries, most illicit substance-related overdose fatalities are caused by non-deliberate (ND) overdose involving opiates (Cassidy *et al*., 1995; Frischer *et al.,* 1993; European Monitoring Centre for Drugs and Drug Addiction (EMCDDA), 1999). Previous research has identified a number of potential factors which may increase the risk of death from a fatal ND opiate overdose. These include being male, not being in treatment, co-administration of other central nervous system depressants, using after a period of abstinence, intravenous use and using while alone (Warner-Smith *et al*., 2001). However, despite having gained knowledge of these factors for some years[1] and providing drug education accordingly, fatal ND opiate-related overdose continues to be a significant contributor to the mortality of young people in the United Kingdom and persists in rising in many countries (EMCDDA 2000).

As Neale (2000) observes, our understanding of fatal ND opiate overdose comes largely from research based on information held by coroners or their equivalents (for example; Ruttenber & Luke, 1984; Cassidy *et al.,* 1995; Hammersley *et al*., 1995; Bentley & Busuttil., 1996; Zador *et al*., 1996; Copper *et al*., 1999; Darke *et al*., 2000; Oliver *et al*., 2001 & 2003). The information collected as part of the coroner's investigation typically includes emergency service reports, witness statements, reports from treatment providers, a full physical autopsy and toxicological findings. This type of research has and continues to produce a wealth of descriptive data on such fatalities, particularly with respect to the characteristics of those who have died, the circumstances of the overdose and the pharmacological mechanisms of death.

In additional to the coroner's investigation, confidential enquiries are often conducted to better understand the role of treatment services in opiate-related fatalities. A confidential enquiry is an audit system used by authorities in cases of adverse critical incidents – usually deaths – to critically evaluate the quality of care

[1] For example, concomitant drug use was identified as a potential risk factor by Monforte in 1977.

of the person who died and to determine how services may be improved in the future. This process normally involves requesting the deceased's general practitioner and/or other clinicians to complete a questionnaire on the treatment being given to the person around the time of death, which is then assessed anonymously by two or more experienced doctors. The conclusion of the reviewers is then fed back to the service provider(s) and written up into a report.

The National Treatment Agency (NTA) now recommends that confidential enquires are carried out by drug action teams and the Department of Health provides a guidance document for the collection of such data (DH, 2003). Collections of such reports from local or national enquires may also be used as descriptive research tools. For example, Scott *et al*., (1999) describe data from 32 confidential enquiries carried out in Glasgow during 1996 in which they identify deficiencies in the care of more than half of those who died in that period.

In combination, coronial records and confidential enquires provide essential data for determining where, when and how the overdose fatality occurred, as well as helping inform treatment services. Inevitably, however, there is a limit to the sort of information readily available from such sources. While data such as demographic characteristics, toxicology levels and prescribed drugs are easily accessible, the psychosocial functioning of the individual around the time of death can be difficult to determine in any systematic way. As we discuss below, such factors are now believed to play an important role in opiate overdose, and this therefore represents a significant shortcoming. As data sources for research purposes, and particularly for identifying factors that increase the risk of fatal overdose, this type of information is also limited, largely because aggregated data from these sources (case-series studies) does not allow causal inferences to be made. In the absence of a suitable control group, typical rates of exposure to any of these factors within the population at risk cannot be determined and therefore cannot be compared.

Therefore, methods of investigating fatal opiate poisonings are unsatisfactory on two grounds. First, because they are in the most part based on conveniently available data from coroner's investigations they are of insufficient detail and, second, because they employ only descriptive methods they cannot determine (with any certainty) whether the presence of any of these variables has actually contributed to death.

Two methodological developments in the field of suicide research offer potential solutions to these problems: the psychological autopsy and the use of case-control study designs. A psychological autopsy consists of reconstructing the life and personality of the deceased at the time of death, with details of the circumstances, behaviours and events that preceded death (Schneidman & Farberow, 1961). This is achieved through synthesising information from multiple sources, most important of which is an extensive structured interview with one or more "informants" – typically a partner, parent, sibling or close friend (Isometsa, 2001). The technique originated from the US in the 1950s to assist in differentiating between deaths caused by suicide and ND overdose. Schneidman (1961) is credited with coining the term in 1961 when he wrote an article identifying 16 categories for inclusion in the process.

The psychological autopsy approach was further developed by Robins *et al*., (1959), Rudestam (1979) and Schneidman (1981a) to study suicide and has now become the gold standard method for investigating the reasons behind such deaths. Today, the use of psychological autopsies has largely been to aid the understanding of equivocal deaths and suicides, however the methodology is increasingly being used to gain an understanding of the psychosocial antecedents preceding deaths of other populations, (sudden unexplained deaths of psychiatric inpatients and prisoners, for example) and also in gaining a clearer understanding of living people in order to better predict their actions (in hostage situations and forensic settings). More recently, psychological autopsies have been used in risk-factor research and with appropriately selected controls (such as in "case-control studies") are able to estimate the role of various psychosocial risk factors involved in a suicide or other death (Appleby *et al.*, 1999).

1.2 Psychosocial risk factors for opiate-overdose

There are further advantages to the use of case-controlled (CC) psychological autopsy methods for the investigation of fatal ND opiate overdose, beyond the (considerable) improvements in the amount of information that can be collected. Research carried out by our group in Sheffield and by others has shown that many of those who die from a ND opiate overdose have a prior history of co-morbid psychiatric problems such as severe depression, psychosis and personality disorder (Oliver & Keen, 2003). Kraus & Muller-Kalthoff (2002) found that a history of previous overdose, co-morbidity of a psychiatric diagnosis (most often depression), and other determinants of psychosocial stress are associated with drug-related death. Neither study, however, included a control group, and therefore it is difficult to say whether these characteristics would also be found in a similar group of living heroin misusers. Despite this criticism – which is a recurring problem with much research into fatal opiate overdose – this data is at least suggestive of a role for psychological factors in fatal opiate overdose which makes the psychological autopsy a particularly relevant investigative technique.

1.3 Study aims

The purpose of this study is to adapt and describe the psychological autopsy methodology to investigate the psychosocial antecedents of opiate misuse deaths both as a research tool and as a standardised method for services to investigate such fatalities. After doing this, a case-control study will be conducted in which data from a control group of living heroin users recruited from local drug services will be compared to opiate overdose decedents in order to identify psychological

and social risk factors associated with fatal opiate overdose. The results of this study will provide a more complete understanding of psychosocial nature of opiate misuse deaths and the developed methodology and instruments will be made available for future research on a national and international level.

2 Methods

2.1 Introduction

This section has been written to serve two main functions: first as a traditional methodology section to describe the process by which our research questions were investigated and second as a guide to conducting psychological autopsies in the case of fatal illicit opiate-related fatalities. Those wishing to use psychological autopsies for this purpose are also directed to reviews of ethical and methodological issues by Beskow *et al*., (1990, 1991), Hawton *et al*., (1998) and Cooper (1999). The present study was run in accordance with the guidelines for conducting psychological autopsy studies, as published by Clark and Horton-Deutsch (Maris, 1992).

2.2 Definition of an acute non-deliberate opiate-related fatal overdose

2.2.1 Definition of acute

All of the cases included in this study were individuals who died as a consequence of the immediate effects of taking an opiate. This type of death may not always occur straight away, for example the person may die later in hospital, but they are distinguishable from delayed deaths which are related to illicit opiate use but not directly attributable to the toxicity of the drugs themselves, such as death from virus infections (for example, HIV and hepatitis B and C) or vascular complications that arise from injecting.

2.2.2 Definition of non-deliberate

In accordance with the Coroners Act 1988 and the Coroners' Rules 1984, all sudden, unexpected, or suspicious deaths are investigated by the Coroner's Office. If such a death is then considered to be from unnatural causes an inquest is held and a verdict as to the cause of death is normally passed. In order to exclude deliberate deaths, we therefore omitted those who died from a fatal opiate-related overdose but had suicide verdicts passed. Open verdicts that were probable suicides were also omitted after consultation with the coroner. Such deaths remain amenable to investigation by psychological autopsy using the methods developed here but are not the focus of this research study.

2.2.3 Definition of opiate-related

As the focus of this study is on fatal overdose in relation to illicit opiate use, our definition of "opiate-related" is restricted to either illicit opiates or opiates used in the treatment of heroin dependence. In practical terms this essentially limits the definition to fatalities involving illicit heroin or methadone, as deaths involving other opiates in this population are comparatively rare.

2.3 Functions of the psychological autopsy

The psychological autopsy employed in this study has two principal functions. The first is as a method of determining the major social and psychological characteristics and circumstances at the time of death. This is achieved through an in-depth structured interview with one of more informants – usually a spouse or family member – using standardised and validated psychological assessment instruments where available. The second function is that the information gathered may be used to identify risk factors associated with the fatality by pooling together data from multiple autopsies in an appropriate research study. Although not a specific function in the present study, some researchers have noted that appropriately conducted psychological autopsies may also have therapeutic benefits for the interviewees (Beskow *et al*., 1990).

2.4 Study design

A risk factor is defined as an aspect of personal behaviour, inherited characteristic or environmental exposure which increases the risk of a person developing a disease or condition. For the present study we employed a matched case-control design to evaluate a series of psychosocial risk factors for acute non-deliberate fatal opiate overdose. In a case-control study, a group of individuals with the outcome of interest (fatal opiate overdose in this instance) is compared to a similar group of individuals without this outcome with respect to certain factors which are believed to increase (or decrease) the risk of the outcome occurring. Cases were matched to controls 1:1 on sex and age. It was originally intended that cases and controls would also be matched on treatment status (and by proxy drug use status). In practice it proved to be difficult to recruit controls from non-prescribing settings and therefore where possible we matched out-of-treatment cases with controls that had only recently entered treatment (within the past month).

2.5 Participants

2.5.1 Selection of cases

Cases for the study were a consecutive sample of individuals who died from an acute non-deliberate, opiate-related overdose and on whom an inquest was held between April 2004 and May 2005 at the two South Yorkshire coroners' courts. These courts cover the cities of Sheffield, Doncaster, Barnsley and Rotherham, and surrounding areas. All fatalities suspected of dying from a fatal-opiate overdose were notified by the coroner's office to a research nurse who attended the inquest. Cases fulfilling the following criteria were included.

2.5.2.1 Inclusion criteria

Death confirmed by physical autopsy blood toxicology to have been caused by either the acute toxicological effects of an opiate or a related state, such as aspiration asphyxia or aspiration pneumonitis.

2.5.1.2 Exclusion criteria

1 Cases in which the mode of death as determined by the coroner was ascribed as suicide

2 Probable cases of suicide in which the mode of death was unclassified (that is, an "open" verdict) by the coroner. Consensus agreement on such cases was reached by the clinical members of the study management committee including the coroner

3 Cases in which an opiate played an incidental role in death (for example, a road traffic accident)

4 Cases in which a convincing toxicological cause of death could not be determined

5 Cases where no key informants could be consented

6 Cases under the age of 16.

2.5.2 Selection of controls

Control participants were recruited on a case-by-case basis (dependent upon the matched characteristics) from treatment and voluntary sector services located within Sheffield. Suitable controls were identified by staff members within the treatment service and asked permission to be approached by a member of the research team. The control was contacted by telephone and, if willing to participate, consented and asked to nominate an informant. The informant was then contacted by the research team to confirm participation and to provide consent.

2.5.3 Informants

2.5.3.1 Key informants

The selection of informants was guided by reviews of the literature, in particular Hawton *et al*., (1998) and Cooper (1999, 2001). One key informant was selected for each index case to be interviewed as part of the psychological autopsy. The informant (typically a parent or partner) was approached at inquest by one of the coroner's ushers in the first instance and, where appropriate, directed to a researcher present at the inquest. If no suitable informant was present, attempts were made to identify one from the coroner's records. Where a potential informant was identified in this manner they were contacted by letter from the coroner and asked to participate. Those that did not opt out at this stage where contacted directly by the research nurse a week later.

2.5.3.2 Healthcare professional informants

In preparation for the study a mailshot was sent out to all Sheffield general practitioners on behalf of the coroner and the research team, detailing the study and requesting participation where appropriate.[2] The deceased's general practitioner was identified from the coroner's records or the district Family Health Services Authority (FHSA) following the inquest and a letter was sent describing the study including a participant information sheet. From either the coroner's case records or the general practitioner, other healthcare professionals from statutory and non-statutory drug treatment services were also identified.

2.6 Contents of the psychological autopsy interview schedule

No standard interview schedule exists for conducting psychological autopsies; however, some authors have published recommended lists of components that should be included. In the present study we employed a modified version of psychological autopsy schedules used by Foster *et al*., (1997), Appleby *et al*., (1999) and Cooper, (2001) which have been used extensively to study suicide in the UK. The standard interview schedule[3] contains seven sections including:

1 Demographics

2 Clinical history

3 History of deliberate self-harm

4 Social networks

5 Life events and chronic life stressors

6 ICD-10 psychiatric diagnoses

7 ICD-10 personality disorder diagnoses.

This was augmented with information from the coroner's records to describe the circumstances of death for the cases, and with an additional section to collect information about the informant and their relationship to the study participant. Sections 5 to 7 were based around standardised instruments as detailed in the following sections.

2.6.1 Life events and chronic stressors

Life events are defined in the method as "dateable occurrences involving changes in the external social environment" (Paykel, 1997). The impact of life events occurring in the six months prior to death or interview and ongoing chronic life stressors ("life difficulties") were assessed using a derivative of Paykel's (1971) Life Events Schedule as used by Appleby *et al*., (1999). The schedule comprised 46 life event items, covering domains corresponding to employment, education, finances, health,

[2] The study was extended to other South Yorkshire cities at a later date.
[3] The standard interview schedule can be downloaded from http://www.nta.nhs.uk/publications/documents/psychological_autopsy_appendix_rb24.pdf

relationships, family, migration, bereavement, and crime. Each event was rated according to how recently it had taken place (within the past week, month, three months or six months prior to death or interview), and the degree of negative impact (none, mild, moderate or severe). Where more than one event had occurred within each item, the event with the highest impact took priority (Paykel, 1983). Life difficulties, defined as chronic life stressors that are ongoing and affecting the person during the three months leading up to death or interview, were also recorded for the domains of primary relationships, other relationships, finances, health, education and work. These were also rated according to degree of impact as described for life events.

2.6.2 ICD-10 psychiatric diagnoses

Psychiatric diagnoses were made according to International Statistical Classification of Disease and Related Problems, 10th revision (ICD-10) criteria. Briefly, this covers areas of depression, mania, and schizophrenia, as well as anxiety, panic, phobic, adjustment, obsessive compulsive and eating disorders. Alcohol and substance misuse disorders were also included. The informant was asked a series of 38 screening questions in a semi-structured fashion which were then developed into more detailed enquiries where there was evidence of the particular disorder within the past month. A diagnosis of one or more of these disorders was made according to The ICD-10 Classification of Mental and Behavioural Disorders – Diagnostic Criteria for Research (DCR-10, WHO, 1993). The validity of diagnoses obtained using the psychological autopsy method has been confirmed in studies by Brent *et al*., (1993) and Kelly & Man (1996).

2.6.3 ICD-10 diagnoses of personality disorder

Presence of one or more ICD-10 personality disorders was diagnosed using Tyrer's (2000) informant-rated version of the Personality Assessment Schedule (PAS). Nine different types of personality disorder were assessed: paranoid, schizoid, dissocial, impulsive, borderline, histrionic, anakastic, anxious and dependent. Each of these was scored on a scale of 0 to 14 via a series of semi-structured questions and then recoded into a three-category scale corresponding to: no personality disorder, personality difficulty and personality disorder. An overall severity score[3] was also produced, taking into account potential combinations from different personality disorder types. The resulting severity score was classified as either absent, simple, complex or severe personality disorder.

2.6.4 Modifications to the psychological autopsy schedule for use with opiate users

The psychological autopsy schedule was expanded to include a more extensive drug use and treatment history. This was based upon reviews of the literature, sections of the comprehensive assessment used by clinical nurse specialists in Sheffield and additional information on the individual's history of accidental overdose. It was also felt necessary to expand Paykel's (Paykel *et al.,* 1971) life events schedule to include items with direct relevance to heroin users. To facilitate this, a service user development worker ran a small focus group of current heroin users to discuss the relevance of items within the life events schedule and to discuss possible additions. From this a separate "drug-related" life events category was added to the schedule containing five additional items (LE45–49)[3] covering issues such as withdrawal of prescribed treatment, problems with dealers and child protection problems.

The revised version of the complete psychological autopsy schedule was piloted on a parent from a local drug misuse bereavement group who provided useful information about the acceptability of the questions and the length of the interview. Following the pilot interview, the schedule layout was modified to reduce its overall size as to minimise any potential apprehension that the informant may experience about the volume of information to be collected.

2.7 How the interviews were conducted

It is recommended in the literature that interviews are conducted by a person with a psychiatric background and experience of dealing with bereavement (Beskow *et al*., 1990). Due to the nature of the deaths involved in this study we added a further criterion – that the interviewer should have some experience of substance misuse populations. In the present study the interviewer was a clinical nurse specialist in substance misuse who also had additional research experience.

Potential informants for the deceased who agreed to be approached by the research nurse at inquest were briefly given verbal details about the study and a study information sheet to take away. With their permission, they were then contacted by telephone within one week and asked to participate in the study. An initial appointment was offered to all the informants before deciding to participate in the research to provide detailed information about the interview process and to discuss what information would be collected. Informants for both groups were interviewed at their home and interviews conducted using a semi-structured format. While the research nurse ensured that all questions within the interview schedule were addressed, the structure of the interview was allowed to flow naturally and guided where necessary.

Care was taken to ensure that the integrity of the case or control was respected and that facts about either that may have been unknown to the informant were not disclosed. Interviews were recorded where consented (and practical) using a digital voice recorder as an *aid-memoir* and also to facilitate the flow of the interview and avoid excessive note taking which might otherwise diminish the intimacy of the interview (Hawton, 1998).

All informants for the cases were offered a bereavement information pack provided by the Royal College of Psychiatrists (Hill *et al.*, 1997) at the end of the interview, along with a leaflet

describing a community self-help group that offers support to families and friends bereaved by illicit drug use. They were then contacted after two-to-three days by the research nurse to follow-up any potential psychological issues that emerged from the psychological autopsy.

General practitioners and other relevant health care professionals were interviewed to collect information on clinical and drug treatment histories either face-to-face at their office or by telephone.

2.8 Validity of psychiatric assessment

To ensure that the presence of any psychiatric or personality disorder diagnoses were determined as accurately as possible, digital recordings of relevant sections of the semi-structured interview were analysed independently by a consultant psychiatrist and a clinical psychologist. The DCR-10 and PAS sections were separated from the rest of the psychological autopsy and sent individually to the experts (who were blinded to the case-control status) in a random order. Both experts completed the DCR-10 and PAS forms from these recordings and scored the instruments based upon their interpretation of the criteria and clinical judgement. Regular review meetings took place to reach consensus on all participants. In the few instances in which the psychological autopsy could not be recorded, the research nurse discussed any ambiguities with the expert panel to reach consensus.

			Group		Hypothesis tests[a]
Variable		Total sample *n*=26	Opiate fatalities with informants *n*=16	Refusals *n*=10	*P*-value
Mean age in years (SD)		32 (7.62)	32 (8.33)	32 (6.75)	0.940
Sex	Male	25 (96%)	15 (94%)	10 (100%)	0.420
Ethnicity	White	26 (100%)	16 (100%)	10 (100%)	1.000
Marital status	Not currently in a relationship	23 (89%)	14 (88%)	9 (90%)	0.846
Any resident children?	No	23 (89%)	14 (88%)	9 (90%)	0.846
In employment?	No	18 (69%)	12 (75%)	6 (60%)	0.420
If unemployed, has this been for more than 1 year? (*n*=18)	Yes	16 (100%)*	10 (100%)	6 (100%)	1.000
Social class	V	23 (89%)	14 (88%)	9 (90%)	0.846
Accommodation**	Rented or owned home Parent's home Hostel/support housing/inpatient setting Homeless	12 (46%) 5 (19%) 5 (19%) 4 (15%)	7 (44%) 3 (19%) 4 (25%) 2 (13%)	5 (50%) 2 (20%) 1 (10%) 2 (20%)	0.756
Lived alone?	Yes	19 (73%)	11 (69%)	8 (80%)	0.529
Lived with a heroin user?	Yes	5 (20%)*	4 (25%)	1 (11%)	0.405

Table 1: Characteristics of total sample and comparisons between those with and without informant interviews.

[a] Pearson's Chi-squared (χ^2) test for nominal variables and the independent groups t-test for continuous variables test.

* Data unavailable in two cases.

** Chi-squared (χ^2) test conducted on rented/owned home vs other.

2.9 Statistical analysis

Statistical analysis first involved summarising the information contained within the interview schedule using descriptive statistics. Potential risk factors for fatal opiate overdose were then derived from this exploratory analysis. Odds ratios (ORs) were calculated to estimate the risk of non-deliberate fatal opiate overdose associated with each of the derived variables. Since cases and controls were matched, ORs were estimated using conditional logistic regression (Kleinbaum *et al.*, 1998).

An OR of one indicates that there is the same risk of overdose in those who have the characteristic in question as those who do not. ORs greater than one indicate that the presence of the characteristic increases the risk of fatal overdose and conversely an OR of less than one suggests a decreased risk of overdose – the characteristic is protective. Confidence intervals were reported in all cases and McNemar's Chi squared (χ^2) test for matched pairs was used to test the null hypothesis that the OR=1. All data from the psychological autopsy were analysed using STATA version 8.2 (StatCorp, 2003).

3 Results

3.1 Study participation

During the study period March 2004 to August 2005, 32 opiate-related inquests took place at the two South Yorkshire coroner's courts. Of these, 26 fulfilled the criteria for study inclusion. From these, two cases were excluded as no informant attended the inquest or could be subsequently identified. A further eight cases were omitted: three after the potential informants refused to allow an approach by the study research nurse and five who declined after being contacted by telephone following the inquest. The most common reason for refusing to take part in the study was because the family were unaware of their relative's drug use and they were upset by the role this had played in the death.

3.2 Characteristics of fatalities with and without informants

In order to assess potential selection bias we compared the characteristics of the 16 opiate fatalities with participating informants to the ten cases whose families did not attend the inquest or refused to take part in the study (Table 1). Both groups were similar on socio-demographic variables and no statistically significant differences were detected.

3.3 Matching

Fifteen of the 16 overdose cases were matched with a suitable control on the basis of gender and age. Eleven of the 15 cases were matched within four years of age with a further three matched within six years. The solitary female overdose fatality could only be matched with a control that was 11 years younger. This was considered preferable to having no females in the study whatsoever. There were therefore 15 case-control pairs entered into the matched analysis.

3.4 Acceptability of the psychological autopsy for the case-group informants.

Without exception, all the consenting case informants were extremely willing to be involved and motivated by the hope that their participation would help in reducing future deaths of this nature. Although not a necessary part of the interview, as it had been dealt with at inquest, many informants still had questions regarding the circumstances of death and many wanted further clarification of issues that had been raised at the inquest itself. The interview at times could be emotional for the informants – though the informants did not view this as a negative state. Many felt the time they had with the research nurse offered them space to talk and reflect on the participant as a person rather than as a "drug user".

		n (%)
Mean age in years (SD)		32 (8.5)
Sex	Male	14 (94%)
Coroner's verdict	Misadventure	7 (47%)
	Dependence, misuse or abuse of drugs	5 (33%)
	Non-dependent use of drugs	1 (7%)
	Open	1 (7%)
	Narrative verdict	1 (7%)
Cause of death	Heroin toxicity	4 (27%)
	Heroin plus concomitants	5 (33%)
	Methadone	3 (20%)
	Methadone plus concomitants	3 (20%)
Place of death	Own home	6 (40%)
	Friend or family's home	6 (40%)
	Other	3 (20%)
How was deceased discovered?	Found dead	7 (47%)
	Found unconscious	4 (27%)
	At point of collapse	4 (27%)
Abstinence?	No	7 (47%)
	Recent prison release	4 (27%)
	Break from drug use/no history of heroin use	3 (20%)
	Detoxification	1 (7%)

Table 2: Characteristics and circumstances of death for the case group (n=15)

Variable		Group			
		Total sample *n*=30	Study group *n*=15	Control group *n*=15	Hypothesis tests[(a)]
Mean age in years (SD)		45.63 (14.27)	49.73 (13.55)	41.53 (14.23)	t_{28}=1.62, *P*=0.117
Sex	Female	22 (73.3%)	9 (60.0%)	13 (86.7%)	χ^2_1=2.73, *P*=0.215
Relationship to deceased/control	Partner Parent Other	8 (26.7%) 14 (46.6%) 8 (26.7%)	1 (6.7%) 8 (53.3%) 6 (40.0%)	7 (46.7%) 6 (40.0%) 2 (13.3%)	χ^2_2=6.58, *P*=0.047
Is the informant a heroin user?	No	23 (76.7%)	11 (73.3%)	12 (80.0%)	χ^2_1=0.19, *P*=0.666
Length of time known	Lifetime >12 months	19 (63.3%) 11 (36.7%)	11 (73.3%) 4 (26.7%)	8 (53.3%) 7 (46.7%)	χ^2_1=1.29, *P*=0.256
Average frequency of contact with the deceased	Lived with At least weekly Between two and three times a month	9 (30.0%) 19 (63.3%) 2 (6.7%)	3 (20.0%) 10 (66.7%) 2 (13.3%)	6 (40.0%) 9 (60.0%) 0	χ^2_2=3.05, *P*=0.217

Table 3: Details of informants and hypothesis tests for differences between both informant groups

[(a)] Pearson's χ^2 test for nominal variables and the independent groups t-test for continuous variables test.

The interviews, while following the same format, varied in length of time reflecting the amount of information offered and the manner in which this was gathered. Interviews took between one-and-a-half and seven hours, and were broken into two sessions where it was considered necessary. All the informants received a follow-up phone call a few days after the interview and this seemed to be a key ingredient in ensuring that the families were not then left with any psychological issues following the interview.

3.5 Circumstances of death for the case group

Details of the circumstances of death and demographic data for the 15 cases with matched controls are given in Table 2. Mean age at time of death (32 years, SD=9 years) and gender distribution are similar to those from larger scale studies of opiate-related overdose in Sheffield, the UK and other countries (Oliver & Keen, 2003; Zador *et al.*, 1996). The cause of death as determined by the coroner's inquest was heroin-related in nine cases and methadone-related in the remaining six cases.

Coroner's records indicated that there was only limited opportunity for intervention following overdose – in only four cases was another person present at the point of collapse. Eight of the 15 overdoses may have occurred due to incomplete tolerance to opiates, and of these four took place shortly after the deceased had been released from prison. Verdicts of "misadventure" and "dependence, misuse or abuse of drugs" were the most common to be passed at inquest.

3.6 Characteristics of informant groups

Table 3 shows the characteristics of the informant groups for the cases and controls. The informant was more likely to be a parent for cases but a partner for controls (χ^2_2=6.58, *P*=0.047), however, there was little difference between the average length of time that the informant had known the study participant and, most importantly, the frequency of contact. All informants had known the participant for at least 12 months and the majority throughout their entire lifetime. Informants were most often females (73 per cent) and mean age was 46 years (SD=14 years).

3.7 Risk factors for acute ND fatal-opiate overdose[4]

3.7.1 Social and clinical histories

A range of social and demographic indicators associated with disrupted social functioning were measured (Table 4). Marked differences between the two study groups were observed with respect to relationship status. Thirteen of the 15 overdose cases (87 per cent) were described as not being in a relationship, compared to only five in the control group (OR_m=9.00, 95 per

[4] Because of the limited sample size, this study is insufficiently powered to detect as statistically significant ORs of anything less than considerable magnitude (around 10 for risk factors, depending on the exposure in the control group). For descriptive purposes therefore we will highlight group differences greater than 20 per cent as potentially relevant factors for further study.

cent CI=1.14–71.04). While this was the only statistically significant social functioning variable, cases were more likely to live alone (33 per cent compared to seven per cent) and were also more likely to be considered as having a disruptive or isolated social network (73 per cent vs. 53 per cent). The clinical history of the study groups is shown in Table 5.

Cases were more likely to have had a history of mental health difficulties (33 per cent vs. seven per cent), a current psychiatric diagnosis (29 per cent vs. eight per cent) and to be in receipt of a prescription for psychotropic medication (29 per cent vs. seven per cent). Four of the cases (27 per cent) and two of the controls (13 per cent) had previously attempted self-harm. With the exception of one individual (who was a crack user) all of the cases were known to have used heroin at some point in the past. At the time of death 36 per cent of the cases and 47 per cent of the controls were using heroin daily. Cases were less likely to be prescribed an opiate replacement by their doctor (27 per cent vs. 80 per cent, Table 6). This was to be expected given that most of the controls were recruited from treatment settings. There were no differences between either of the two groups with respect to any opiate overdose history variables (data not shown).

3.7.2 Acute life events and chronic difficulties

Experience of life events was common and with the exception of one individual, all study participants experienced one or more life events in the previous six months. The mean number of life events, of any impact, was 5.73 (SD=3.33) for the cases and 5.13 (SD=2.85) for the controls. The highest life event scores were for the domains of finance, crime, migration and drug-related (Figure 1). Cases experienced more difficulties with finance and migration-related events than the controls while controls had a higher proportion of drug-related events. This is also confirmed in Table 7, which shows the number of study participants with at least one event in the past six months for each of the life event domain.

	Group		Unadjusted odds ratios		*P*-value*
Variable	**A. Study group (*n*=15) n (%)**	**B. Control group (*n*=15) n (%)**	**OR_m (95% CI)**	**OR_{un} (95% CI)**	
Not currently in a relationship	13 (87%)	5 (33%)	9.00 (1.14–71.04)	13.00 (2.1–81.5)	0.037
Living with one or more children	2 (13%)	3 (20%)	0.67 (0.11–3.99)	0.62 (0.1–4.3)	0.657
Unemployed	11 (73%)	13 (87%)	0.33 (0.03–3.20)	0.40 (1.1–2.8)	0.341
Rented or owned their own home	7 (46%)	10 (67%)	0.57 (0.17–1.95)	0.44 (0.1–1.9)	0.372
Living alone	5 (33%)	1 (7%)	† (0.66– .)	7.00 (0.7–69.5)	0.125**
Living alone with another heroin user	4 (27%)	4 (27%)	1.00 (0.20–4.95)	1.00 (0.20–5.05)	1
Isolated from peer group	4 (27%)	6 (40%)	0.60 (0.14–2.51)	0.55 (0.12–2.55)	0.484
Complained of feeling lonely	3 (20%)	2 (13%)	2.00 (0.57–22.05)	1.63 (0.23–11.46)	0.571
Disruptive or isolated social network	11 (73%)	8 (53%)	2.5 (0.49–12.89)	2.41 (0.52–11.10)	0.273

Table 4: Univariate odds ratios (ORs) for socio-demographic variables

* *P*-value based on McNemar's χ^2 test for matched pairs and the ** Exact McNemar test for matched pairs when asymptotic significance levels could not be estimated.

OR_m = Odds ratio estimate using conditional logistic regression.

OR_{un} = Odds ratio estimate using cross-product ratio estimate.

† Odds ratio could not be estimated using conditional logistic regression due to the distribution of responses in each strata. Exact confidence intervals are provided to aid inference in these instances.

	Group		Unadjusted odds ratios		*P*-value*
Variable	A. Study group (*n*=15) n (%)	B. Control group (*n*=15) n (%)	OR_m (95% CI)	OR_{un} (95% CI)	
Registered with a GP	11 (73%)	15 (100%)	† (. –1.51)	.a	0.125**
Contact with GP within past month	4 (27%)	5 (33%)	0.80 (0.22–2.98)	0.73 (0.15–3.49)	0.739
Treated by GP within the past month: physical health-related	4 (27%)	4 (27%)	1.00 (0.20–4.95)	1.00 (0.20–5.05)	1
Current mental health diagnosis (*N*=26)	4 (29%)	1 (8%)	3.00 (0.31–28.84)	3.6 (0.32–40.23)	0.341
History of mental health difficulties	5 (33%)	1 (7%)	5.00 (0.58–42.79)	7.00 (0.71–69.49)	0.142
Psychotropic medication (*N*=28)	4 (29%)	1 (7%)	† (0.41– .)	5.20 (0.50–54.05)	0.250**
Attempted deliberate self-harm in the past	4 (27%)	2 (13%)	3.00 (0.34–28.84)	2.36 (0.36–15.46)	0.341

Table 5: Univariate odds ratios (ORs) for GP record-based variables

* *P*-value based on McNemar's χ^2 test for matched pairs and the

** Exact McNemar test for matched pairs when asymptotic significance levels could not be estimated.

OR_m = Odds ratio estimate using conditional logistic regression.

OR_{un} = Odds ratio estimate using cross-product ratio estimate.

† Odds ratio could not be estimated using conditional logistic regression due to the distribution of responses in each strata. Exact confidence intervals are provided to aid inference in these instances.

.a OR could not be estimated using cross product ratio due to zero values.

In the week prior to fatal overdose (or interview) most study participants (28/30) had experienced one or more life events of any impact. The average number of such events was 4.20 (SD=3.47) for cases and 3.27 (SD=2.52). Occurrences of a life event of moderate or major impact in the past week were observed in both groups with 53 per cent of cases and 60 per cent of controls having at least two of these events during this period. Five cases (33 per cent) and two controls (13 per cent) experienced a life event of major impact in the week prior to overdose or interview.

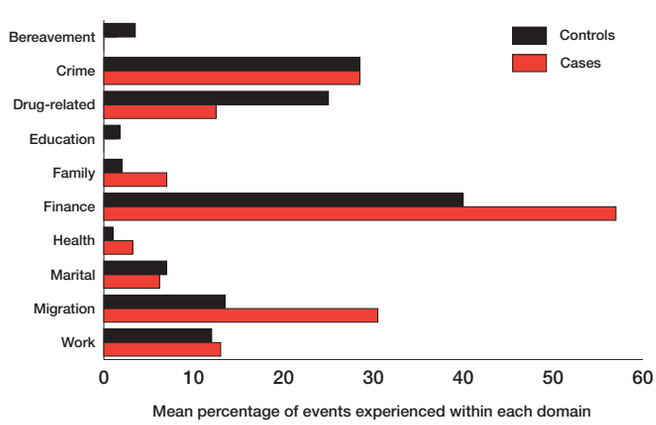

Figure 1: Mean proportion of events experienced by study group in each life event domain

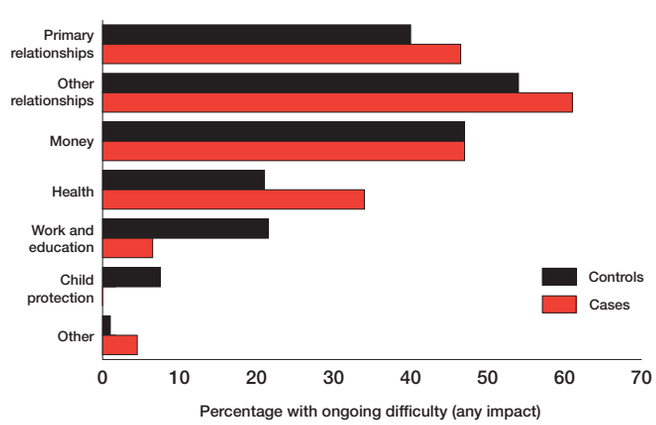

Figure 2: Odds ratios (ORs) for life events and difficulties

	Group		Unadjusted odds ratios		*P*-value*
Variable	**A. Study group (*n*=15) n (%)**	**B. Control group (*n*=15) n (%)**	**OR_m (95% CI)**	**OR_{un} (95% CI)**	
Daily heroin use (*N*=28)	5 (36%)	7 (47%)	1.05 (0.86–1.27)	0.56 (0.12–2.53)	0.641
Receiving opiate substitute therapy	4 (27%)	12 (80%)	† (. –0.58)	0.09 (0.02–0.50)	0.008
Ever received a pharmacological intervention for drug dependence (*N*=28)	10 (71%)	13 (87%)	0.33 (0.03–3.20)	0.39 (0.06–2.54)	0.341
History of overdose from use of illicit drugs (*N*=24)	8 (67%)	6 (50%)	2.00 (0.37–10.92)	2.00 (0.38–10.41)	0.423
Number of overdoses in the past five years (*N*=24)	1.00 (0–6)	0.5 (0–6)	1.05 (0.58–1.88)	1.15 (0.75–1.78)	0.882

Table 6: Univariate odds ratios (ORs) for drug use variables

* *P*-value based on McNemar's χ^2 test for matched pairs and the ** Exact McNemar test for matched pairs when asymptotic significance levels could not be estimated.

OR_m = Odds ratio estimate using conditional logistic regression.

OR_{un} = Odds ratio estimate using cross-product ratio estimate.

† Odds ratio could not be estimated using conditional logistic regression due to the distribution of responses in each strata. Exact confidence intervals are provided to aid inference in these instances.

	Number with at least one life event in the past six months		
Life event category	**Cases (*n*=15)**	**Controls (*n*=15)**	***P*-value***
Work	13 (87%)	13 (87%)	0.701
Education	—	1 (7%)	0.500
Finance	11 (73%)	8 (53%)	0.225
Migration	6 (40%)	4 (27%)	0.350
Health	2 (13%)	1 (7%)	0.500
Marital	3 (20%)	6 (40%)	0.213
Family	5 (33%)	2 (13%)	0.195
Bereavement	—	1 (7%)	0.500
Crime	9 (60%)	9 (60%)	0.645
Drug-related	5 (33%)	7 (50%)	0.645

Table 7: Summary of life events, showing the number of cases/controls with at least one life event (of any impact) in the six months prior to death/interview

* *P*-value based on Fisher's exact test.

Experiences of ongoing chronic life difficulties were also common in each of the study groups. The most common ongoing life difficulties were problems in relationship and finances (figure 2). Of the seven life difficulty areas, 47 per cent of cases and 40 per cent of controls had two or more current life difficulties of moderate impact or above. Cases however were more likely to have an ongoing severe life difficulty than controls (47 per cent vs. 20 per cent). Four of the overdose cases (27 per cent) had recently been released from prison; one died the day after release, two within one week and one within one month. One of

	Group		Unadjusted odds ratios		*P*-value*
Variable	Case group (*n*=15)	Control group (*n*=15)	OR_m (95% CI)	OR_{un} (95% CI)	
Number of life events in the past six months of any impact (mean, SD)	5.73 (3.33)	5.13 (2.85)	1.07 (0.83–1.38)	1.07 (0.84–1.36)	0.577
Number of life events in the past week of any impact (mean, SD)	4.20 (3.47)	2.93 (2.40)	1.16 (0.89–1.52)	1.17 (0.89–1.53)	0.268
Two or more life events in the past week of moderate or major impact	8 (53%)	9 (60%)	0.75 (0.17–3.35)	0.76 (0.18–3.24)	0.706
Major life event in the week prior to overdose/interview	5 (33%)	2 (13%)	4.00 (0.45–35.79)	3.25 (0.52–20.37)	0.423
Recently released from prison	4 (27%)	1 (6.7%)	4.00 (0.48–35.79)	5.01 (0.50–52.29)	0.215
Two or more moderate/severe life difficulties	7 (47%)	6 (40%)	1.25 (0.34–4.65)	1.31 (0.31–5.58)	0.739
One or more current severe life difficulties	7 (47%)	3 (20%)	3.00 (0.61–14.86)	3.50 (0.69–17.71)	0.178

Table 8: Odds ratios (ORs) for life events and difficulties

* *P*-value based on McNemar's χ^2 test for matched pairs and the ** Exact McNemar test for matched pairs when asymptotic significance levels could not be estimated.

OR_m = Odds ratio estimate using conditional logistic regression.

OR_{un} = Odds ratio estimate using cross-product ratio estimate.

the control group participants had also been released from prison in the week prior to interview. Matched and unmatched odds ratios for these variables are given in Table 8.

3.7.3 ICD-10 psychiatric and personality disorders

All but two of the study participants fulfilled the criteria for one or more psychiatric diagnoses following the psychological autopsy. The most common psychiatric diagnoses met were related to substance abuse. Nine out of the 15 cases (64 per cent) and 14 out of the 15 cases (93 per cent) met the criteria for substance dependence (Table 9). One-third of the cases and 20 per cent of the controls met the criteria for harmful alcohol use. Non-substance-related diagnoses were rarer and given to only three of the cases and three of the controls (20 per cent respectively). This included one case and two controls with mild depression, one case with moderate depression, anxiety disorder and panic disorder, one case with severe depression and one control with anxiety disorder.

Personality disorder criteria were met in three of the cases (20 per cent) and six of the controls (40 per cent). One of the cases met the criteria for both dependent and borderline personality disorders, the other two fulfilled the criteria for anxious and dependent personality disorders, respectively. All six controls met the criteria for antisocial (dissocial) personality disorder. Personality difficulties (PAS severity ratings of between four and six) were identified in nine cases (60 per cent) and 11 controls (73 per cent). Impulsivity and histrionic personality disorder categories were the most common found to have such ratings for the cases (four, 27 per cent each), and paranoid and histrionic for controls (also four cases). Seven cases (47 per cent) and five controls (33 per cent) had two or more personality difficulties (see Table 10).

Odds ratios for variables derived from the ICD-10 psychiatric and personality disorder classifications are given in Table 11.

4 Discussion

4.1 Methodological issues

Sixty-seven percent (16/24) of the informants approached to participate in the psychological autopsy study at inquest agreed to be interviewed. Various methods have previously been used to approach suitable informants with varying degrees of success. In one study of suicide Brent *et al*. (1988) achieved a 77 per cent acceptance rate after contacting informants by letter followed by a telephone call one week later. Other methods of approach include visits to the home of the informant (Barraclough *et al.,* 1974; Cheng *et al*., 2000), which can result in low refusal rates

ICD-10 disorder	Cases (*n*=15)	Controls (*n*=15)
Depression		
Mild	1 (7%)	2 (13%)
Moderate	1 (7%)	–
Severe	1 (7%)	–
Severe with psychosis	–	–
Mania		
Hypomania	–	–
Mania	–	–
Bipolar affective disorder	–	–
Schizophrenia	–	–
Generalised anxiety disorder	2 (13%)	1 (7%)
Panic disorder		
Moderate	1 (7%)	–
Severe	–	–
Phobic disorder	–	–
Obsessive compulsive disorder	–	–
Adjustment disorder	–	–
Eating disorder		
Anorexia nervosa	–	–
Bulimia nervosa	–	–
Alcohol		
Harmful use	5 (33%)	3 (20%)
Dependence syndrome	–	–
Substance abuse		
Harmful use	6 (40%)	6 (40%)
Dependence syndrome	9 (64%)	14 (93%)

Table 9: Psychiatric diagnoses following psychological autopsy using the ICD-10 classification of mental or behavioural disorders diagnostic criteria for research

but may be considered unacceptable to local research ethics committees in England and Wales (Cooper *et al*., 1999).

Our method of approach was constrained to a degree by the coroner who wished to limit disclosure of confidential information and protect the deceased families from unsolicited contact. Because the coroner's inquest is a public hearing in open court and the coroner's ushers mediated any initial contact, these issues were circumvented and while it remains possible that higher rates of participation may have been achievable through alternative methods of approach, we believe that ours offered the greatest respect for the autonomy of the deceased's relatives.

As with previous research using this methodology (Beskow *et al.,* 1990, 1991), all of the case informants who agreed to participate were eager to be involved and none found the psychological autopsy unduly upsetting nor asked for the interview to be terminated.

4.2 Key findings

In this study a number of differences between those who had died of a fatal opiate overdose and current opiate users emerged. While we do not wish to mislead the reader into concluding that these differences represent actual risk factors – with a few exceptions none were statistically significant – our small sample size means that it would equally wrong to dismiss these differences as the study was insufficiently powered to detect anything other than particularly substantial effects. Here we summarise some of the larger differences in proportions between the two groups and general trends but emphasise that these should be treated as exploratory findings to direct future research.

We found evidence that being in a relationship is a protective factor for fatal ND opiate overdose. Eighty-seven percent of cases were single – a figure similar to descriptive studies of fatal and non-fatal opiate overdose – compared to 33 per cent in the control group. In a nested case-control study of 81 overdose deaths among intravenous drug users, Davoli *et al.* (1993) found that unmarried drug users were 2.48 (CI=1.31 to 4.68) times more likely to die from a drug overdose than their married peers. Similarly, O'Driscoll *et al*. (2001) showed that living alone increased the risk of ND fatal drug overdose among intravenous drug users by a factor of 2.28 (CI=1.01 to 5.17). More generally, we found that a higher proportion of cases lived alone and experienced an isolated or disrupted social network (that is, one characterised by conflict) consistent with findings from studies of non-fatal overdose (for example, Latkin *et al*., 2004).

It is of little surprise that the majority of the study group met the ICD-10 criteria for substance misuse; however more individuals fulfilled these criteria in the control group (93 per cent compared to 64 per cent). This suggests that some of the overdose fatalities were less experienced users and that incomplete tolerance or opiate naivety played a role, though the selection of the control group from predominately treatment settings may also be relevant. Overdose fatalities were more likely to have been currently diagnosed with a mental health problem and be in receipt of a prescription for psychotropic medication as previously shown by others (Jones *et* al., 2002; Kraus & Müller-Kalthoff, 2002). Despite this, following the psychological autopsy interview there was little difference between those who died and the control group with respect to meeting the criteria for an ICD-10 psychiatric diagnosis not related to substance misuse.

Other research is similarly inconclusive. For example, in a recent longitudinal cohort study of non-fatal heroin overdose carried out as part of the Australian Treatment Outcomes Study (ATOS), Darke *et al.* (2005) found no differences in rates of major depression between heroin users who had experienced a non-

	Personality difficulty		Personality disorder (PD)	
Personality disorder	**Case (*n*=15)**	**Control (*n*=15)**	**Case (*n*=15)**	**Control (*n*=15)**
Paranoid	3 (20%)	4 (27%)	–	–
Schizoid	–	–	–	–
Antisocial (dissocial)	3 (20%)	2 (13%)	1 (7%)	6 (40%)
Impulsive	4 (27%)	3 (20%)	–	–
Borderline	3 (20%)	3 (20%)	1 (7%)	–
Histrionic	4 (27%)	4 (27%)	–	–
Anakastic	–	1 (7%)	–	–
Anxious	3 (20%)	2 (13%)	1 (7%)	–
Dependent	1 (7%)	2 (13%)	1 (7%)	–
Overall severity score	**Cases**	**Controls**		
0– No PD	6 (40%)	3 (20%)		
1– Simple PD	6 (40%)	7 (47%)		
2– Complex PD	–	–		
3– Severe PD	1 (7%)	3 (20%)		

Table 10: ICD-10 personality disorder diagnoses following psychological autopsy using the informant rated personality assessment schedule

fatal overdose in the past 12 months and a control group. But in the UK analogue of this study, NTORS,[5] Stewart *et al*. (2002) found higher mean depression scores for those reporting a non-fatal overdose three months prior to study intake. Differences in the diagnostic criteria used in these two studies may go some way to explaining this discrepancy as the former study used an ICD-10 definition of depression whereas the NTORS study did not use formal diagnostic criteria.

In another study of non-fatal overdose, Tobin & Latkin (2003) found that scores of greater than 16 on the Centre for Epidemiological Studies Depression Scale increased the risk of having an overdose by a factor of three (95 per cent CI=1.33, 7.05). On the basis of our present findings and those of Darke *et al.* (2005) it would appear that heroin users meeting the criteria for depression may not be at greater risk of a ND heroin overdose, however, as other studies have shown, sub-clinical depressive cognitions and other less severe psychological difficulties such as anxiety (Gossop *et al*., 2002) do appear to be a credible risk factors for fatal ND opiate overdose.

Personality disorder (PD), in particular anti-social personality disorder (ASPD), is commonly found in heroin users and has been associated with a range of adverse outcomes (Seivewright & Daly, 1997). The role of PD as a risk factor for ND opiate overdose has received considerably less attention, but where it has been studied it appears that it may be an independent risk factor, at least for non-fatal opiate overdose (Darke *et al*., 2005). The prevalence of PD among heroin users is considered to be in the region of around 40 per cent when diagnosed using an instrument such as the PAS which measures pre-morbid personality characteristics (Seivewright & Daly, 1997).

In our study, six controls (40 per cent) met the criteria for PD compared to three cases (20 per cent) perhaps reflecting differences in the severity of opiate dependence between the two groups. Unfortunately this somewhat limits the conclusions that can be drawn from the present findings however we did find that those who died from an opiate overdose were more likely to have two or more personality difficulties and given the association between PD and negative treatment outcomes this clearly warrants further research.

Occurrences of negative life events in the past week were more common among those who died from an overdose, with family, financial and accommodation difficulties appearing to be the most problematic areas. The overdose group were also more likely to have ongoing chronic life stressors of severe impact at the time of death. Furthermore, 27 per cent of overdose fatalities had recently been released from prison compared to only seven per cent of controls (see also Table 8). Database linkage studies have also shown release from incarceration to be a period of high risk for overdose, particularly within two weeks following release which has been shown to increase the risk of death from

[5] The National Treatment Outcome Research Study

	Group		Unadjusted odds ratios		*P*-value*
Variable	**Case (*n*=15)**	**Control (n=15)**	**OR_m (95% CI)**	**OR_{un} (95% CI)**	
ICD-10 psychiatric diagnosis					
Drug dependence[1]	9 (64%)	13 (93%)	0.14 (0.01–1.39)	0.14 (0.01–1.39)	0.09
Any other diagnosis	3 (20%)	3 (20%)	1.00	1.00	–
Two or more diagnoses	6 (40%)	7 (47%)	0.80 (0.22–2.98)	0.76 (0.18–3.24)	0.739
ICD-10 personality disorder					
Any personality disorder	3 (20%)	6 (40%)	0.40 (0.08–2.06)	0.37 (0.07–1.92)	0.215
Two or more personality difficulties	7 (47%)	5 (33%)	2.00 (0.37–10.98)	1.75 (0.40–7.66)	0.423

Table 11: Odds ratios (ORs) for ICD-10 psychiatric and personality disorders

* *P*-value based on McNemar's χ^2 test for matched pairs and the

OR_m = Odds ratio estimate using conditional logistic regression.

OR_{un} = Odds ratio estimate using cross-product ratio estimate.

[1] Data missing for one case.

overdose by almost eight times (Seaman *et al*., 1998; Bird & Hutchinson, 2003).

Kraus & Müller-Kalthoff (2002) found high rates of "critical life events" in the three months prior to death following a case-series analysis of 107 drug-related deaths in Germany, though their conclusions were limited by a lack of a control group. More robust evidence for the role of life events in opiate overdose comes from work by Neale & Robertson (2005). In a cross-sectional survey of 793 heroin users seeking treatment these authors found that overdosing within the past 90 days was independently associated with recent accommodation problems (OR=2.15, CI=1.34, 3.46) and recent relationship difficulties (OR=1.64, CI=1.02, 2.65).

4.3 Overlap between risk factors for ND opiate overdose and suicide among opiate users

Along with ND overdose, suicide is another significant cause of death among heroin users[6] and as well as being associated with risk of ND fatal opiate overdose, psychosocial factors are clearly important in completed suicide. There is however an emerging body of evidence which suggests that these two modes of death may share some underlying mechanisms (Rossow & Lauritzen 1999).

Farrell *et al* (1996) suggest that there may be a continuum between non-fatal overdose, fatal ND overdose and fatal deliberate overdose. This idea is supported by the fact that suicides involving opiate overdose are especially difficult to differentiate from accidents (Cantor *et al*., 2001). These authors state that "the self-destructive lifestyle associated with opiate abuse may be associated with a 'Russian roulette' mindset and a much greater ambivalence regarding life"; notions that link in closely with the conceptual suicidology literature (for example, Schneidman, 1981a, 1981b).

If either ambivalence to life or sub-intentioned suicide orientations play a role in ND overdose then one might expect that factors which have been shown to increase the risk of suicide may also be relevant in ND substance-misuse death. In a recent review of the risk factors for suicide among heroin users, Darke & Ross (2002) highlighted psychopathology, personality disorder, social isolation and social functioning not only not only as risk factors for suicide but also as characteristics typical of a large proportion of heroin users. Within the accepted limitations imposed by the low sample size, the present study, along with recent research such as Neale & Robertson (2005), go some way to supporting the idea that overdose-related death among heroin users represent a unitary phenomena with similar risk factors for both non-deliberate death and suicide.

While the degree of psychopathology and overt expressions of suicidal ideation are likely to distinguish between different positions along the overdose spectrum (for example: Kjelsberg *et al*., 1995; Best *et al*., 2000) the high-risk nature of opiate use is evidently susceptible to the individual's cognitive functioning especially when considered in combination with other processes which may impair judgement such as the use of alcohol.

4.4 Conclusions and recommendations

This present study has demonstrated the potential of the psychological autopsy methodology to provide a detailed

[6] While the proportion of deaths of heroin users attributed to suicide varies greatly from study to study most estimates appear to lie between three and ten per cent (Darke & Ross, 2002).

summary of the psychological characteristics and social circumstances of those who die from an opiate-related poisoning. Where resources allow we would recommend that these are conducted by drug action teams (DATs), particularly in areas in which such fatalities remain high. The same methodology could also be adopted for other forms of illicit substance-misuse death. Our findings are by no means conclusive but support the hypothesis that psychosocial factors play a role in fatal ND opiate-related overdose as they have been shown to in other forms of accidental death (Gau & Cheng, 2004).

Further large-scale research is needed to more accurately determine the risk associated with such factors. This could be achieved if DATs were encouraged to conduct psychological autopsies, perhaps alongside confidential enquires. The preventative strategies for reducing mortality from heroin overdose require a co-ordinated approach which broadens the traditional passive educational messages such as avoiding co-administration of heroin and other depressants and using after periods of abstinence to include more proactive monitoring of the psychological wellbeing of heroin users.

5 References

Appleby, L., Cooper, J., Amos, T. & Faragher, B., (1999). Psychological autopsy study of suicides by people aged under 35. *British Journal of Psychiatry, 175*(8), 168–174

Barraclough, B., Bunch, J., Nelson, B. & Sainsbury, P., (1974). A hundred cases of suicide: clinical aspects. *British Journal of Psychiatry, 125*, 355–73

Bentley, A. J. & Busuttil, A., (1996). Deaths among drug abusers in south-east Scotland (1989-1994). *Medical Science & Law, 36*, 231–236

Beskow, J. et al., (1991). Ethical aspects of psychological autopsy. *Acta Psychiatrica Scandinavia 84*, 482–487

Beskow, J. et al., (1990). Psychological autopsies: Methods and ethics. *Suicide and Life-Threatening Behaviour, 20*, 307–323

Best, D., Gossop, M., Man, L. H., Finch, E., Greenwood, J. & Strang, J., (2000). Accidental and deliberate overdose among opiate addicts in methadone maintenance treatment: Are deliberate overdoses systematically different? *Drug & Alcohol Review, 19*(2), 213–216

Bird, S. M. & Hutchinson, S. J., (2003). Male drugs-related deaths in the fortnight after release from prison: Scotland 1996-1999. *Addiction,* 185–190

Brent, D. et al., (1993). Psychiatric risk factors for adolescent suicide: A case-control study. *Journal of the American Academy of Child & Adolescent Psychiatry, 32*(3), 521–529

Brent, D. et al., (1988). The psychological autopsy: Methodological considerations for the study of adolescent suicide. *Journal of American Academy of Child & Adolescent Psychiatry, 27*, 362–366

Cantor, C. H. (2000). Suicide in the western world. (In K. Hawton, & K. van Heeringen, eds.). *The International Handbook of Suicide and Attempted Suicide*. Chichester, John Wiley & Sons.

John Wiley & Sons.Cassidy, M. T., Curtis, M., Muir, G. & Oliver, J. S., (1995). Drug abuse deaths in Glasgow in 1992 – a retrospective study. *Medical Science and Law, 35*, 207–212

Cheng, A. T., Chen, T. H., Chen, C. C. & Jenkins, R., (2000). Psychosocial and psychiatric risk factors for suicide: Case-control psychological autopsy study. *British Journal of Psychiatry, 177*, 360–365

Cooper, G. A. et al., (1999). A study of methadone in fatalities in the Strathclyde region, 1991-1996. *Medical Science and Law, 39*, 233–242

Cooper, J., (1999). Ethical issues and their practical application in a psychological autopsy study of suicide. *Journal of Clinical Nursing, 8*(4), 467–475

Cooper, J., (2001). *The Antecedents of Suicide by Young People, 2001*. PhD thesis, University of Manchester

Darke, S., Williamson, A., Ross, J., Teesson, M. & Lynskey, M. (2004). Borderline personality disorder, antisocial personality disorder and risk-taking among heroin users: findings from the Australian Treatment Outcome Study (ATOS). *Drug and Alcohol Dependence*, *74*(1), 77–83

Darke, S. et al., (2005). Non-fatal heroin overdose, treatment exposure and client characteristics: Findings from the Australian Treatment Outcome Study (ATOS). *Drug and Alcohol Review, 24*, 425–432

Darke, S. & Ross, J., (2002). Suicide among heroin users: Rates, risk factors and methods. *Addiction, 97*(11), 1383–1394

Darke, S., Ross, J., Zador, D. & Sunjic, S., (2000). Heroin-related deaths in New South Wales, Australia, 1992-1996. *Drug and Alcohol Dependence, 60*, 141–150

Davoli, M. et al., (1993). Risk-factors for drug overdose mortality – Response. *International Journal of Epidemiology, 22*(6), 1205

Department of Health (2003). Guidance for Drug Action Teams on developing local confidential inquiries into drug related deaths, DH, London.

European Monitoring Centre for Drugs and Drug Addiction (EMCDDA). *Extended annual report on the state of the drugs problem in the European Union 1999.* Lisbon, EMCDDA

Farrell, M., Neeleman, J., Griffiths, P. & Strang, J., (1996). Suicide and overdose among opiate addicts. *Addiction, 91*(3): 321–323

Frischer, M., Bloor, B., Goldberg, D., Clark, J., Green, S. & McKeganey, N., (1993). Mortality among injecting drug users: A critical reappraisal. *Journal of Epidemiology and Community Health, 47*, 59–63

Foster ,T., Gillespie, K. & McClelland, R (1997). Mental disorders and suicide in Northern Ireland. *British Journal of Psychiatry*, 170, 447–452

170, 1997, pp 447-452Gau, S. F. & Cheng, A. T., (2004). Mental illness and accidental death: Case-control psychological autopsy study. *British Journal of Psychiatry, 185*, 422–428

Gossop, M., Stewart, D., Treacy, S. & Marsden, J., (2002). A prospective study of mortality among drug misusers during a four-year period after seeking treatment. *Addiction, 97*, 39-47

Hammersley, R., Cassidy, M. T. & Oliver, J., (1995). Drugs associated with drug-related deaths in Edinburgh and Glasgow, November 1990 to October 1992. *Addiction, 90,* 959–965

Hawton, K. et al., (1998). The psychological autopsy approach to studying suicide: A review of methodological issues. *Journal of Affective Disorders, 50*, 269–276

Hill, K., Hawton, K., Malmberg, A. & Simkin, S., (1997). *Bereavement Information Pack*. London, The Royal College of Psychiatrists

Isometsa, E. T., (2001). Psychological autopsy studies – a review. *European Psychiatry, 16*(7), 379–385

Jones, R., Gruer, L., Gilchrist, G., Seymour, A., Black, M. & Oliver, J., (2002). Recent contact with health and social services by drug misusers in Glasgow who died of a fatal overdose in 1999. *Addiction, 97*(12), 1517-1522

Kjelsberg, E., Winther, M. & Dahl, A. A., (1995). Overdose deaths in young substance-abusers – accidents or hidden suicides? *Acta Psychiatrica Scandinavica, 91*(4), 236–242

Kleinbaum D. G. et al., (1998). *Applied Regression Analysis and Other Multivariable Methods* (3rd edition). Pacific Grove, Duxbury Press.

Kraus, L. & Muller-Kalthoff, T., (2002). Psychosocial stress preceding drug-related deaths. *Gesundheitswesenl 64*(10), 548–553

Kelly, T. M. & Mann, J. J., (1996). Validity of DSM-III-R diagnosis by psychological autopsy: a comparison with clinician ante-mortem diagnosis. *Acta Psychiatrica Scandinavica, 94*(5), 337–343

Latkin, C. A., Hua, W. & Tobin, K., (2004). Social network correlates of self-reported non-fatal overdose. *Drug and Alcohol Dependence, 73*, 61–67

Maris, R. W., (1992). *Assessment and Prediction of Suicide 1992*. New York, The Guilford Press

Monforte, J. R. (1977). Some observations concerning blood morphine concentrations in narcotic addicts. J. Forens. Sci. 22(7),18–724

Neale, J. (2000) Suicidal intent in non-fatal illicit drug overdose. Addiction, 95, 85-93

Neale, J. & Robertson, M., (2005). Recent life problems and non-fatal overdose among heroin users entering treatment. *Addiction, 100*, 168–175

O'Driscoll, P. T. et al., (2001). Predictors of accidental fatal drug overdose among a cohort of injection drug users. *American Journal of Public Health, 91*, 984–987

Oliver, P. & Keen, J., (2003). Concomitant drugs of misuse and drug-using behaviours associated with fatal opiate-related poisonings in Sheffield, UK, 1997-2000. *Addiction, 98*, 191–197

Oliver, P., Keen, J., Rowse, G. & Mathers, N., (2001). Deaths from drugs of abuse in Sheffield, 1998: The role of prescribed medication. *British Journal of General Practice, 51*, 394–396

Paykel, E. S., (1983). Methodological aspects of life events research. *Journal of Psychosomatic Research, 27*, 341–352

Paykel, E. S., (1997). The interview for recent life events. *Psychological Medicine, 27*, 301–310

Paykel, E. S., Prusoff, B. A. & Uhlenhuth, E. H., (1971). Scaling of life events. *Achives of General Psychiatry 25*, 340–347

Robins, E. et al., (1959). The communication of suicidal intent: A study of 134 consecutive cases of successful (completed) suicide. *American Journal of Psychiatry, 115*, 724–733

Rossow I, Lauritzen G., (1999). Balancing on the edge of death: suicide attempts and life-threatening overdoses among drug addicts. *Addiction, 94*(2), 209–219

Rudestam, K. E., (1979). Some notes on conducting a psychological autopsy. *Suicide and Life-Threatening Behaviours, 9*, 141–144

Ruttenber, A. J. & Luke, J. L., (1984). Heroin-related deaths: New epidemiological insights. *Science, 226*, 14–20.

Schneidman, E. S. & Farberow, N. (1961). Sample investigation of equivocal suicide deaths. In *The Cry for Help* (N. Farberow & E. Schneidman, 1961, eds). New York, McGraw-Hill

Schneidman, E. S., (1981a). The psychological autopsy. *Suicide and Life-Threatening Behaviours, 11*, 325–340

Schneidman, E. S., (1981b). Orientations toward death: Subintentioned death and indirect suicide. *Suicide and Life-Threatening Behaviours, 11*(4), 232–253

Scott, R. T., Jay, M. J., Keith, R. & Oliver, J. S., (1999). A confidential enquiry into methadone-related deaths. *Addiction, 94*, 1789–1794

Seaman, S. R., Brettle, R. P. & Gore, S. M., (1998). Mortality from overdose among injecting drug users recently released from prison: A data-base linkage study. *British Medical Journal, 316*, 426–428

Seivewright, N. & Daly, C., (1997). Personality disorder and drug use: A review. *Drug and Alcohol Review, 16,* 235–250

StatCorp. (2003). *Statistical Software: Release 8.2. 2003*. College Station, Texas, Stata Corporation

Stewart, D., Gossop, M. & Marsden, J., (2002). Reductions in non-fatal overdose after drug misuse treatment: Results from the

National Treatment Outcome Research Study (NTORS). *Journal of Substance Abuse Treatment, 22*(1), 1–9

Tobin, K. E. & Latkin, C. A., (2003). The relationship between depressive symptoms and nonfatal overdose among a sample of drug users in Baltimore, Maryland. *Journal of Urban Health – Bulletin of the New York Academy of Medicine, 80*(2), 220–229

Tyrer, P. (2000) Personality Assessment Schedule: PAS–I (ICD–10 version). In *Personality Disorders: Diagnosis, Management and Course* (P. Tyrer ed.), 160–180. London: Arnold.

Warner-Smith M, Darke, S., Lynskey, M. & Hall, W., (2001). Heroin overdose: Causes and consequences. *Addiction, 96*, 1113–1125

World Health Organization (1993).*The ICD-10 Classification of Mental and Behavioural Disorders – Diagnostic Criteria for Research 1993*. Geneva, The World Health Organisation

Zador, D., Sunjic, S. & Darke, S., (1996). Heroin-related deaths in New South Wales, 1992: Toxicological findings and circumstances. *Medical Journal of Australia, 164*, 204–207

National Treatment Agency for Substance Misuse

8th floor, Hercules House, Hercules Road, London SE1 7DU

Tel 020 7261 8573. Fax 020 7261 8883

Email: nta.enquiries@nta-nhs.org.uk Website: www.nta.nhs.uk

Publications

All NTA publications can be downloaded from www.nta.nhs.uk. To order additional copies of this report, complete the online order form at www.nta.nhs.uk. Alternatively, email nta@prolog.uk.com or telephone 08701 555 455 and quote product code RB24

If you require this publication in an accessible format, please email nta.enquiries@nta-nhs.org.uk