
Journal of Urban Health: Bulletin of the New York Academy of Medicine Vol. 80, No. 2, June 2003

Intentional Overdose Among Heroin Overdose Survivors

Penny Heale, Paul Dietze, and Craig Fry

ABSTRACT *Previous studies have reported varying rates of intentional overdose among heroin overdose survivors. This article reports on the prevalence of intentional heroin overdose among a sample of overdose survivors in Melbourne, Australia. This is part of a larger study examining the risk factors associated with nonfatal overdose. The study involved interviews with 256 heroin overdose survivors successfully resuscitated by Melbourne Ambulance Service paramedics. A substantial minority (17%) of the sample indicated that they had ever had an intentional overdose, and 67% had one within the last 6 months (11% of the total sample). Of those who had ever intentionally overdosed, 21% did so at the overdose for which they were recruited into the study (4% of total sample). Self-reported reasons for intentional heroin overdose fell into two categories: precipitating events and emotional states prior to use. Intentional overdose appears to comprise a relatively low proportion of overall heroin overdoses. However, given the complexity of suicidal thought and behavior, it is possible that some heroin overdose survivors who report their overdose to be unintentional were in fact experiencing some degree of suicidal thinking at the time of the overdose. Future research could address the potentially ambiguous nature of some intentional heroin overdoses.*

INTRODUCTION

The number of fatal and nonfatal heroin overdoses in Victoria, a state in the southeast of Australia, increased dramatically in the late 1990s. There was an increase from 49 in 1991 to 268 in 1999 of heroin-related deaths,[1] such that in 1999 Victoria had the highest rate of opioid-related fatality of any Australian jurisdiction.[2] The high rate of reported heroin overdose, both fatal and nonfatal, came to be regarded as a significant social concern in the late 1990s.

The issue received much public attention in the media, and a variety of responses have been developed in relation to this apparent overdose epidemic.[1] Detailed investigation of this phenomenon has been undertaken through an analysis of routinely collected data as well as specific studies of the risk factors associated with overdose. Previous research has shown that there are many factors that contribute to heroin overdose, such as differing metabolic rates, recent changes in patterns of use affecting tolerance, use in combination with other drugs or alcohol, and the purity of the heroin used.[3,4] However, investigation of these factors in the

The authors are with Turning Point Alcohol and Drug Centre, Inc., Victoria, Australia; Ms. Heale is with the National Drug Research Institute, Perth, Western Australia; and Mr. Dietze is with the School of Health Sciences, Deakin University, Victoria, Australia.

Correspondence: Penny Heale, Research Fellow, Turning Point Alcohol and Drug Centre, Inc., 54-62 Gertrude Street, Fitzroy VIC 3065, Australia. (E-mail: pennykh@turningpoint.org.au)

absence of information about the user's state of mind immediately prior to the overdose in question assumes that the event was accidental.

Intentional Overdose

Heroin users appear to be at elevated risk of suicide attempts (by any means) relative to the general community; one study found that 40% of methadone maintenance patients reported having ever attempted suicide. Heroin overdose was the third most commonly employed method by this group, following nonopioid drug overdose and wrist slitting.[5] A number of previous studies have examined the prevalence of intentional overdose among heroin users and the associated risk factors.[5–10]

The studies yielded differing estimates, from 1% (see Darke et al.[11]) to 49% (see Neale[9]), of the extent to which heroin overdoses are intentional. This variation is probably a consequence of the different samples included (e.g., methadone maintenance clients vs. nontreatment samples), definitions used of nonaccidental overdose, and recall bias. Furthermore, the presence or absence of other drug or alcohol use in the overdose event is not routinely reported, and few studies have investigated immediately precipitating events. Another limitation of many of these studies is that, while they may inquire about the lifetime history of overdosing, they only focus on the deliberateness of the most recent overdose.[7,9,10] Therefore, these studies may underreport the true rate of lifetime intentional overdose.

Some discussion needs to be given to the issue of what researchers and participants mean by the terms *intentional* and *deliberate* in relation to overdose. Many of the studies reviewed here have used one or the other term without investigating how participants interpret their meaning.[5–7,10] It is known that suicidal thinking is often characterized by ambivalence,[12] and it is possible that some people who deny "intending" to overdose were experiencing strong suicidal feelings at the time. Others who acknowledge the deliberateness of the event may in fact have had a relatively low wish actually to die from the overdose. Neale[9] more fully investigated the complexity of intention and reached the conclusion that, in many cases, the person expresses ambiguity about his/her intent to die.

Previous research has found differences in participation in treatment and mental health between cases of deliberate overdose and accidental overdose. Best et al.[7] found that 65% who reported a deliberate overdose had been in treatment at the time, compared to only 35% who said their overdose was accidental. Furthermore, those who reported a deliberate overdose were more likely to be depressed, but no more anxious than other participants. Neale[9] noted that a difference between people who had overdosed deliberately and those who had overdosed accidentally was that persons who had overdosed deliberately were more likely to have a self-reported history of mental health problems.

Issues in Defining and Sampling Intentional Overdose Victims

Critical issues for the interpretation of findings in this area include how overdose is defined and how participants are recruited. In terms of definition, it is important to know whether reference is made to lifetime overdoses or only the most recent overdose, whether overdose is self-defined or uses some biological marker such as response to naloxone, and whether *deliberate* means a certain suicide attempt or an attempt with varying degree of intent. The method of recruitment will also have a bearing on the results. Samples obtained from treatment populations alone may

not be representative of the broader group of people at risk of overdose who do not come into contact with such services.

In this article, we report on one aspect of a larger study designed to examine the factors associated with heroin overdose. We present here an exploratory analysis of the prevalence and characteristics of intentional overdose among a sample of heroin overdose survivors recruited through ambulance attendance in Melbourne.

METHODS

Sample and Recruitment

Participants were recruited through the Metropolitan Ambulance Service. Ambulance paramedics working in the inner city of Melbourne were given contact cards to distribute to people who had experienced nonfatal heroin overdose (here defined as regaining consciousness following naloxone administration).[13] These cards invited potential participants to contact the research team within 10 days of the overdose if they wished to participate in a study of heroin overdose.

A total sample of 256 survivors of heroin overdose received contact cards and presented for interview between July 1999 and May 2001. A total of 2,031 cards were distributed to ambulances; however, not all of the cards were necessarily handed out to overdose survivors. Some were known to have been discarded when ambulances were moved from one branch to another or taken out of service. Therefore, the exact number of cards distributed cannot be determined. In addition, the recruitment method was passive as involvement depended on card recipients contacting the researchers. Further detail on the recruitment methods used in this study can be found elsewhere.[13] Of those interviewed, 10 participants were not included in the analyses reported here as they did not provide information about whether they had ever had an intentional overdose or about their most recent overdose.

Procedure

We administered a structured questionnaire that inquired about the following domains: demographic characteristics, overdose history and experiences, drug use in the 12 hours prior to overdose, typical drug use patterns, and overdose intentionality. Intentional overdose was explored through the following questions: "Have you ever had an intentional overdose?" (yes/no); "How many intentional overdoses have you had in the last 6 months?" (number); "When was the last time you had an intentional overdose?" (date); and "Why did this happen?" (open ended). The last question enabled participants to reflect on the reasons for the intentional overdose. All interviews were conducted in private by trained researchers at an inner-metropolitan drug treatment agency, and each interview lasted approximately 50 minutes. Participants were reimbursed for participation in the study, and referral to appropriate services was made on the request of participants. The study procedures were approved by the University of Melbourne Human Research Ethics Committee.

Data Analysis

The date of the participant's most recent intentional overdose was matched with the date provided for the overdose for which they were recruited into the study. It was assumed that if these dates matched, the overdose after which the person was recruited was intentional. These were referred to as recent intentional overdoses.

The amount of heroin reported as used by participants was generally reported

as an amount in Australian dollars (Au $). When participants reported amounts used through other measures (e.g., syringe lines), these were converted to an amount in Australian dollars by assuming that 100 syringe lines equaled a Au $50 amount of heroin as evidenced in other studies undertaken in Melbourne. It is very likely that most of those interviewed would have used standard syringes issued via needle and syringe programs, for which each line marked on the barrel indicates 0.1 mL. Tests of statistical significance of the differences between groups were undertaken using *t* tests used for continuous variables and χ^2 for differences in proportions on categorical variables.

RESULTS

Sample Characteristics

The characteristics of the sample are shown in Table 1. The majority of respondents were male (77%), with a mean age of 27.4 years (range 14 to 52 years, with a median of 26 years), which does not differ significantly from the typical cases attended by ambulances in Melbourne. The mean number of overdoses ever experienced by this sample was 5.8 (median of 3), ranging from 1 to over 100 overdoses since first injecting. The mean number of times naloxone had ever been administered was 4.2 (median 2, range 1 to 50). Within the last 6 months, the average number of heroin overdoses experienced was 2.3 (median 2, range 1 to 30), and the mean number of naloxone administrations was 2.1 (median 1, range 1 to 30).

Prevalence of Intentional Overdose

There were 42 respondents who reported ever having had an intentional overdose (17% of the available sample). Of those who had ever had a deliberate overdose,

TABLE 1. Demographic characteristics of sample according to intentional overdose (OD) status

	Recent intentional OD	Ever intentional OD*	Never intentional OD	Total
Number	9	42	204	246
Mean age (range):				
At interview	29.3 (19–52)	27.6 (15–52)	27.4 (14–50)	27.4 (14–52)
Reported first injection	18.3 (11–35)	17.7 (11–35)	18.3 (12–46)	18.2 (11–46)
Reported regular injection	19.3 (12–35)	19.1 (12–35)	19.9 (12–49)	19.8 (12–49)
Gender, %				
Male	89	74	78	77
Education level, %				
Primary/secondary	56	61	51	53
Tertiary/trade	44	39	49	47
Living alone, %	75	87	74	76
Unstable accommodation, %	56	45	38	39
Unemployed, %	100	91	78	80
Currently in treatment, %	33	26	31	30

*Includes recent intentional OD group.

67% reported at least one within the 6 months prior to interview, with 9 participants reporting that their last intentional overdose was the overdose for which they were recruited into the study. Table 1 shows the demographic characteristics of those reporting ever having an intentional overdose and those reporting a recent intentional overdose in comparison to the remainder of the sample. While there are some differences evident in Table 1, none of these differences were sufficiently large to reach statistical significance, possibly due to the small number of people in the recent overdose group.

Reasons Given for Intentional Overdose

Respondents who had ever had an intentional overdose were asked "Why did this happen?," and responses were recorded verbatim. In reviewing the comments, it appeared that individuals articulated the reason for the intentional overdose in two main ways: describing the event or circumstance that preceded the overdose or reflecting on their emotional state at the time. Common events that appeared to have triggered the overdose included primary relationship problems or breakdown (7/42 people), leaving treatment (4/42 people), bereavement (3/42 people), family problems (3/42 people), and special occasion days such as Christmas (2/42 people). Other events or circumstances mentioned included legal problems, low social support, suicide pacts, unemployment, and mental health problems. Commonly occurring emotional states included unhappiness and depression, frustration and anger, a sense of life being too much, an inability to cope, feeling hopeless, and not wishing to be a burden on others. Feelings of anger and frustration were most likely to be articulated in cases for which the preceding event had involved difficulties in an intimate personal relationship or the person had prematurely left treatment.

Participants in the recent intentional overdose group reported similar triggering events, such as primary relationship breakdown (3/9 people), other familial problems (2/9 people), and recent discharge from a therapeutic community. The emotional states reported by this group were similar to those of the overall intentional overdose group.

Circumstances of Recent Intentional Overdose

The circumstances of overdose were compared between the recent overdose group and the remainder of the sample. Table 2 shows the circumstances of the overdose in terms of self-reported amount of heroin used in the injecting episode that resulted in overdose, other drug use in the 12 hours prior to the injecting episode, and the location at which the injecting episode took place. The only difference between groups was the mean self-reported amount of heroin used, with the amount used by the recent overdose group being significantly greater than that used by the remainder of the sample ($F_{2,231} = 11.29$, $P < .01$).

However, in terms of other drug use in the preceding 12 hours and injecting location (public vs. private), there was no difference between the groups. This suggests that those in the recent intentional overdose group did not attempt overdose within the context of a generalized drug "binge" (e.g., by mixing heroin with other drugs such as alcohol and benzodiazepines), but instead intentionally overdosed through the use of a large amount of heroin alone. Indeed, only two participants in this group reported use of any drugs other than heroin. However, the intentional overdose group represents a small sample.

It is also worth noting that those who had recently intentionally overdosed had on average used a far larger amount (mean Au $153) than their self-reported usual

TABLE 2. Characteristics of most recent heroin overdose according to intentional overdose (OD) status

	Recent intentional OD	Ever intentional OD	Never intentional OD	Total
Number	9	33	204	246
Amount heroin used (Australian dollars or equivalent)*	120	53	46	50
Drug use in 12 hours prior to most recent overdose (% sample)				
Heroin	44	24	20	22
Benzodiazepines	11	46	30	32
Alcohol	11	22	12	20
Location of overdose injecting episode (% public location)	55	84	70	72

*$P < .01$.

amount (mean Au $32). While the difference was vast in dollar terms, this failed to reach significance, possibly as a consequence of the small number (n = 6) in this group reporting their usual amount ($t_5 = 1.46$, $P > .1$).

DISCUSSION

In this study, we present an exploratory analysis of available data on overdose intentionality among a sample of nonfatal heroin overdose survivors recruited through ambulance attendance. A significant feature of this study is that it specifically targeted people who had recovered from an overdose that was sufficiently severe to warrant the administration of naloxone, thereby avoiding some of the ambiguity inherent in many other studies of heroin overdose. Further, as participants were interviewed within a few days of the occurrence of the overdose, information on the circumstances of recent intentional overdoses could be obtained while memory for the event was presumably good. Finally, in contrast to some convenience samples recruited in other studies of heroin overdose, the sample appears roughly representative of nonfatal heroin overdose victims in Melbourne. The age and sex distributions of the sample were consistent with the profile of people attended by ambulance for heroin overdose in Melbourne as a whole (although there is undoubtedly some unknown recruitment bias in the sample).[13]

The finding that 17% of those interviewed had ever intentionally overdosed was similar to that of Darke and Ross,[5] who found that 10% of methadone maintenance patients had ever deliberately overdosed. The finding that 67% of drug users who had ever had an intentional overdose had done so within the last 6 months is interesting as it provides some insight as to the size of the risk group. That is, most of those who have ever had an intentional overdose could be said to be at risk within any given 6-month time frame.

This study adds to the growing body of evidence that suggests that most heroin overdoses are in fact accidental. However, this study found that a high proportion of people who have ever experienced an intentional overdose have done so within

the previous 6 months. Therefore, people known to have overdosed intentionally in the past may remain at elevated risk of future intentional overdose compared to people who have never overdosed. Future research could investigate individual patterns of accidental versus deliberate overdosing over time.

We also found that many people who survived intentional overdoses were able to identify specific events and emotional states as triggers. These primarily included difficulties in, or breakdown of, primary relationships and leaving treatment prematurely. Clinicians should be aware of the potential risk some heroin users with a history of intentional overdose may face when such disruptions occur and, when possible, directly inquire about suicidal thoughts. Exploration of associated feelings, such as frustration, anger, and hopelessness, may be a useful starting point for intervention.

An interesting area of further study in relation to this topic is the definition of intentional overdose. Many of the studies conducted to date have not explored the meaning of deliberate or intentional to the individual,[5–7,10] and most (including this study) categorize overdoses as intentional or otherwise on the basis of a dichotomous question. Suicidal thought and behavior are complex, and it is possible that more sensitive questioning could reveal some level of suicidal intent, while dichotomous questioning may reveal none. Even among those who might be considered suicidal, it is likely that some of these participants were ambiguous in their intent to kill themselves. The dichotomous response options of these earlier studies, and indeed the present research, preclude exploration of these issues. A study that we are currently conducting will examine this issue in greater detail.

ACKNOWLEDGEMENTS

The authors would like to acknowledge the cooperation of the Melbourne Metropolitan Ambulance Service, in particular Greg Cooper and Stephen Burgess, as well as the paramedics involved in the study for their assistance in recruitment and the participants for their time and contribution. The research reported in this paper was funded by the National Health & Medical Research Council and the Victorian Health Promotion Foundation and the second author is supported by a Victorian Health Promotion Foundation Public Health Research Fellowship.

Thanks also to Jennifer Richards, Bernadette McGrath and Paul McElwee for their assistance in data collection and analysis.

REFERENCES

1. Dietze P, Fry C, Rumbold G, Gerostamoulos J. The context, management and prevention of heroin overdose in Victoria, Australia: the promise of a diverse approach. *Addict Res Theory*. 2001;9:437–458.
2. Degenhardt L. *Opioid Overdose Deaths in Australia*. Sydney, Australia: National Drug and Alcohol Research Centre; 2001.
3. White J, Irvine R. Mechanisms of fatal opioid overdose. *Addiction*. 1999;94:961–972.
4. Darke S, Hall W, Weatherburn D, Lind B. Fluctuations in heroin purity and the incidence of fatal heroin overdose. *Drug Alcohol Depend*. 1999;54:155–161.
5. Darke S, Ross J. The relationship between suicide and heroin overdose among methadone maintenance patients in Sydney, Australia. *Addiction*. 2001;96:1443–1453.
6. Gossop M, Griffiths P, Powis B, Wiliamson S, Strang J. Frequency of non-fatal heroin overdose: survey of heroin users recruited in non-clinical settings. *BMJ*. 1996;313:402.
7. Best D, Gossop M, Man L, Finch E, Greenwood J, Strang J. Accidental and deliberate

overdose among opiate addicts in methadone maintenance treatment: are deliberate overdoses systematically different? *Drug Alcohol Rev.* 2000;19:213–216.
8. Vingoe L, Welch S, Farrell M, Strang J. Heroin overdose among a treatment sample of injecting drug misusers: accident or suicidal behaviour? *J Subst Use.* 1999;4:88–91.
9. Neale J. Suicidal intent in non-fatal illicit drug overdose. *Addiction.* 2000;95:85–93.
10. Strang J, Best D, Man L, Noble A, Gossop M. Peer-initiated overdose resuscitation: fellow drug users could be mobilised to implement resuscitation. *Int J Drug Policy.* 2000;11:437–445.
11. Darke S, Ross J, Hall W. Overdose among heroin users in Sydney, Australia: I. prevalence and correlates of non-fatal overdose. *Addiction.* 1996;91:405–411.
12. Schneidman E. *The Suicidal Mind*. New York, NY: Oxford University Press; 1996.
13. Dietze P, Fry C, Sunjic S, et al. Using ambulance attendances to recruit people who have experienced non-fatal heroin overdose. *Drug Alcohol Depend.* 2002;67:99–103.