

RESEARCH REPORT

Preventing opiate overdose fatalities with take-home naloxone: pre-launch study of possible impact and acceptability

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Abstract

Aims. Before proceeding with the introduction of an overdose fatality prevention programme including teaching in cardio-pulmonary resuscitation and distribution of naloxone, a pre-launch study of treatment and community samples of injecting drug misusers has been undertaken to establish (i) the extent of witnessing overdoses, (ii) the acceptability of naloxone distribution and training; and (iii) the likely impact of such measures. **Design and setting.** Structured interview of two samples: (a) a community sample of injecting drug misusers recruited by selected privileged access interviewers (PAI) and interviewed by them in community settings and (b) a treatment sample of opiate addicts recruited from our methadone maintenance clinic (interviewed by in-house research staff). **Participants.** (a) Three hundred and twelve injecting drug misusers with a history of having injected and currently still using injectable drugs; and (b) 142 opiate addicts in treatment at our local catchment area methadone maintenance clinic in South London. **Findings.** History of personal overdose was found with 38% of the community sample and 55% of the treatment sample—mainly involving opiates and in the company of friends. Most (54% and 92%, respectively) had witnessed at least one overdose (again mostly involving opiates), of whom a third had witnessed a fatal overdose. Only a few (35%) already knew of the existence and effects of naloxone. After explanation to the treatment sample, 70% considered naloxone distribution to be a good proposal. Of the 13% opposed to the proposal, half thought it may lead them to use more drugs. Eighty-nine per cent of those who had witnessed an overdose fatality would have administered naloxone if it had been available. We estimate that at least two-thirds of witnessed overdose fatalities could be prevented by administration of home-based supplies of naloxone. **Conclusions.** Substantial proportions of both community and treatment samples of drug misusers have witnessed an overdose death which could have been prevented through prior training in resuscitation techniques and administration of home-based supplies of naloxone. Such a new approach would be supported by most drug misusers. On the basis of these findings, we conclude that it is appropriate to proceed to a carefully constructed trial of naloxone distribution.

Introduction

Opiate misuse is associated with substantial morbidity and mortality from overdose (Davoli *et al.*,

1993; Oppenheimer *et al.*, 1994; Darke, Ross & Hall, 1996; Farrell *et al.*, 1996; Frischer *et al.*, 1997), much of which may be avoidable (Drew,

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1982; Hall, 1996; Strang *et al.*, 1996a). It has recently been proposed that take-home supplies of naloxone (Strang *et al.*, 1996a; Darke & Hall, 1997) might enable family or friends to effect emergency resuscitation in the critical period between the sudden onset of heroin overdose and eventual naloxone administration by health-care personnel.

However, before proceeding with distribution of take-home naloxone, we need to consider: (i) how often do drug misusers witness opiate overdoses?; (ii) how acceptable is the proposal of naloxone distribution?; and, on the basis of these data, (iii) how many overdose fatalities could have been prevented by effective naloxone distribution?

Method

The two study samples

We examined responses from two samples of opiate misusers—a community sample and, after identification of areas requiring fuller enquiry, a treatment sample.

The *community sample* comprised 312 injecting drug misusers in South London who were contacted and interviewed in various community settings during 1994/95, i.e. not a treatment cohort, even though they may previously have been, or currently be, in treatment. We will report separately on analyses of the data on their personal overdose histories and risk factors (Powis *et al.*, in press). The defining features of the community sample were that they had a history of injecting and were currently using injectable drugs, and had been contacted by a network of privileged access interviewers (PAIs) as has been described previously by Griffiths *et al.*, (1993).

The *treatment sample* comprised 142 opiate addicts currently attending for treatment from the Methadone Maintenance Clinic at the community base for the drug treatment services at the Maudsley Hospital in South London at the time of interview (1996/97): all subjects in this sample were living in the local catchment area covering the boroughs of Lambeth and Southwark. Within this catchment area there is a predominantly young population with a substantial proportion (29%) from black and ethnic minority groups and with indices of morbidity and deprivation which are higher than the national average (e.g. mortality rate from suicide

at twice the national average—SMR197). Thirteen per cent of the population are recorded as living in overcrowded accommodation—nearly twice the national average of 7%. The district is recognized as an underprivileged area (UPA) with a Jarman score of 40 (Jarman, 1983, 1984), indicating an extremely high level of deprivation, and making it the seventh highest-scoring UPA district in England and Wales in 1991.

Operationalizing the interviews

The data from the community sample were collected in the context of a wider interview which explored attitudes to, and behaviour regarding, injecting and the extent to which they had experienced a wide range of adverse consequences of their drug use, including exploration of the extent to which they had experienced, and witnessed, overdose. These data were collected by structured interviews using a questionnaire with a stem-and-branch design, and administered by one of a team of interviewers who had been selected on the basis of their existing access to drug-taking populations in South London and who had satisfactorily completed an initial training session and supervised sample interview. During the pilot phase, minor modifications were made to the interview from the basis of interviewer feedback and researcher observations of the returned written records from the PAI interviewers. In addition to the written questionnaire record of the PAI interviews all interviews were also tape-recorded, which provided an opportunity for fuller study of the content of the interview as well as providing a means for checking on the quality of the written data record. At the outset of enquiry about overdose, the subject was asked to explain how they would be able to tell whether someone had overdosed: PAI interviewers reported that there was a clear understanding of the concept of overdose and study subjects reported a wide range of indicative signs including that the person was unconscious (44%); had a distinctively abnormal facial appearance (e.g. blue) (27%); had stopped breathing (11%) or was visibly dead or almost dead (11%). Interviewers were instructed to prompt the respondent to consider important autobiographical landmarks (such as birth of a child or periods of imprisonment) so as to help identify the chronology of changes in drug-taking behav-

Table 1. Summary characteristics of the two study samples

	Community sample (n = 312)	Treatment sample (n = 142)
Male/female ratio	1.69 (196, 116)	2.74 (104, 38)
Age (years)	30.6 (SD \pm 6.7)	35.8 (SD \pm 6.7)
Age first injected	20.1 (SD \pm 4.9)	19.5 (SD \pm 7.2)
Age first injected heroin	20.5 (SD \pm 5.0)	19.7 (SD \pm 5.2)
Duration in treatment		3.1 (SD \pm 3.5)

jour—an approach which has been found to improve the accuracy of recall to autobiographical questioning for general samples (Bradburn *et al.*, 1987) and specifically with injecting drug users (Schoenbaum *et al.*, 1989). For items reported in this paper the responses were scored as reported in the Results section of this paper.

Interviews of the treatment sample were conducted after the interviews and initial analyses of the results from the community sample, thereby giving the opportunity to include new areas of enquiry such as exploration of the drug user's knowledge of naloxone and acceptability of possible proposals for provision of take-home supplies. These enquiries about overdose and naloxone were again in the context of interview enquiry about various different aspects of drug-taking behaviour. All the interviews of the treatment sample were conducted by one of three of our qualified research staff with whom a similar process of piloting of the interview schedule was undertaken to that described above. An operational definition of overdose was given by the interviewer to the subject: "Overdose is defined as any of the following symptoms occurring in conjunction with your drug use: difficulty breathing, turning blue, lost consciousness and unable to be roused, collapsing. Overdose does not mean being 'on the nod'/'gouching', i.e. acute intoxication with heroin resulting in drifting in or out of consciousness, but without the above signs and symptoms". Responses to questions were coded by the interviewer as reported below in the Results section, apart from the responses to the subjects' views on the potential worth of naloxone distribution as an overdose prevention strategy, the responses to which were originally recorded as one of four responses ("very good idea", "good idea", "bad idea" or "very bad idea") for the first 42 respondents before addition of a fifth mid-point response ("don't know") for the remaining 100, but were

subsequently collapsed to two responses (either "good idea" or "bad idea") for data analysis.

Results

A: General characteristics of the study samples

A brief description of the two study samples will be presented before proceeding to a more detailed account of their overdose histories. These are summarized in Table 1.

The community sample were generally a somewhat younger sample, with a chronological age of approximately 5 years younger than the treatment sample, although with very similar ages of first injection and ages when they had first injected heroin. As with the findings from other studies of non-treatment samples, there was a larger proportion of women in the community sample, among which they comprised 37.2%, compared with only 26.8% among the treatment sample. However, since the purpose of this paper is not to compare the results between these two samples, but rather to examine the extent of overdose experiences in these two samples and the feasibility of possible preventive measures through take-home naloxone, statistical comparisons between the two samples are considered inappropriate.

B: Overdose experiences of the study samples

Personal overdose histories

History of overdose was frequent in both community and treatment samples (38% and 55%, respectively) with 89% of last overdoses having involved opiates, and 79% having occurred in the company of friends (see Table 2).

Witnessing the overdoses of others

Most interviewees had witnessed an overdose—54% of the community sample and 92% of the

Table 2. Extent of personal experience of overdose among community sample (n = 312) and treatment sample (n = 142)

	Community sample (n = 312)	Treatment sample (n = 142)
<i>Personal overdoses</i>		
Ever overdose?	118/312 (38%)	78/142 (55%)
<i>Details of last overdose</i>		
involved opiates	102/118 (86%)	72/ 78 (92%)
at own or friend's home	94/118 (80%)	61/ 78 (78%)
own home	52	43
friend's home	42	18
in company of others	95/118 (81%)	66/ 78 (85%)
sexual partner	32	33
close friends	57	27

treatment sample (and see Table 3). A quarter had witnessed an overdose during the last year. Most overdoses involved opiates—96% of those witnessed by the community sample and 100% of those witnessed by the treatment sample. Nineteen per cent had witnessed an overdose fatality, usually of a close friend, and involving opiates.

Acceptability of naloxone distribution

The treatment sample were then asked about take-home naloxone. Only a third (35%; 49/142) knew about naloxone (Narcan). Only three had ever had a supply of naloxone (of whom two had administered the naloxone). After explanation of the effects of naloxone (Narcan) to those who did not know, subjects were then asked: "It has been suggested that naloxone (Narcan) should be made available to heroin users for resuscitation. What do you think of this idea?" Seventy per cent (90/142) considered the proposal to distribute supplies of naloxone to be a "good idea" (i.e. responding either "good idea" or "very good idea" (see description in Method)). Thirteen per cent (19/142) considered it a "bad idea", including 6% (9/142) who reported that they might then increase their heroin dosage. Forty-nine per cent (70/142) reported that they would keep supplies of naloxone at home. The respondents proposed a wide range of outlets for these supplies of naloxone—needle-exchange schemes (30%), community pharmacies (21%), general practitioners (27%) and drug treatment services (33%). Support for proposed naloxone distribution did not differ significantly according to gender or age of the respondent, nor whether they had had an overdose.

Further enquiry was made of all 44 of the treatment sample who had witnessed an overdose: 89% (39/44) would have given naloxone at the last overdose witnessed.

Estimate of preventable overdose fatalities

Finally we have estimated how many witnessed overdose fatalities might have been prevented by take-home supplies of naloxone. A fifth of our samples had witnessed a fatal overdose involving opiates—at least 16% of the community sample and 29% of the treatment sample. With most overdoses occurring at home (own or friends), and with 89% indicating they would administer naloxone, we estimate that at least two-thirds of these 69 overdose fatalities might have been avoided by immediate administration of a home-based supply of naloxone.

Discussion

Overdose is a major cause of the substantial increased mortality of opiate addicts—a finding confirmed in recent studies (Davoli *et al.*, 1993; Oppenheimer *et al.*, 1994; Frischer *et al.*, 1997; Hall & Darke, 1998). These overdoses almost always involve heroin (hence applicable to the potential beneficial use of naloxone), which has been used in the company of others, in the subject's own home or the home of a friend. More than two-thirds of the overdoses in our study satisfy these criteria—not only among the subjects' own previous overdoses but also among the witnessed fatal overdoses and similar findings have recently been reported in a study from Adelaide, Australia (McGregor *et al.*, 1998).

Table 3. Identifying opportunities for overdose intervention among community (n = 312) and treatment (n = 142) samples

	Community sample (n = 312)	Treatment sample (n = 142)
<i>Witnessing overdoses</i>		
Ever witnessed overdose?	167/312 (54%)	44/48* (92%)
Witnessed O/D in last year?	81/312 (26%)	13/48 (27%)
<i>Details of last O/D witnessed</i>		
involved opiates	153/159† (96%)	44/44 (100%)
O/D by sexual partner	18	6
close friend	84	32
casual acquaintance	53	1
stranger	10	5
<i>Witnessing fatal overdoses</i>		
Ever witnessed overdose fatality?	55/312 (18%)	14/48* (29%)
<i>Details of last fatal O/D witnessed</i>		
involved opiates	34/ 38‡ (89%)	14/14 (100%)
death of sexual partner	2	
close friend	33	
casual acquaintance	15	
stranger	3	

*Data collected from only 48 of treatment sample; † data missing on eight cases; ‡data available from only 38 subjects.

Naloxone is certainly not currently used for resuscitation by heroin users in the United Kingdom. Only two subjects had ever administered naloxone, even though 211 had been present at an overdose (69 having witnessed a fatal overdose). Furthermore, only a third of our sample were aware of the effect of naloxone and its value in emergency resuscitation after opiate overdose. Provision of a take-home naloxone supply would therefore need to be accompanied by extensive educational programmes. Due consideration would also need to be given to the possibility of adverse reactions to the administration of naloxone, as has recently been highlighted by Osterwalder (1996): if the level of severe adverse reactions to naloxone was indeed found to occur in an opiate misusing population at the levels of 0.4–3%, then this would have implications for the necessary training and precautions, and would need to be borne in mind in the cost-benefit considerations, in much the same way as must previously have been undertaken prior to other decisions about extending the net of personnel equipped to provide resuscitation such as the training of ambulance personnel to administer naloxone or the training of non-medical staff

in sports centres in the use of defibrillation equipment.

Even though very small in number, concern must remain about those who reported that naloxone availability might lead them to use more heroin. Special study is required to establish the extent to which this concern is legitimate. However, overall, there was broad support for the benefits of take-home naloxone.

How much benefit could result from a public health measure of naloxone distribution? It could be argued that naloxone might not be effective in treating overdose since heroin will not have been the only drug taken (Darke *et al.*, 1996; Zador *et al.*, 1996; Frischer *et al.*, 1997); however, the prompt administration of an opiate antagonist would at least have reversed the opiate element of the respiratory depression and would almost certainly have been sufficient to prevent the fatal outcome in most of these instances. With an estimated 30 000 opiate addicts receiving methadone treatment at any one time in England and Wales (Strang *et al.*, 1996b), then the potential benefit from a prevention approach through this population could be considerable. Even if we consider a prevention approach only through this

methadone treatment sample then, with one in five having been present at a fatal overdose, most of which involved opiate overdose of a partner or close friend, we estimate that approximately 2000 heroin overdose fatalities have already been witnessed by the current treatment sample in England and Wales, most of which would seem to satisfy our criteria of preventability. We consequently agree with Drew (1982) and Hall (1996) that many of the current opiate overdose deaths could be prevented, and we conclude that the great potential benefits are sufficient to justify conduct of carefully conducted treatment trials and the subsequent introduction of carefully monitored pilot naloxone distribution schemes.

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