

# Suicide in recently discharged psychiatric patients: a case-control study

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**Background.** Few controlled studies have specifically investigated aspects of mental health care in relation to suicide risk among recently discharged psychiatric patients. We aimed to identify risk factors, including variation in healthcare received, for suicide within 3 months of discharge.

**Method.** We conducted a national population-based case-control study of 238 psychiatric patients dying by suicide within 3 months of hospital discharge, matched on date of discharge to 238 living controls.

**Results.** Forty-three per cent of suicides occurred within a month of discharge, 47% of whom died before their first follow-up appointment. The first week and the first day after discharge were particular high-risk periods. Risk factors for suicide included a history of self-harm, a primary diagnosis of affective disorder, recent last contact with services and expressing clinical symptoms at last contact with staff. Suicide cases were more likely to have initiated their own discharge and to have missed their last appointment with services. Patients who were detained for compulsory treatment at last admission, or who were subject to enhanced levels of aftercare, were less likely to die by suicide.

**Conclusions.** The weeks after discharge from psychiatric care represent a critical period for suicide risk. Measures that could reduce risk include intensive and early community follow-up. Assessment of risk should include established risk factors as well as current mental state and there should be clear follow-up procedures for those who have self-discharged. Recent detention under the Mental Health Act and current use of enhanced levels of aftercare may be protective.

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**Key words:** Case-control, hospital discharge, psychiatric patient, suicide.

## Introduction

It is well documented that individuals are at high risk of suicide following discharge from psychiatric in-patient care (Goldacre *et al.* 1993; Isometsa *et al.* 1993a; Appleby *et al.* 1999a; King *et al.* 2001; Ho, 2003; Yim *et al.* 2004). Studies have reported that those who have been discharged from psychiatric units are at over 100 times greater risk of suicide than the general population (Goldacre *et al.* 1993; Geddes *et al.* 1997; Sohlman & Lehtinen, 1999; Ho, 2003). In England and Wales, the National Confidential Inquiry into Suicide and Homicide by People with Mental Illness found that there were 270 suicides per year in the 3 months following discharge from psychiatric in-patient care during 1996–2004. This represented 23% of cases in contact with mental health services and

5% of cases of suicide in the general population (Appleby *et al.* 2001, 2006; Meehan *et al.* 2006). There is evidence that the incidence of post-discharge suicide may be increasing in the UK (Kapur *et al.* 2006).

A number of studies have examined factors associated with suicide in psychiatric patients, including those who have been discharged from in-patient care (Dennehy *et al.* 1996; Rossau & Mortensen, 1997; Appleby *et al.* 1999a; King *et al.* 2001; Pirkis *et al.* 2002; Busch *et al.* 2003; Høyer *et al.* 2004; Yim *et al.* 2004; Qin & Nordentoft, 2005; Kan *et al.* 2007). Some investigators have included both current and former in-patients (Busch *et al.* 2003; Qin & Nordentoft, 2005) and so clinical heterogeneity may limit the generalizability of their results. Studies have tended to look at suicide over extended periods of 1 year or more since discharge, rather than focus on the early post-discharge period despite evidence that it is the latter that is the time of greatest risk (Rossau & Mortensen, 1997; Appleby *et al.* 2001; Høyer *et al.* 2004; Qin & Nordentoft, 2005). The role of psychiatric

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aftercare, an important element in designing possible preventive interventions, has been relatively neglected. The majority of studies have been regionally based or carried out in the catchment areas of single hospitals.

We sought to overcome these difficulties by conducting a detailed analysis of a national consecutive series of individuals who had died by suicide within 3 months of discharge from psychiatric care. We aimed to compare cases of suicide with surviving post-discharge controls to identify clinical and psychosocial risk factors, including variation in aftercare received.

## Method

The study was conducted within the National Confidential Inquiry into Suicide by People with Mental Illness, a clinical survey that collects data on all suicides in people with recent contact with mental health services. The method of the Inquiry is described fully elsewhere (Appleby *et al.* 2001; Meehan *et al.* 2006). In brief, data collection on cases of suicide had three stages: (i) the collection of a comprehensive national sample, irrespective of mental health history; (ii) the identification of people in the sample who had been in contact with mental health services in the 12 months before death; (iii) the collection of clinical data about these people. The Inquiry achieves a questionnaire response rate of >95%. Information on all deaths in England receiving a verdict of suicide or an open verdict at coroner's inquest was obtained from the Office for National Statistics. Open verdicts were included as most are thought to be suicides and are conventionally used in suicide rate estimation in the UK (Linsley *et al.* 2001). These suicides and probable suicides are referred to as suicides in this paper. For each case the consultant psychiatrist responsible for the patient was sent a questionnaire and asked to complete it after discussion with other members of the mental health team. Ethical approval was obtained from the research ethics committees of all health districts in England.

### Identification of cases

The cases were a consecutive series of individuals aged 16–65 years who died by suicide between 1 April 2000 and 31 December 2001 within 3 months of being discharged from in-patient care in England ( $n=250$ ). We excluded suicides aged >65 years as risk factors are known to differ in older people (Rubenowitz *et al.* 2001) and in-patient care for this age group is provided by specific services in most areas in the UK.

### Identification of living controls

Controls were identified using the Nationwide Clearing Service Database, which collects anonymized patient data on all psychiatric National Health Service in-patient admissions in England. The dataset consists of individual-level data for each admission including patient hospital number, age, gender, date of admission, admission end-date, outcome (i.e. discharge, death, hospital transfer) and consultant code. Due to the anonymized data, clinicians were sent the patient hospital number and month/year of birth to identify controls. One control per case was randomly selected who satisfied the following criteria: (i) having been in psychiatric in-patient care and (ii) discharged on the same day as the corresponding case. No other matching criteria were used, as we wanted to include commonly matched variables such as gender in the analysis. To minimize information bias, data were collected up to the day on which the corresponding case died (index date).

### Data collection

The suicide questionnaire completed by clinicians consisted of sections on sociodemographic characteristics, clinical history, details of the suicide, aspects of care and details of the preceding in-patient admission and discharge. The sociodemographic, psychosocial and clinical items reflect many of the more frequently reported risk factors for suicide. Identical items were collected for the controls as for the cases using an adapted version of the suicide questionnaire, but with reference to the index date rather than the suicide date.

Potential predictors were selected on an *a priori* basis using results from a clinical survey of suicides (Appleby *et al.* 2001). These were separated into the following six domains for analysis: (i) socio-demographic, (ii) clinical, (iii) behavioural, (iv) last psychiatric admission, (v) last contact with services and (vi) last discharge.

### Statistical analyses

Results from the National Confidential Inquiry report 'Safety First' (Appleby *et al.* 2001) indicated the presence of a number of predictors in approximately a quarter of post-discharge suicides. We predicted that the prevalence of these variables in the control group would be half that in the cases. The intended sample size was therefore 250 cases and 250 controls, which would have provided 94% power to detect a statistically significant (two-sided  $\alpha=0.05$ ) difference in exposure prevalence of 25% in the suicides and 12.5% in the control group [odds ratio (OR)

**Table 1.** Key characteristics of early (<1 month discharge) and late (between 1 and 3 months discharge) suicide cases, expressed as a percentage of all suicides in that time period

Characteristic	Early suicides ( <i>n</i> = 102) <sup>a</sup> , <i>n</i> (%)		Later suicides ( <i>n</i> = 136) <sup>a</sup> , <i>n</i> (%)		$\chi^2$	<i>p</i>
Male	74	(73)	82	(60)	3.88	0.05
Living alone	43	(42)	45	(34)	1.60	0.21
Unmarried	72	(71)	93	(68)	0.23	0.58
History of self-harm	82	(82)	94	(70)	4.31	0.04
History of violence	29	(28)	18	(14)	8.01	0.005
History of substance misuse	59	(58)	76	(56)	0.11	0.75
Recent (<3 months) adverse life events	52	(53)	62	(48)	0.56	0.46
Diagnosis of affective disorder	33	(32)	62	(46)	4.46	0.04
Non-compliance with medication	23	(24)	41	(35)	3.10	0.08
Last contact <1 week before index date	68	(67)	63	(46)	10.34	0.001
Patient-initiated discharge	44	(44)	32	(24)	10.57	0.001
No follow-up	11	(11)	8	(6)	1.83	0.17
Died before follow-up	42	(47)	17	(13)	29.75	<0.001
Missed last appointment	20	(20)	42	(32)	4.40	0.04

<sup>a</sup> Denominators vary for explanatory variables due to missing data. Explanatory variables 91–100% complete.

2.30]. Because of non-response among controls, the achieved sample of cases (*n* = 238) and controls (*n* = 238) was still sufficient to detect this difference in exposure prevalence with 92% power.

Conditional logistic regression was selected as the analytical model due to time-matching of cases and controls on discharge date. Stata release 9.0 software (StataCorp, College Station, TX, USA) was used to calculate ORs, 95% confidence intervals (CIs) and associated *p* values. Univariate analyses were first performed to assess the effect of individual factors on the risk of post-discharge suicide. A multivariate model was then fitted to identify independent predictors of poor outcome. Backwards elimination procedures were performed within each domain, with explanatory variables carried forward from each domain that were either significant (*p* < 0.05) or borderline significant (0.05 < *p* < 0.1). The final regression model included only those variables that were independently significant at the 5% level.

## Results

Of the 250 patients who died within 3 months of discharge from psychiatric in-patient care, 181 (72%) had suicide verdicts returned, while 69 (28%) had open verdicts returned (both groups referred to as 'suicides' herewith). Of the suicide cases, 162 (65%)

were male. A total of 238 control questionnaires were returned, a response rate of 95%. Data on 12 controls could not be collected because of missing case-notes or erroneous patient identity numbers. The following analyses relate to the 238 cases and their matched controls.

### Characteristics of the post-discharge suicide cases

The most common method of suicide was hanging (91 cases, 39%), followed by self-poisoning (63 cases, 27%). Death by jumping from a height or in front of a vehicle occurred in 27 cases (11%). In eighteen cases (8%) the method was drowning and in 16 cases (7%) carbon monoxide poisoning.

Among the suicide cases the most common primary diagnoses were major affective disorder (95 cases, 40%), schizophrenia (43 cases, 18%), alcohol dependence (28 cases, 12%) and personality disorder (23 cases, 10%). The majority of all cases (144 cases, 61%) also had a secondary diagnosis, usually depressive illness (35 cases, 24%).

Twenty-nine (12%) suicides took place within a week of discharge, 102 (43%) within a month and 172 (72%) within 2 months. Within the first week of discharge, the highest number of deaths was on the day after discharge (seven cases). Those who died within the first month of discharge (Table 1) were more

**Table 2.** Sociodemographic characteristics of cases and controls: univariate conditional logistic regression analyses

Risk factor	Suicide cases ( <i>n</i> = 238) <sup>a</sup> , <i>n</i> (%)	Controls ( <i>n</i> = 238) <sup>a</sup> , <i>n</i> (%)	OR (95% CI)	<i>p</i>
Median age, years (range)	41 (18–65)	38 (16–65)	–	
Male gender	156 (66)	122 (51)	1.8 (1.2–2.6)	0.002
Employment status				
Employed	48 (21)	38 (16)	1.0 (Reference)	0.30*
Unemployed/long-term sick	148 (64)	168 (72)	0.7 (0.4–1.2)	
Other <sup>b</sup>	36 (16)	28 (12)	1.0 (0.5–2.0)	
Unmarried	165 (70)	166 (70)	1.0 (0.7–1.5)	1.00
Living alone	88 (38)	88 (38)	1.0 (0.6–1.4)	0.84
Homeless	5 (2)	3 (1)	1.7 (0.4–7.0)	0.48

OR, Odds ratio; CI, confidence interval.

<sup>a</sup> Denominators vary for explanatory variables due to missing data. Explanatory variables 91–100% complete.

<sup>b</sup> Other employment status includes retired, student, housewife/husband.

\* Relates to significance across all strata of the explanatory variable.

**Table 3.** Behavioural and clinical characteristics of cases and controls: univariate conditional logistic regression analyses

Risk factor and category	Suicide cases ( <i>n</i> = 238) <sup>a</sup> , <i>n</i> (%)	Controls ( <i>n</i> = 238) <sup>a</sup> , <i>n</i> (%)	OR (95% CI)	<i>p</i>
Behavioural features				
History of self-harm	176 (75)	111 (48)	3.4 (2.2–5.3)	<0.001
History of violence	47 (20)	50 (21)	0.9 (0.6–1.5)	0.82
History of substance misuse	135 (57)	127 (54)	1.2 (0.8–1.7)	0.38
Clinical features				
Diagnosis of affective disorder	95 (40)	67 (28)	1.6 (1.1–2.4)	0.01
Any secondary psychiatric diagnosis	144 (61)	112 (47)	1.9 (1.3–2.9)	0.001
More than five previous admissions	43 (19)	58 (24)	0.7 (0.4–1.1)	0.16
Duration of illness (<12 months)	57 (25)	40 (17)	1.6 (1.0–2.6)	0.046
Non-compliance with medication	64 (30)	70 (32)	0.9 (0.6–1.3)	0.45
Recent (<3 months) adverse life events	114 (50)	80 (35)	1.9 (1.3–2.8)	0.001

OR, Odds ratio; CI, confidence interval.

<sup>a</sup> Denominators vary for explanatory variables due to missing data. Explanatory variables 91–100% complete.

likely to be male, with a history of violence and self-harm, and to have had contact with services within a week of death compared with later suicides. They were less likely to have had a diagnosis of affective disorder. A higher proportion had initiated their own discharge. Nearly half of the suicides occurring within the first month of discharge died before attending their follow-up appointment.

#### Univariate models of suicide risk

Tables 2–4 show the univariate analyses assessing factors associated with suicide following psychiatric discharge. There was no difference in age distribution between the suicide and control groups, but males

were at greater risk of suicide than females. Factors associated with post-discharge suicide included a lifetime history of self-harm, a diagnosis of affective disorder, short duration of illness and psychiatric co-morbid conditions. Adverse life events within 3 months of the index date occurred significantly more frequently in suicides than controls, most often relationship break-ups (39 cases, 16% *v.* 19 controls, 8%; *p* = 0.005).

More suicides than controls had been in contact with a member of the mental health team within a week prior to the index date. At last contact, those reporting depressive symptoms, hopelessness and suicidal ideas were all more likely to die by suicide, but recent self-harm did not predict suicide.

**Table 4.** Contact with psychiatric services factors in cases and controls: univariate conditional logistic regression analyses

Risk factor and category	Suicide cases (n=238) <sup>a</sup> , n (%)	Controls (n=238) <sup>a</sup> , n (%)	OR (95% CI)	p
<b>Last admission</b>				
Detained under the MHA	32 (13)	49 (21)	0.6 (0.4–1.0)	0.04
Index admission <1 week duration	68 (29)	57 (24)	1.2 (0.8–1.9)	0.30
Re-admission within 3 months	53 (22)	44 (19)	1.3 (0.8–2.1)	0.32
<b>Last contact with services</b>				
Last contact <1 week before index date	131 (55)	106 (47)	1.6 (1.1–2.3)	0.02
<b>Psychiatric symptoms at last contact</b>				
Depressive symptoms	51 (22)	25 (11)	2.2 (1.2–3.8)	0.005
Hopelessness	32 (14)	15 (7)	2.2 (1.1–4.2)	0.02
Suicidal ideation	34 (15)	16 (7)	2.9 (1.4–6.2)	0.003
Self-harm	30 (13)	22 (10)	1.3 (0.7–2.5)	0.35
<b>Last discharge</b>				
Patient-initiated <sup>b</sup>	76 (32)	45 (19)	2.0 (1.3–3.1)	0.001
No follow-up	19 (8)	25 (11)	0.8 (0.4–1.4)	0.35
Missed last appointment	62 (27)	30 (13)	2.3 (1.4–3.8)	<0.001
Under CPA	120 (52)	150 (64)	0.6 (0.4–0.9)	0.007

OR, Odds ratio; CI, confidence interval; MHA, Mental Health Act; CPA, Care Programme Approach.

<sup>a</sup> Denominators vary for explanatory variables due to missing data. Explanatory variables 91–100% complete.

<sup>b</sup> Includes self-discharge, discharge following breach of ward rules or patient contract, patient request and other specified.

There were no significant differences between cases and controls in number of previous admissions, length of last admission, history of violence or substance misuse, or non-compliance with medication. Suicide cases were less likely than controls to have been detained under the Mental Health Act during their last admission. Suicide cases were more likely to have initiated their own discharge and to have missed their last appointment with psychiatric services than controls. Fewer suicides than controls were receiving enhanced aftercare under the Care Programme Approach (CPA; a mechanism which provides supervision by a care co-ordinator and regular multi-disciplinary case reviews to patients with complex health and social care needs).

### Multivariate model of suicide risk

The final multivariate model (Table 5) included eight independent predictors of suicide: male gender, history of self-harm, primary diagnosis of affective disorder, psychiatric co-morbidity, suicidal ideation, recent last contact, patient-initiated discharge and missed last appointment with services. The prevalence of multiple risk factors among the cases was high; significantly more of the post-discharge suicides had at least four of the seven risk factors compared with controls (36% *v.* 13%,  $p < 0.001$ ).

**Table 5.** Independent predictors of post-discharge suicide risk in the final multivariate conditional logistic regression model<sup>a</sup>

	Adjusted OR (95% CI)	p
Male gender	2.2 (1.3–3.8)	<0.01
History of self-harm	3.2 (1.9–5.5)	<0.001
Diagnosis of affective disorder	2.3 (1.3–3.9)	<0.01
Any secondary psychiatric diagnosis	1.8 (1.0–3.3)	0.048
Last contact <1 week before index date	2.2 (1.3–3.8)	<0.01
Symptoms of suicidal ideation	2.5 (1.0–5.9)	0.045
Patient-initiated last discharge	2.5 (1.4–4.5)	0.003
Missed last appointment	2.1 (1.1–3.9)	0.03

OR, Odds ratio; CI, confidence interval.

<sup>a</sup> Multivariate model created using 81% (384/476) of the whole sample.

## Discussion

### Main findings

Our main findings in this study relate to the timing of death, the risk factors for suicide and the elements of care by mental health services that may be protective. There was clustering of suicides within the first month, first week and first day following discharge.

We found that nearly half of suicide cases occurring within the first month had taken place before their first out-patient appointment.

It is worth reiterating that the comparisons in this study were between psychiatric patients who did and did not die by suicide following discharge from hospital. Comparisons were not made with the general population, as this would not have been an appropriate control group. We identified a number of important risk factors for post-discharge suicide, including a diagnosis of affective disorder, a lifetime history of self-harm, psychiatric co-morbidity and recent service contact. Other features associated with subsequent suicide included clinical symptoms detected at final contact with staff, particularly suicidal ideation, hopelessness and low mood. Suicide was associated with missing the most recent appointment with services but not with non-compliance with drug treatment. These findings are consistent with the finding that decreased care or the withdrawal of care may contribute to suicide risk (Appleby *et al.* 1999*a*). We also found that social risk factors for suicide in the general population (such as living alone or being unemployed) may not increase risk among the mentally ill (Appleby *et al.* 1999*a*; Powell *et al.* 2000).

Our findings suggest that some aspects of care by mental health services may be protective. Patients who died by suicide were less likely to have been detained under the Mental Health Act at their last admission and were less likely to be under the CPA on discharge. Although cases and controls were not matched for risk, it is unlikely that detained patients and patients under the CPA were considered to be at lower risk than informal patients and it may be that closer management of risk in recently detained or CPA patients is an important protective factor.

### **Methodological issues**

Our study has the strength of being a national case-control study, quantifying risk over a short time-frame, i.e. 3 months since discharge, which is shorter than most previous controlled studies. Although it is possible that differences in mental health care systems between countries may limit generalizability of some of our findings, many have universal relevance, particularly those regarding timing of post-discharge suicide and the importance of continuity of care (Yim *et al.* 2004; Desai *et al.* 2005). Further strengths include the representative random sampling of controls from the population at risk, low levels of missing data in the explanatory variables and the precision of our effect estimates.

Limitations to the study include the retrospective data collection from clinicians based on their

knowledge of the patient, clinical judgement and case records. Some misclassification in risk factor measurement may have occurred as a result. Clinicians who provided the information were not blind to case-control status and may have been biased by their awareness of outcome. However, the majority of questionnaire items are factual and should not have been greatly affected by any reporting bias. Further, a number of suicide studies have relied on similar methods (King *et al.* 2001) and Inquiry questionnaire data have been shown to be reliable (Appleby *et al.* 1999*b*).

In conclusion, the transition from in-patient care to the community is a time of increased suicide risk. An awareness of the predictors of suicide risk identified in this study could help clinicians to target those at greatest risk following discharge from hospital. Self-discharge appears to be a predictor of suicide, and follow-up arrangements should reflect this, incorporating the same risk management practices as for those whose discharge is planned. Regular risk assessments throughout the admission and during discharge planning should include the assessment of long-standing risk factors as well as the current mental state of the patient. Intensive community support and effective transition from in-patient to community services is vital in ensuring that service contact is maintained and any signs of relapse receive a prompt response. In England, services are required to follow-up all patients under the CPA within 1 week of discharge. Extending this requirement to other high-risk patients, such as those with a history of previous suicide attempts, may help reduce risk at this vulnerable time.

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### **Declaration of Interest**

L.A. is the Director of Mental Health in England and also chairs the Suicide Prevention Advisory Group at the Department of Health.

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