

Potential for suicide prevention in primary care? An analysis of factors associated with suicide

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SUMMARY

Background. General practitioners (GPs) need to be aware of the risk factors for suicide. GP records may provide clues to identifying the relative importance of such risk factors.

Aims. To identify, in suicide cases and matched controls, the patterns of consultation, diagnosis, and treatment of mental illness, and recording of risk factors for suicide. To examine the usefulness of data routinely collected by GPs in computerized databases to investigate treatment of patients in general practice prior to suicide.

Method. Case control study using GP records from the General Practice Research Database (GPRD). Three controls selected for each case, matched for age, sex, and duration of registration with practice. Information extracted of the prevalence of major disease; diagnosis of, and treatment, or referral for, mental illness; frequency of recording of recent life events; and consultations with the GP in the 12 months prior to death.

Result. Of the 339 suicide cases recorded, 80% were male, which is similar to the national percentage for this age group. Females were more likely than males to have a history of mental illness and to have been diagnosed and treated for mental illness in the 12 months before death (59% versus 35%), and women were more likely to have previously attempted suicide (47% versus 27%). There was no significant difference between males and females in period of time since last contact with GP practice, but females consulted more frequently. Twenty-nine per cent of cases had not consulted their GP in the six months prior to death. In multivariate analysis, the following were identified as independent risk factors: history of attempted suicide; untreated serious mental illness (odds ratios >20); recent (past 12 months) marital life event; alcohol abuse; frequent consultations with GP; and previous mental illness. Recording of life events by GPs was poor.

Conclusions. Females at risk of suicide are more likely than males to have been diagnosed and treated for mental illness. It is likely that GPs are under-diagnosing and under-treating males at risk. Data from the GPRD give comparable results to those from other studies. The GPRD is a potentially useful tool for research into relatively uncommon events in general practice.

Keywords: mental illness; suicide; risk factors; general practitioners.

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Introduction

RATES of suicide have given much cause for concern^{1,2,3} and, in 1992, the reduction of suicide, both in the population as a whole and in people with mental illness, formed two of the targets of the Mental Illness Key Area of the Government's *Health of the Nation* strategy. The strategy included actions/targets aimed at improving the early identification and treatment of those at risk of suicide, reducing access to the means of suicide, targeting high-risk groups, improving services for people with mental illness, providing information to the general public and the media. The action to improve early identification and treatment of those at risk included education of doctors and nurses to increase recognition of depression, a major risk factor for suicide, and education of health and social care professionals about assessment and management of suicide risk.

The GP is often the frontline professional, and the role of the GP may be potentially crucial in determining whether or not suicide occurs. A national survey suggested that most people with a depressive illness consult their GP during the course of a year.⁴ However, about half of mental illness remains undetected in general practice.⁵ Most people with mental illness are not referred to secondary care. Furthermore, around half of all people who kill themselves are not in touch with secondary care services. Therefore, the primary care team has a potentially important role to play in suicide prevention. Barraclough *et al*⁶ found that two-thirds of suicide cases were seen in the month before death. However, subsequent work in Scotland⁷ has suggested that only 38% of cases had seen their GP in the month before death, and 50% in the eight weeks before death. A small study in Bristol confirmed that 38% of suicide cases had consulted in the month before death, but those aged 35 and over were twice as likely to have consulted than those aged under 35 years.⁸

The GP is in a position to assess, not only current mental state, including the intensity of any suicidal feelings, but also such factors as socio-economic position, recent life events, chronic stresses, and social supports. Such factors may provide important clues to potential suicide risk. The importance of diagnosis and treatment in potentially preventing suicide was suggested by the results of a study in Sweden, which evaluated the effectiveness of a GP education programme about depression and found a substantial reduction in suicide rates in the two years following the education programme.¹⁰ Data from Hungary has also suggested that reduction in suicide is possible with appropriate treatment of depression by GPs.¹¹

The aim of the present study was to identify, in suicide cases and matched controls, the patterns of consultation, diagnosis, and treatment, and recording of risk factors for suicide, and to examine the usefulness of data routinely collected by GPs for this purpose. The source was the computerized medical records held in the General Practice Research Database (GPRD) (formerly the VAMP database).^{12,13} The main use of this database, to date, has been for pharmacoepidemiological research, but it has much potential for research into general practice. The size of the database makes it suitable for studying conditions or events that are relatively uncommon and that are dealt with mainly in primary care.

Method

General Practice Research Database

The GPRD is a database containing the computerized, anonymized medical records of approximately 3.4 million patients, comprising data from 540 practices for up to seven years. GPs contributing to this database have to follow a recording protocol. The data are subject to regular routine validation by full-time validators, to ensure that contributing GPs continue to follow the protocol. This requires them to record all significant morbidity, all contacts that result in a prescription, all prescriptions and the reason (diagnosis and/or symptom) for the prescription, and all referrals. All deaths and the cause of death must be recorded, and every patient who has a registration status recorded as 'dead' has the record checked by the GPRD validators to ensure that the fact and the cause of death are entered. All omissions are reported to GPs to ensure that they are corrected. A number of studies have assessed the validity of the data in the database.^{14,15,16,18} Completeness of recording of prescriptions was found to be 95%;^{14,15} of recording of diabetes diagnosis, 96%;¹⁸ of schizophrenia diagnosis, 88%;¹⁴ and 74% of all consultations were recorded.¹⁴ A study in 1995 used the GPRD to identify suicide patients and investigated prescribing for these patients prior to suicide.¹⁷

Identification of cases

Suicide cases aged 16–64 years, for suicides occurring between May 1991 and May 1993, were identified from the database in two ways:

1. Patients with a record of suicide in the notes; and
2. Patients who did not have a record of suicide, but whose record of cause of death on the database suggested that suicide might be possible. These causes included death from carbon monoxide poisoning (excluding accidental poisoning), hanging, suicidal or accidental overdose, and reference to self-inflicted injury. The GPs of these patients were contacted to confirm that they were suicide cases, and death certificates were obtained where the GP would allow identification of the patient and where death by suicide was uncertain. Ethical approval was obtained for these procedures from the independent ethical committee that oversees the use of the GPRD. Information was obtained for 77% of uncertain deaths, and 82% of these were confirmed as suicide. Cases where the verdict was open were included. Cases for whom no data were obtained to confirm suicide were excluded.

There were 271 cases of suicide in people aged 16–64 years recorded in practices that fitted the criteria in the database. A further 85 cases were identified using the second criteria as above. Seventeen cases were excluded because of inconsistencies in the patient registration data, or because the recording in the practice had not been assessed up to research standard for at least six months before death. Thus, there was a total of 339 suicide cases in the study.

Identification of controls

Three controls were selected for each patient, matched for practice, sex, age (+/- 2 years), and length of time registered with the practice (less than two years or more than two years). Controls were patients who were permanently registered with the practice at the time of the death of the cases. In six cases there were insufficient controls who matched the selection criteria, so for these cases the age selection criteria was widened to +/- 3 years. For

nine cases, only two controls could be found that fitted the criteria.

Data collected from the database

Data were identified from their respective entries in the database on history of major diseases; psychiatric diagnoses; major life events (bereavement, termination, financial, employment or marital problems); psychiatric referral; and treatment with drugs (British National Formulary (BNF) sections 4.1–4.3); and contacts with the practice in the six months prior to death. Free text entries (i.e. data recorded in the 'comments' section of the medical record) were also searched for extra information in these areas.

Data analysis

The data were analysed in two ways.

1. The percentage of male and female suicide cases and controls who had each risk factor were calculated. For cases and controls, female and male rates were compared using rate ratios.
2. A matched case-control analysis was undertaken comparing cases and controls using conditional logistic regression.^{19,20} These analyses take full account of the matching criteria, and provide estimated odds ratios for assessing the relative importance of the different risk factors. Univariate and multivariate models were fitted. The multivariate modelling tested for all two-factor interactions.

Results

Characteristics of cases and controls

Table 1 summarizes the characteristics of cases and controls. Of the 339 suicide cases identified, 80% were male and 20% female. Forty-six per cent of female cases and 32% of male cases were aged 45–64 years (not shown in table). These distributions are similar to the national suicide data.¹

History of mental illness

Sixty-one per cent of the suicide cases had a record of mental illness (78% of women, 56% of men). This was defined as a diagnosis ever recorded of serious mental illness (manic depression, schizophrenia), depression or anxiety, and/or prescription for drugs in BNF sections 4.1–4.3 in the last 12 months, or a history of attempted suicide. Of these problems, depression was the most commonly recorded problem (Table 1). Among suicide cases women were more likely than men to have had a recorded diagnosis of depression (34% versus 19%) in the last 12 months, and to have had a recorded history of depression or anxiety (59% versus 35%). Nine per cent of women and 6% of men had a diagnosis of schizophrenia recorded in their notes, and 7% and 1.5% respectively had had a diagnosis of manic depression. Female suicide cases were also more likely to have previously attempted to commit suicide (47% versus 27%), but there was no difference between men and women in the recorded prevalence of alcohol abuse.

History of physical illness

There was no apparent difference in the prevalence of major chronic diseases other than mental illness in the suicide cases compared with the controls. However, because the study was limited to people under 65 years of age, the number of people with degenerative diseases was small.

Treatment

Women were more likely than men to have had treatment (with drugs in BNF categories 4.1–4.3; 65% versus 38%) in the 12-month period before suicide. In particular, 26% of women and

Table 1. Characteristics of sample analysed (percentages in each category).

	Suicide cases (Female = 68; Male = 271)				Matched controls (Female = 201; Male = 807)			
	Females (%)	Males (%)	Rate ratio F:M	95% CI for rate ratio	Females (%)	Males (%)	Rate ratio F:M	95% CI for rate ratio
Diagnosis of chronic illness								
Asthma	8.8	4.4	2.0	0.7–5.5	10.0	8.1	1.2	0.7–2.1
Diabetes	0.0	1.8	0.0	–	0.0	1.5	0.0	–
Malignancy	4.4	1.5	3.0	0.7–13.7	5.0	1.0	5.0	2.0–12.9 ^a
CHD	2.9	3.0	1.0	0.2–4.8	1.5	4.8	0.3	0.1–1.0
Cerebrovascular disease	0.0	1.5	0.0	–	1.0	1.2	0.8	0.2–3.7
Multiple sclerosis	0.0	0.4	0.0	–	0.5	0.2	2.0	0.2–22.3
MND	0.0	0.7	0.0	–	0.0	0.0	–	–
Epilepsy	1.5	2.2	0.7	0.1–5.6	0.0	1.1	0.0	–
Diagnosis of mental illness								
Schizophrenia	8.8	5.9	1.5	0.6–4.0	0.5	1.0	0.5	0.1–4.0
Manic depression	7.4	1.5	5.0	1.3–19.1 ^a	0.5	0.1	4.0	0.3–64.5
Attempted suicide	47.1	26.9	1.7	1.0–3.0 ^a	1.5	1.2	1.2	0.3–4.4
Alcohol abuse	8.8	8.9	1.0	0.4–2.5	0.0	1.6	0.0	–
Depression	51.5	26.2	2.0	1.1–3.4 ^a	11.4	7.3	1.6	0.9–2.6
Anxiety	36.8	16.6	2.2	1.2–4.0 ^a	9.0	6.6	1.4	0.8–2.4
Depression/anxiety	58.8	34.7	1.7	1.0–2.9 ^a	15.9	11.3	1.4	0.9–2.2
Depression in past 12 months	33.8	18.5	1.8	1.0–3.3 ^a	8.5	4.6	1.8	1.0–3.3 ^a
Anxiety in past 12 months	20.6	12.2	1.7	0.8–3.4	7.0	4.2	1.7	0.9–3.1
Anxiety/depression in past 12 months	33.8	25.8	1.3	0.7–2.3	12.4	7.3	1.7	1.0–2.8 ^a
Any psychiatric history	77.9	56.1	1.4	0.7–2.6	25.4	16.2	1.6	1.1–2.3
Record of life events								
Bereavement/unemployment	2.9	1.5	2.0	0.4–11.1	2.5	1.5	1.7	0.6–4.8
Marital event	4.4	4.1	1.1	0.3–4.0	0.0	1.0	0.0	–
Treatment								
Referral to psychiatrist in past 12 months	16.2	11.1	1.5	0.7–3.1	1.0	1.5	0.7	0.1–3.0
Drug prescribed								
BNF 4.3 (antidepressants)	47.1	22.5	2.1	1.2–3.6 ^a	11.9	6.6	1.8	1.1–3.0 ^a
BNF 4.2 (antipsychotics)	27.9	9.2	3.0	1.5–5.9 ^a	2.0	1.6	1.2	0.4–3.8
BNF 4.1 (hypnotics and anxiolytics)	45.6	22.9	2.0	1.1–3.5 ^a	12.4	7.1	1.8	1.1–2.9 ^a
Any of 4.1–4.3	64.7	38.0	1.7	1.0–3.0	19.9	11.0	1.8	1.2–2.7 ^a
Cumulative days since past practice contact								
1–6	17.6	11.4	1.5	0.7–3.2	4.5	3.5	1.3	0.6–2.8
1–13	25.0	18.8	1.3	0.7–2.5	10.4	8.1	1.3	0.8–2.2
1–27	33.8	29.9	1.1	0.6–2.0	23.9	14.6	1.6	1.1–2.4 ^a
1–90	72.1	53.1	1.4	0.8–2.4	44.3	30.7	1.4	1.1–2.0 ^a
1–182	82.4	68.3	1.2	0.6–2.4	62.7	47.3	1.3	1.0–1.8
No of contacts recorded in past 6 months								
0	17.6	32.1	0.5	0.3–1.1	37.8	52.9	0.7	0.5–1.0 ^a
1–2	22.1	33.2	0.7	0.4–1.2	29.9	31.2	1.0	0.7–1.3
3–6	29.4	22.1	1.3	0.7–2.4	25.4	11.5	2.2	1.5–3.2 ^a
7 or more	30.9	11.4	2.7	1.4–5.1 ^a	7.0	4.3	1.6	0.8–3.0

^aSignificant at 5% level.

9% of men had been given antipsychotic drugs (BNF section 4.2). Men and women had similar rates of referral to a psychiatrist in the last year of life.

Consultation

Contact with the practice was defined as a recorded surgery visit or telephone contact within the last six months of life. There was no significant difference between male and female cases in the length of time between the last practice contact and death. Thirty-four per cent of women and 30% of men had had a recorded contact with the surgery in the month before death (Figure 1). Women consulted more frequently than men: 60% of women and 34% of men consulted three or more times.

However, 29% of the cases had not had a contact recorded with their practice in the last six months (Table 1).

Comparisons with controls

Cases and controls were matched for practice, sex, age, and length of registration, and these matching factors were included in all univariate and multivariate conditional logistic regression models. However, because of the matching, their regression coefficients cannot be interpreted.

Univariate analyses

These analyses examined each risk factor in isolation. The results compare risk factors for suicide in cases and controls (Table 2),

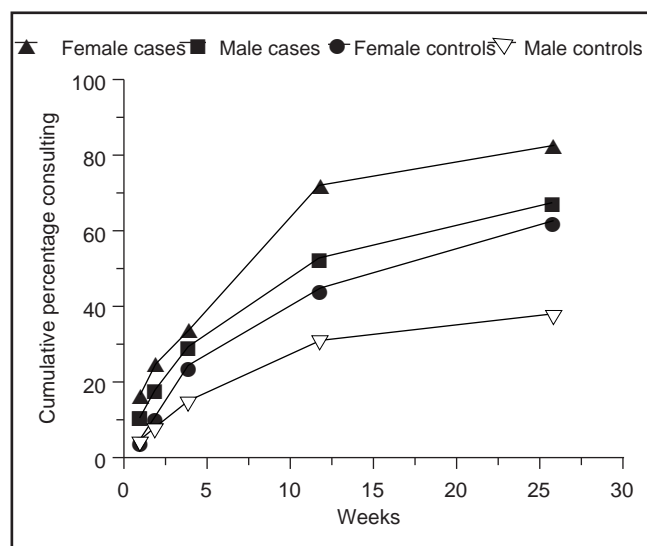


Figure 1. Time since last contact with GP practice prior to suicide in cases and controls. (Cumulative percentage of patients consulting in the weeks before suicide.)

and suggest that history of a major chronic physical disease (asthma, diabetes, malignancy, coronary heart disease, cardiovascular disease, multiple sclerosis, motor neurone disease, and epilepsy) was not a significant risk factor for suicide. However, for most of these diseases, the numbers compared were small because of the young age group (Table 1). On the other hand, a history of attempted suicide, diagnosis of and/or treatment for mental illness, and recent marital problems and alcohol abuse were statistically significant risk factors. The odds ratios were particularly high for patients who had previously attempted suicide (OR = 23.3; 95% CI = 10.6–51.0), and for patients with a serious mental disorder that was not being treated (OR = 20.8;

95% CI = 3.2–136.1) (Table 2).

Cases were more likely than controls to have consulted their GP in the week prior to death, in the last month of life, and overall in the previous six months (Figure 1). For both men and women, suicide cases were more likely to have consulted frequently in the past six months than controls.

There were very few life events recorded for either cases or controls: only 4% of cases and 1% of controls had a record of marital problems, and other major life events were recorded in only 2% of cases and 1% of controls. Only four patients had a record of financial or employment problems. In spite of small numbers, a recorded marital life event was a highly significant risk factor.

Multivariate analyses

Multivariate analyses were carried out using conditional logistic regression to establish the odds ratios of risk for suicide for each factor when controlling for the others. All possible two-factor interactions were tested for significance (i.e. allowing for the possibility that the effect of one factor may be modified by the presence/absence of another). However, the only significant two-factor interaction was between diagnosis and treatment for serious mental disorders (Table 2). Thus, compared with patients with no serious mental disorder (OR = 1), patients with treated serious mental disorders were at lower risk (OR = 4.8) than those patients whose serious mental disorders were untreated (OR = 20.8).

The analysis also showed that frequent contact with the GP surgery, a history of attempted suicide, a history of and treatment for mental illness, alcohol abuse, and a record of recent marital conflict were all independent and significant risk factors. A history of severe mental illness, which was currently (within the past 12 months) untreated, and attempted suicide had the strongest independent effects, both of these having an odds ratio that was more than 20. A score to assess risk in an individual with combinations of risk factors can be derived from the multivariate model by multiplying together the odds ratios for all risk

Table 2. Regression model for the effects of diagnosis, treatment, and contact with GP on risk of suicide.

Model variables	Multivariate model			Univariate model		
	OR	95% CI		OR	95% CI	
Contacts in the past 6 months						
0	1.0	–	–	1.0	–	–
1–2	1.3	0.9	2.3	1.8	1.3	2.4
3–6	1.4	0.9	2.3	3.4	2.3	4.9
7+	2.1	1.1	4.1	6.9	4.2	11.2
Previous attempted suicide?						
No	1.0	–	–	1.0	–	–
Yes	23.3	10.6	51.0	42.6	19.9	91.2
Diagnosis of mental illness ever (non-serious)?						
No	1.0	–	–	1.0	–	–
Yes	1.8	1.1	3.0	5.4	3.9	7.5
History of alcohol abuse?						
No	1.0	–	–	1.0	–	–
Yes	3.3	1.3	8.2	7.5	3.8	14.9
Marital life event recorded?						
No	1.0	–	–	1.0	–	–
Yes	5.9	1.8	19.5	5.8	2.3	14.2
Other life event recorded?						
No	1.0	–	–	1.0	–	–
Yes	0.3	0.1	1.4	0.6	0.2	2.0
No serious mental illness	1.0	–	–	1.0	–	–
Serious mental illness not treated	20.8	3.2	136.1	12.7	2.4	66.4
Treated for serious mental illness, no diagnosis	2.0	1.2	3.2	5.5	3.9	7.7
Diagnosed and treated for mental illness	4.8	1.7	13.3	13.5	5.8	31.5

factors that apply. This gives the odds ratio compared with an individual with the same age/sex characteristics but with no risk factors.

Discussion

The strength of this study lies in its very wide coverage of United Kingdom GPs. Data from 540 practices were available (although not all had suicide cases).

This study confirmed the importance of a number of risk factors that could act as important pointers for GPs in the identification of potential suicide risk. A history of attempted suicide was a major risk factor for subsequent, successful suicide. It is known that women are more likely than men to attempt suicide, and it is a common conception that this may be part of 'help seeking' behaviour rather than a serious desire to end their lives. However, the fact that nearly half of the female suicide cases had a previous history of attempting suicide (nearly twice as high as men) indicates that attempted suicide should be taken seriously as a major marker of risk.

Comparison with other smaller studies using different methodology shows similar rates of self harm and suicide, similar rates of contact with GP, and similar rates of psychiatric illness.^{7,8}

This study has also highlighted differences, not previously described, between men and women in relation to suicide risk, and in the diagnosis and treatment of mental illness by GPs. Men were as likely as women to have consulted prior to suicide (although less frequently). However, men were less likely to have been diagnosed with a mental illness than women, and, even when diagnosed, were less likely to have received treatment. History of severe mental illness not treated in the past 12 months was a highly significant risk factor for suicide. The increased detection and treatment of suicide risk in women may provide some insight into the difference between men and women in rates of successful suicide.

The recording of life events was low in comparison to national rates of divorce, abortion, and unemployment, but similar to another study using GP manual records.⁷ National data suggest that 5% of people in this age group are likely to have experienced marital conflict in the previous six months,²² and these figures are not reflected in our data. Research on suicide indicates that, often, people who kill themselves have major and/or multiple social stresses, and that, despite low recording, marital stress was a significant risk factor for suicide in this study. The significance of this risk indicates the importance of recording major life events in the medical record, as these may be an important component of suicide risk.

We therefore have strong grounds for arguing that primary care teams need to be aware of the clinical and sociodemographic risk factors for suicide that are readily identifiable in general practice: a history of attempted suicide; history of mental illness and, particularly, untreated severe mental illness; and major life stresses.

This study has also demonstrated the research potential of databases based on GP recording, such as the GPRD: a large and relatively accurate database giving information in a wide range of clinical areas, and with sufficient coverage to reflect the national picture. This is particularly relevant as GPs will play an increasing role in commissioning, and strategy formation and research information will be required quickly and accurately on a number of vital issues.

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