

# Differences between general practices in hospital admission rates for self-inflicted injury and self-poisoning: influence of socioeconomic factors

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## SUMMARY

**Background.** Self-inflicted injury and self-poisoning are major causes of hospital admission of young adults throughout the United Kingdom, while in Scotland, suicide is the leading cause of death each year in persons aged 15 to 40 years. General practitioners are in a unique position in that they may have contact with the patient before the attempted suicide and later play a supportive role along with other health service and social work professionals.

**Aim.** This study set out to examine the differences between 72 general practices in Tayside in the hospital admission rates for self-inflicted injury/poisoning among their patients, and the extent to which these differences were related to the socioeconomic conditions prevailing in the patients' areas of residence and in the areas in which practices were located. The study also aimed to examine the agents of self-inflicted injury/poisoning most commonly used by different age groups.

**Method.** Details of admissions to hospitals in Tayside for self-inflicted injury/poisoning, from 1991 to 1993 inclusive, were obtained from a national, hospital inpatient discharge summary scheme, loaded onto a microcomputer and analysed using standard commercial software. Data from the 1991 census at the postcode sector level and death registrations summaries were obtained from the office of the registrar general for Scotland. The deprivation categories used were based on 1991 census data.

**Results.** In the study period, 52% of hospital admissions for self-inflicted injury/poisoning were of patients aged 30 years or over. Overall, the number of admissions of females exceeded that of males by 26%. Annual hospital admission rates for self-inflicted injury/poisoning per 1000 registered patients averaged over the Tayside practices correlated closely with the male unemployment rate in, and deprivation category of, the postcode sector in which the practice was located. Rates ranged from an average of 1.1 admissions per 1000 registered patients per year in sectors with less than 5% male unemployment to 4.6 where male unemployment was 15% or over. Similarly, the admission rates ranged from 1.1 per 1000 registered patients per year in the most affluent sectors to 3.3 in the most deprived sectors. The proportion of older patients who used sedatives, hypnotics and tranquillizers to poison themselves was greater than that of younger patients; analgesics, such as paracetamol, were the agents most commonly used for self-poisoning by the younger age groups.

**Conclusion.** The routine monitoring at national level of hospital admission rates for self-inflicted injury/poisoning, using established computerized information systems, would enable the identification of those practices that have

a relatively high proportion of such admissions. This would provide a starting point for the identification of pilot sites for the development of protocols for offering multi-agency support to high-risk groups of patients.

**Keywords:** self abuse; self poisoning; referral to hospital for admission; referral rates; hospital admission rates.

## Introduction

THE government, in its white paper *The health of the nation*, has set a target for the reduction of the suicide rate in England and Wales by at least 15% by the year 2000.<sup>1</sup> This would mean a fall from the rate in 1990 of 11.1 suicides per 100 000 population to 9.4 suicides per 100 000 population. The equivalent Scottish Office publication, *Scotland's health, a challenge to us all*, emphasized that 'the rising number of deaths from suicide in young men is a particular cause for concern'.<sup>2</sup>

Suicide is a major cause of premature death in England and Wales, accounting for 11% of all deaths in persons aged between 15 and 40 years,<sup>3</sup> while in Scotland, suicide is the leading cause of death each year in this age group. In Scotland in 1992, 19% of all deaths in this age group were recorded as caused by suicide, with another 8% recorded as undetermined whether caused accidentally or deliberately.<sup>4</sup> To put this into perspective, in Scotland in 1992 the 233 suicides and 100 undetermined deaths in young adults (aged 15–40 years) compare with 206 deaths from motor vehicle traffic accidents, 139 from cancer and 77 from diseases of the heart and circulatory system.

It has long been recognized that people with a history of admissions to hospital for self-inflicted injury and self-poisoning have a much higher risk than the general population of dying from suicide.<sup>5-7</sup> Although the dramatic rise in rates of self-poisoning which occurred in the late 1960s and early 1970s appears to have levelled off,<sup>8,9</sup> self-poisoning is still a major problem in Scotland as elsewhere in the United Kingdom<sup>10</sup> and remains one of the most common causes of hospital admissions in young adults.<sup>11</sup>

General practitioners are in a unique position within the health service in that they may have contact with the patient before the attempted suicide and in some cases may find themselves in the unenviable position of having unwittingly prescribed the drugs used. After the event, general practitioners share a supportive role with other health service and social work professionals.

The aim of this study was to determine, with reference to the situation in Tayside, the extent to which the burden of self-inflicted injury/poisoning falls more heavily on some practices than on others and the extent to which this is related to socioeconomic differences in their catchment areas, and to assess the ability of national computer systems to identify, on a routine basis, practices with an especially heavy burden. The availability of such information would assist in the selection of sites for piloting the development of protocols that offer multi-agency support to high-risk groups of patients in an effort to reduce the incidence of attempted suicide. The study also aimed to examine the agents of self-inflicted injury/poisoning most commonly used by different age groups.

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## Method

### Hospital admission details

Details of patients admitted to hospital for self-inflicted injury/poisoning, from 1991 to 1993 inclusive, were obtained by the author from the inpatient summary discharge form, known in Scotland as the 'standard morbidity record 1'. Extracts of the validated standard morbidity record 1 file of all patients admitted to Tayside hospitals were obtained monthly on floppy disc from the information and statistics division of the Common Services Agency for the Scottish Health Service, Edinburgh, and were built up into a cumulative file using standard commercial software (*DBASE IV*) on a microcomputer. A subfile was created based on admissions with the following *International classification of diseases* (ninth revision) (ICD-9) codes recorded as either the main or a secondary diagnosis: self-inflicted injury and self-poisoning (E9500 to E9599); accidental poisoning (E8500 to E8699); and undetermined whether accidentally or deliberately caused (E9800 to E9899). Details of the agents of self-inflicted injury/poisoning were included in the subfile, as were the patients' general practice codes. Where practices had merged over the three years of the study, hospital admissions of patients in the original practices were recorded as being from the merged practice as it existed at the end of 1993.

### Socioeconomic variables

The deprivation categories used were those devised by Carstairs and Morris and calculated for all postcode sectors in Scotland based on the following four variables from the 1991 census:<sup>12</sup> percentage of males who were unemployed; percentage of the population with head of household in social class 4 or 5; percentage of the population with no car; and percentage of the population living in overcrowded housing. The statistical methods used to arrive at the deprivation categories were described by Carstairs and Morris,<sup>12</sup> and subsequently by McLoone.<sup>13</sup> In the present study, lists were constructed of the postcode sectors that comprised each of six categories (1991 census data) and the self-inflicted injury/poisoning subfile was searched with each list in order to determine the number of admissions from postcodes in each deprivation category as previously described.<sup>14</sup> In the analysis of 1991 to 1993 data, the male unemployment rate, extracted (using *SASPAC* software) from 1991 census data supplied by the office of the registrar general for Scotland was also used as a deprivation indicator.

Death registrations summaries, from 1989 to 1992 inclusive, that included the postcode sector of residence were obtained on floppy disc from the office of the registrar general for Scotland.

### Patient and doctor confidentiality

At each stage of the analysis, care was taken to ensure patient and doctor confidentiality and to conform to the principles of the data protection act 1984. This was assisted by the availability of the community health index number — a unique patient identifier used throughout Tayside — which was used instead of the patient's name. In particular it was used to identify multiple admissions of the same patient. Practice code numbers, which did not allow the identification of individual doctors, were also used to ensure confidentiality.

## Results

During the three years of the study, there were 2705 admissions of 2113 Tayside residents to Tayside hospitals as a result of self-inflicted injury/poisoning. They were registered with 72 practices in Tayside. The number of admissions to Tayside hospitals

increased to 3264 when patients from other areas were taken into account.

### Age and sex patterns

Table 1 shows that, from 1991 to 1993 inclusive, of patients aged up to 20 years there were about twice as many admissions of females to Tayside hospitals for self-inflicted injury/poisoning than of males. Of men aged between 20 and 29 years the number of admissions matched, and even slightly exceeded, that of women in this age group but in the older age groups the situation was again reversed. Overall, the number of admissions of females exceeded that of males by 26.2%.

Over this three-year period, 51.8% of hospital admissions for self-inflicted injury/poisoning were of patients aged 30 years or over. About as many men aged 40–44 years were admitted to hospital for self-inflicted injury/poisoning as males aged 15–19 years. Among females, although admissions peaked in the age groups 15–19 years and 20–24 years, they had only fallen by about a third by the age of 40–44 years.

### Socioeconomic influences

Analysis of rates of admission (persons admitted to hospital per 10 000 population) as a result of self-inflicted injury/poisoning in different postcode sectors revealed the extent to which the rates were related to the socioeconomic conditions prevailing in the area of residence. In an earlier study (unpublished, using seven deprivation categories, based on 1981 census data), it was found that in each year from 1980 to 1990 inclusive the admission rate of males living in the most deprived areas (deprivation categories six and seven) was about five to 10 times higher, and the rate among females was about four times higher, than of males and females, respectively, living in the most affluent area (deprivation category one). In this time period the mean annual numbers of males and females admitted per 10 000 population in each deprivation category were: resident in deprivation category one, four males and nine females; in category two, seven males and 10 females; in category three, seven males and 11 females; in category four, 13 males and 18 females; in category five, 19 males and 25 females; in category six, 23 males and 31 females; and in category seven, 37 males and 44 females. Thus, the higher admission rate of females compared with males was seen in each of the seven deprivation categories. This was consistently observed in each year.

**Table 1.** Age and sex distribution of admissions<sup>a</sup> to Tayside hospitals as a result of self-inflicted injury/poisoning, from 1991 to 1993 inclusive.

Age group (years)	No. of		Total no.
	Males	Females	
5–9	3	0	3
10–14	22	90	112
15–19	145	278	423
20–24	260	287	547
25–29	272	216	488
30–34	189	204	393
35–39	155	217	372
40–44	150	188	338
45–49	80	106	186
50–54	56	71	127
55–59	37	57	94
60–69	36	60	96
70+	38	47	85
All ages	1443	1821	3264

<sup>a</sup>Including admissions of patients not resident in Tayside.

The relationship between the suicide/probable suicide rate and socioeconomic conditions was much less marked than that between the hospital admission rate for self-inflicted injury/poisoning and socioeconomic conditions. In Tayside between 1989 and 1992 inclusive, 71.9% of the deaths from poisoning, suicide and undetermined cause of people aged 16 years and over were of males. In this period, the average annual number of such deaths per 100 000 male population aged 16 years and over was: 23 in postcode sector of residence with male unemployment rate under 5.0%; 22 in sector with male unemployment rate 5.0% to 9.9%; 32 in sector with male unemployment rate 10.0% to 14.9%; and 33 in sector with male unemployment rate 15.0% to 20.9%. The number of deaths over this period did not allow meaningful comparisons at general practice level.

#### Variations between general practices

Approximately 46% (range 23.3% to 68.6%) of patients registered with a practice were resident in a postcode sector with the same deprivation category score as the sector in which the practice was located. About 76% (range 57.5% to 84.7%) of patients registered with a practice were resident in a postcode sector with the same or adjacent deprivation category score as the sector in which the practice was located.

Different practices located within the same health centre tended to have similar catchment areas. Five Tayside health centres comprised three or more practices during the study period, 1991 to 1993 inclusive. Within these health centres, the percentage of patients registered with a practice who were resident in a postcode sector with the same and with the same or adjacent deprivation category score as the sector in which the health centre was located varied by a maximum of 12.5% and 10.2%, respectively.

The admission rate to hospital for self-inflicted injury/poisoning per 1000 registered patients increased the higher the male unemployment rate in the postcode sector in which the practice was located, being approximately four times higher for practices in sectors with an unemployment rate of 15% or over than in those where unemployment was less than 5% (Table 2). Using the more complex deprivation category method of assessing the

socioeconomic status of postcode sectors, a similar pattern was observed; practices located in deprived sectors (deprivation categories five and six) had an admission rate for such self-harm about three times greater than that of practices in affluent sectors (deprivation categories one and two). The mean number of admissions per person increased only slightly with rising unemployment, from 1.22 in the low to 1.39 in the high unemployment areas.

Variations in the average annual admission rates to hospital for self-inflicted injury/poisoning between practices are shown in Table 3. Nine practices, all in areas of low (<5.0%) or medium (5.0% to 9.9%) male unemployment, had less than one admission per 1000 registered patients per year. At the other extreme, in areas of high ( $\geq 10.0\%$ ) male unemployment, five practices had a rate of five or more, three of which had a rate of more than eight admissions per 1000 registered patients per year; the highest was 11.6 admissions per 1000 registered patients per year.

Not all patients stayed with the same practice following their self-inflicted injury or self-poisoning: 95 Tayside patients were registered with a different practice on the second or subsequent admission.

#### Agents used for self-poisoning

Although all types of self-inflicted injury/poisoning were assessed in the study, the vast majority of admissions were for self-inflicted poisoning, with less than one per cent of the total being caused by, for example, cutting the wrist and arm. The most common drugs used are listed by broad category in Table 4. About 37% of overall admissions for self-inflicted injury/poisoning were the result of an overdose of analgesics, antipyretics and antirheumatics, although there was considerable variation between age groups. Self-poisoning with paracetamol became less common with age, accounting for a third of admissions in those aged under 30 years but falling to around 16% in those aged 45 years and over. Sedatives, hypnotics and tranquillizers, on the other hand, accounted for 3.5% of admissions of those aged under 15 years, 13.4% of admissions of those aged 15 to 29 years and 38.1% of admissions of those aged 60 years and over.

#### Discussion

Self-inflicted injury/poisoning is by no means confined to teenagers and young adults. In this study, over half of the hospital admissions for self-inflicted injury/poisoning were of patients aged 30 years or over; age therefore offers no guide to those patients most likely to be at risk.

**Table 2.** Hospital admission rates for self-inflicted injury/poisoning and the socioeconomic conditions<sup>a</sup> prevailing in the postcode sectors in which the practices were located, from 1991 to 1993 inclusive.

Socioeconomic conditions <sup>b</sup>	No. of annual admissions per 1000 registered patients		Mean no. of admissions per person
	Total	Of different persons <sup>c</sup>	
<i>Male unemployment rate (%)</i>			
<5.0	1.1	0.9	1.22
5.0-9.9	2.1	1.6	1.31
10.0-14.9	3.1	2.4	1.29
15.0-20.9	4.6	3.3	1.39
<i>Deprivation categories<sup>d</sup></i>			
1 and 2	1.1	0.8	1.38
3 and 4	1.7	1.4	1.21
5 and 6	3.3	2.5	1.32
All areas	2.3	1.8	1.28

<sup>a</sup>Measured by the male unemployment rate or Carstairs deprivation index. <sup>b</sup>At the 1991 census in the postcode sectors in which practices were located. <sup>c</sup>Calculated as the number of different persons admitted over the three-year period divided by three. <sup>d</sup>Category 1 is most affluent, category 6 is most deprived.

**Table 3.** Variations between Tayside practices in average<sup>a</sup> annual hospital admission rates for self-inflicted injury/poisoning (calculated from 1991 to 1993 inclusive).

Average annual admissions per 1000 registered patients	No. (%) of practices (n = 72)	No. of practices in postcode sectors with male unemployment rate		
		<5.0%	5.0%-9.9%	$\geq 10.0\%$
<1.0	9 (12.5)	7	2	0
1.0-1.9	34 (47.2)	15	14	5
2.0-2.9	9 (12.5)	1	2	6
3.0-3.9	12 (16.7)	1	3	8
4.0-4.9	3 (4.2)	0	1	2
5.0-14.9	5 (6.9)	0	0	5

n = total number of practices. <sup>a</sup>Total number of admissions over the three years divided by three.

**Table 4.** Main agents of self-inflicted injury/poisoning used by different age groups; assessed from admissions<sup>a</sup> to Tayside hospitals, 1991 to 1993 inclusive.

ICD-9 code	Cause	% of total admissions for self-inflicted injury/poisoning in age group (years)					
		5-14 (n = 136)	15-29 (n = 1458)	30-44 (n = 1103)	45-59 (n = 407)	60+ (n = 181)	All ages (n = 3264)
9654	Paracetamol	33.9	30.7	25.6	16.7	16.0	26.7
9655-59	Other analgesics/antipyretics/antirheumatics	16.5	12.7	8.6	7.4	7.7	10.9
9690	Antidepressants	2.6	10.7	14.7	11.5	6.6	11.6
967	Sedatives and hypnotics	2.6	6.7	9.5	18.9	20.4	9.8
9691-95	Tranquillizers	0.9	6.7	10.0	15.2	17.7	9.3
9650	Opiates and related narcotics	2.6	4.3	2.4	0.2	1.1	2.9
9651	Salicylates	1.7	2.8	2.4	2.2	1.1	2.5
980	All types of alcohol	3.5	1.8	1.8	3.9	3.3	2.2
881	Open wound elbow, forearm, wrist	0	1.7	1.5	0.5	1.7	1.4
9696	Hallucinogens	1.9	0.5	0	0	0	0.3
9697-99	Other psychotropic agents	0	0.8	0.4	0.5	0	0.5
	All causes above	66.2	79.3	76.8	77.1	75.7	78.0

n = number of admissions for all causes of self-inflicted injury/poisoning in the age group. <sup>a</sup>Including admissions of patients not resident in Tayside.

Admission rates for such self-harm were highest for patients who were resident in areas of greatest deprivation. Despite the dramatic difference in the admission rates between the most affluent and the most deprived areas of residence, it was possible that practices would draw their patients from a wide catchment area and so dilute out the socioeconomic effect, resulting in comparatively little difference between practices. However, as it was shown that practices in affluent areas tended to draw most of their patients from affluent areas and practices in deprived areas tended to attract patients from deprived areas, a large proportion of the socioeconomic difference remained.

For many practices in this study, self-inflicted injury/poisoning among their patients was a major problem, with three practices having more than eight admissions to hospital for such self-harm per 1000 registered patients per year. The incidence of hospital admissions for self-inflicted injury/poisoning was closely related to the socioeconomic conditions prevailing in the area where the practice was located. A typical four-doctor practice in an affluent area with less than 5% male unemployment might have one hospital admission for self-inflicted injury/poisoning every two months. In contrast, a similarly sized practice located in an area with male unemployment at over 15% might expect to have one such hospital admission every two weeks.

With about 80% of the admissions for self-inflicted injury/poisoning in a three-year period being of patients who deliberately injure/poison themselves for the first time in the period, some practices clearly have a substantial number of patients in need of support. This is even more the case if it is assumed that those who actually self-injure themselves severely enough to be admitted to hospital represent only the tip of the iceberg of despair among certain groups in certain areas.

The male unemployment rate at the 1991 census was by itself at least as good an indicator of the likely admission rate as the more complex Carstairs and Morris score<sup>12</sup> of which it is a component. In the absence of data on the occupational status of persons admitted to hospital with self-inflicted injury/poisoning it would, however, be premature to imply that unemployment is the direct cause of the despair, since as well as being a serious problem in its own right for those directly affected, areas with high unemployment levels also tend to be deprived in other respects.<sup>12</sup>

It is not at present possible to determine precisely from national computer systems the extent to which medicines used in self-poisoning are obtained by the patients from their general practitioner, a hospital or via other contacts, or are bought over the counter. The ICD-9 coding used for diagnosis only specifies

broad groups of compounds, some members of which may only be available on prescription while others may be available over the counter. The introduction of Read coding into national computer systems offers the potential for better determination.

In the hospital admissions for self-poisoning with paracetamol there is little clue as to the source for the paracetamol, as it can be obtained with or without prescription. Many of the persons who overdosed on sedatives, hypnotics and tranquillizers are, however, likely to have obtained these on prescription; the proportion of patients who deliberately poisoned themselves with these agents increased with age. Overdosing on another group of prescribed drugs, the antidepressants, was common in all age groups and these drugs were used in 12% of the overall admissions for self-inflicted injury/poisoning.

It is impossible to say whether any of these episodes of self-poisoning would have been avoided had the patients not had access to medicines prescribed by their general practitioner or hospital, or conversely whether some patients would have employed a more lethal method of self-injury instead. Therefore, pointing to the substantial proportion of self-poisoners who may use prescribed medicines is not so much an argument against the prescription of, for example, tranquillizers, sedatives and antidepressants, as one in favour of the development by drug companies of effective compounds with wide safety margins and with inbuilt or readily available antidotes to reduce the risk of death if they are misused. The use of prescribed medicines in self-poisoning also emphasizes that general practitioners have a unique position in that they often may have had contact with the patient before the attempted suicide. Great care obviously has to be taken against inappropriate and excess prescribing.

The routine calculation at national level of hospital admission rates for self-inflicted injury/poisoning, using established computerized information systems, would enable those practices where the problem is greatest to be identified. This would provide a starting point for the identification of pilot sites where the role of general practitioners in tackling the problem can be assessed, and protocols can be developed for offering multi-agency support to high-risk groups of patients.

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