



Premature death after self-harm: a multicentre cohort study

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Summary

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Background People who self-harm have an increased risk of premature death. The aim of this study was to investigate cause-specific premature death in individuals who self-harm, including associations with socioeconomic deprivation.

Methods We undertook a cohort study of patients of all ages presenting to emergency departments in Oxford, Manchester, and Derby, UK, after self-poisoning or self-injury between Jan 1, 2000, and Dec 31, 2007. Postcodes of individuals' place of residence were linked to the Index of Multiple Deprivation 2007 in England. Mortality information was supplied by the Medical Research Information Service of the National Health Service. Patients were followed up to the end of 2009. We calculated age-standardised mortality ratios (SMRs) and years of life lost (YLL), and we tested for associations with socioeconomic deprivation.

Findings 30950 individuals presented with self-harm and were followed up for a median of 6.0 years (IQR 3.9–7.9). 1832 (6.1%) patients died before the end of follow-up. Death was more likely in patients than in the general population (SMR 3.6, 95% CI 3.5–3.8), and occurred more in males (4.1, 3.8–4.3) than females (3.2, 2.9–3.4). Deaths due to natural causes were 2–7.5 times more frequent than was expected. For individuals who died of any cause, mean YLL was 31.4 years (95% CI 30.5–32.2) for male patients and 30.7 years (29.5–31.9) for female patients. Mean YLL for natural-cause deaths was 25.9 years (25.7–26.0) for male patients and 25.5 years (25.2–25.8) for female patients, and for external-cause deaths was 40.2 years (40.0–40.3) and 40.0 years (39.7–40.5), respectively. Disease of the circulatory (13.1% in males; 13.0% in females) and digestive (11.7% in males; 17.8% in females) systems were major contributors to YLL from natural causes. All-cause mortality increased with each quartile of socioeconomic deprivation in male patients (χ^2 trend 39.6; $p < 0.0001$), female patients (13.9; $p = 0.0002$), and both sexes combined (55.4; $p < 0.0001$). Socioeconomic deprivation was related to mortality in both sexes combined from natural causes (51.0; $p < 0.0001$) but not from external causes (0.30; $p = 0.58$). Alcohol problems were associated with death from digestive-system disease, drug misuse with mental and behavioural disorders, and physical health problems with circulatory-system disease.

Interpretation Physical health and life expectancy are severely compromised in individuals who self-harm compared with the general population. In the management of self-harm, clinicians assessing patients' psychosocial problems should also consider their physical needs.

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Introduction

People who self-harm have an increased risk of premature death: studies from the 1980s showed that risk of suicide was 25 times greater, accidental death seven times higher, and death from natural causes two times greater in individuals who self-harm than in the general population.¹ Subsequent studies^{2–7} established that all-cause and natural-cause mortality was increased in people who self-harm, although estimates varied widely across countries, perhaps due to differences in suicide or self-harm rates, periods investigated, and sample characteristics. Both self-harm^{8,9} and suicide¹⁰ are associated with socioeconomic status. Yet, as far as we are aware only one study¹¹ has investigated the association between socioeconomic deprivation and suicide after self-harm, and none has examined deprivation in relation to all-cause or natural-cause mortality after self-harm. The scarcity of data is surprising in view of the profound effect of deprivation on mortality in the general population¹⁰ and on premature mortality in the UK.¹²

Researchers have argued that studies of the association between premature mortality and psychological

disorders should include all causes of death,¹³ and that primary prevention of suicide should focus on overall improvement of health by targeting vulnerabilities that increase risk of natural death.¹ Physical health problems are often poorly treated in people with mental disorders, leading to reduced life expectancy.^{14,15} As well as being at high risk for suicide, most patients who self-harm have psychiatric disorders.^{16,17} It is important to know the extent of physical health problems in this population, and the study of mortality after self-harm is one approach. Patients' characteristics and health risk behaviour could inform clinical practice in relation to management of physical disorders in the context of self-harm.

The aims of this study were to investigate excess all-cause and cause-specific mortality and years of life lost (YLL) in individuals who self-harm compared with the general population. Additionally, we hoped to identify associations between mortality and socioeconomic deprivation and between problems with alcohol, illicit drugs, and physical health identified at the time of self-harm and subsequent mortality.

Methods

Study design and participants

A cohort study was undertaken in Oxford, Manchester, and Derby, UK, where centres are taking part in the Multicentre Study of Self-harm in England.¹⁸ Data were obtained for all individuals who presented with non-fatal self-harm to one general hospital emergency

department in Oxford, three in Manchester, and two in Derby between Jan 1, 2000, and Dec 31, 2007. Non-fatal self-harm was defined as intentional self-poisoning or self-injury, irrespective of motivation.¹⁹ The sample,²⁰ risks of suicide and accidental death,²¹ and methods used for self-harm and suicide²² have been described previously.

	ICD-10 code*	Male patients			Female patients			Sexes combined		
		Reported number of deaths	Expected number of deaths	SMR (95% CI)	Reported number of deaths	Expected number of deaths	SMR (95% CI)	Reported number of deaths	Expected number of deaths	SMR (95% CI)
I Certain infectious and parasitic diseases	A00-B99 (001-139)	18	4	5.1 (3.0-8.0)†	8	3	2.3 (1.0-4.5)	26	7	3.7 (2.4-5.4)†
II Neoplasms	C00-D48 (140-239)	108	71	1.5 (1.2-1.9)†	98	75	1.3 (1.1-1.6)†	206	146	1.4 (1.2-1.6)†
III Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	D50-D89 (280-289)‡	1	1	1.6 (0-5.8)	4	1	5.8 (1.6-14.9)†	5	2	3.8 (1.2-8.8)†
IV Endocrine, nutritional, and metabolic disorders	E00-E90 (240-279)§	16	4	4.1 (2.3-6.6)†	7	4	1.7 (0.7-3.4)	23	8	2.8 (1.8-4.2)†
V Mental and behavioural disorders	F00-F99 (290-319)	69	8	8.8 (6.8-11.1)†	30	7	4.2 (2.9-6.1)†	99	15	6.6 (5.4-8.5)†
VI Diseases of the nervous system	G00-G99 (320-359)	25	9	2.9 (1.9-4.2)†	17	9	2.0 (1.1-3.1)†	42	18	2.4 (1.7-3.3)†
IX Diseases of the circulatory system	I00-I99 (390-459)	205	83	2.5 (2.1-2.8)†	138	64	2.2 (1.8-2.6)†	343	147	2.3 (2.1-2.6)†
X Diseases of the respiratory system	J00-J99 (460-519)	78	28	2.8 (2.2-3.5)†	72	26	2.8 (2.2-3.5)†	150	54	2.8 (2.4-3.3)†
XI Diseases of the digestive system	K00-K93 (520-579)	131	18	7.4 (6.2-8.7)†	114	15	7.8 (6.5-9.3)†	245	33	7.5 (6.6-8.5)†
XIII Diseases of the musculoskeletal systems and connective tissue	M00-M99 (710-739)	3	1	2.2 (0.4-6.3)	2	2	1.0 (0.1-3.7)	5	3	1.5 (0.5-3.5)
XIV Diseases of the genitourinary system	N00-N99 (580-629)	6	4	1.6 (0.6-3.6)	10	4	2.4 (1.2-4.5)†	16	8	2.1 (1.2-3.3)†
XVIII Symptoms, signs, and abnormal clinical and laboratory findings not elsewhere classified	R00-R99 (780-799)	19	4	5.3 (3.2-8.3)†	12	5	2.5 (1.3-4.5)†	31	9	3.7 (2.5-5.3)†
XX External causes of morbidity and mortality	V01-Y89, U509 (800-999)	415	34	12.3 (11.1-13.6)†	221	15	15.0 (13.0-17.2)†	736	49	13.1 (12.1-14.2)†
Accidents	V01-X59 (800-949)	164	18	9.2 (7.8-10.7)†	78	8	9.4 (7.5-11.8)†	242	26	9.2 (8.2-10.5)†
Accidental poisoning	X40-X49 (850-869)	99	4	25.4 (20.6-30.9)†	40	2	24.6 (17.6-33.5)†	139	6	25.1 (21.2-29.8)†
Intentional self-harm; and event of undetermined intent with inquest verdict open	X60-X84, Y10-Y34 with verdict open¶	233	13	18.0 (15.9-20.4)†	127	5	25.9 (21.6-31.1)†	360	18	20.2 (18.1-22.4)†
Intentional self-harm	X60-X84 (950-959)	166	10	16.9 (14.5-19.8)†	80	3	24.1 (19.2-30.1)†	246	13	18.7 (16.4-21.1)†
Undetermined intent	Y10-Y34 (980-989)	76	4	20.3 (16.0-25.5)†	56	2	31.2 (23.6-40.6)†	132	6	23.9 (20.2-28.3)†
Assault; and other specified events of undetermined intent with inquest verdict pending	Y85-Y09, Y33.9 (960-969)	1	2	0.5 (0.0-2.9)	3	1	2.4 (0.5-7.1)	4	3	1.3 (0.3-3.2)
Major causes (I-VI, IX-XI, XIII-XIV, XVIII, XX)	..	1099	263	4.1 (3.9-4.4)†	733	226	3.2 (3.0-3.5)†	1832	489	3.7 (3.6-3.9)†
All causes of mortality	A00-R99, U509, V01-Y89	1099	270	4.1 (3.8-4.3)†	733	232	3.2 (2.9-3.4)†	1832	502	3.6 (3.5-3.8)†

ICD-10=International Statistical Classification of Diseases and Related Health Problems 10th Revision. SMR=age-standardised mortality ratio. ICD-9=International Statistical Classification of Diseases and Related Health Problems 9th Revision. *ICD-9 codes in parentheses. †Relative risk is significantly greater than that for the general population. ‡Calculation of expected deaths in 2000 incorrectly excludes deaths by ICD-9 code 279 for immune disorders (appendix). §Calculation of expected deaths in 2000 incorrectly includes deaths by ICD-9 code 279 for immune disorders (appendix). ¶Calculation of expected deaths from 2001-09 only; combined deaths rates not available in year 2000. ||For years 2001-06, expected numbers were calculated from rates for ICD-10 codes as specified; but for years 2007-09, rates for ICD-10 codes were for deaths registered in these years, thus the inquest verdict pending does not apply.

Table 1: SMR by causes of death according to ICD-10 groups

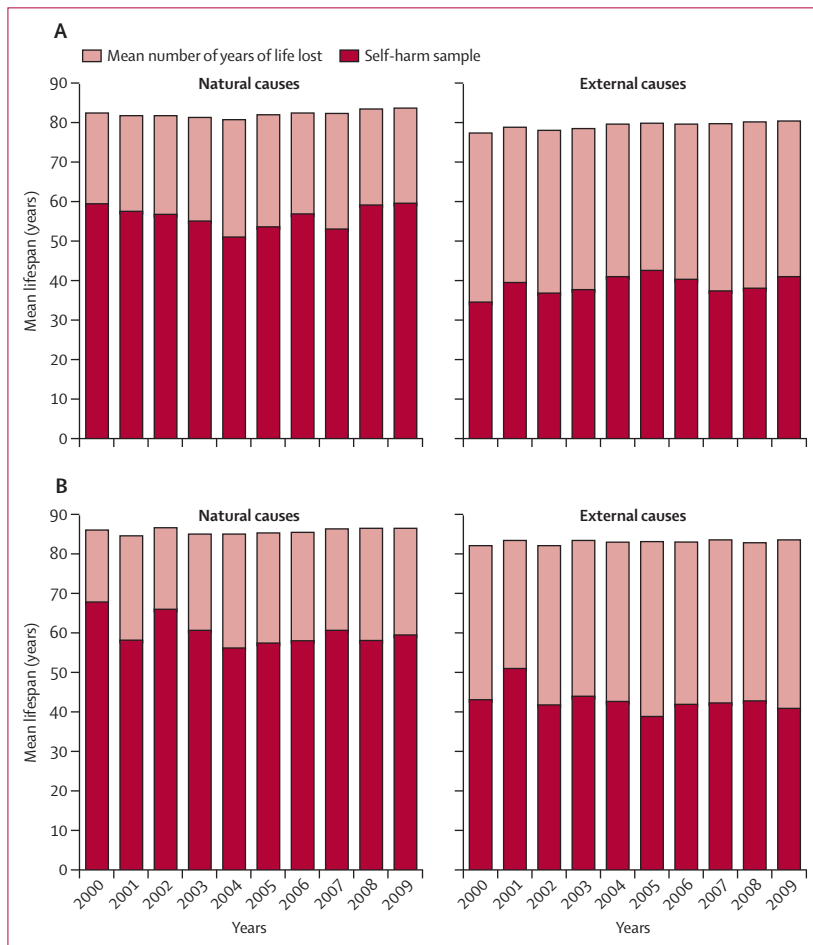


Figure 1: Life expectancy of (A) male patients and (B) female patients who self-harmed compared with an age-matched sample of the general population in England
 Natural causes defined as International Classification of Diseases and Related Health Problems 10th Revision codes A00–R99 and external causes as codes V01–Y89 and U509.

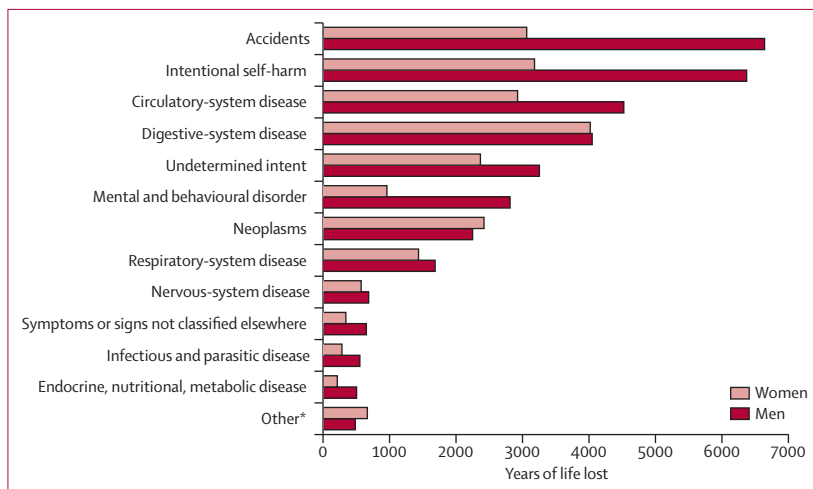


Figure 2: Total years of life lost by cause of death
 *Assault and other external or unknown causes, musculoskeletal-system disease, other neoplasms, genitourinary-system disease, or diseases of the blood or immune systems.

The monitoring systems in Oxford and Derby have approval from local health and psychiatric research ethics committees to obtain data for self-harm in local and multicentre projects. Self-harm monitoring in Manchester is part of a clinical audit system, and has been ratified by the local research ethics committee. All three monitoring systems are fully compliant with the Data Protection Act of 1998. All centres have approval under Section 251 of the National Health Service (NHS) Act 2006 to gather patient identifiable information without patient consent. Thus, data used in the study were obtained without specific patient consent. All patients had access to an information leaflet about the study. All centres had ethical approval to release patient details to the Medical Research Information Service (MRIS) for the NHS for retrieval of mortality information.

Procedures

After self-harm, most patients received a psychosocial assessment by specialist psychiatric clinicians (and some by staff in the emergency departments). Demographic, clinical, and hospital-management data for every episode were gathered in standardised forms or electronically by clinicians. Data included psychosocial, health, economic, and legal problems that patients were facing or precipitated the self-harm (appendix). Patients who did not receive an assessment were identified from emergency-department and medical records, from which data (including socio-demographic information and self-harm methods) were extracted by research clerks or, in Derby, by clinicians.

Postcodes of individuals' place of residence at the time of the most recent self-harm episode were linked to the Index of Multiple Deprivation (IMD) 2007 in England,²³ in which higher scores indicate greater deprivation. IMD scores were grouped into quartiles: scores less than 14·5 (25%), 30·0 (50%), or 49·6 (75%), and scores of 49·6 or more. When the 354 local authority areas in England were scored according to the IMD in 2007, Manchester was ranked fourth worst, Derby 69th, and Oxford 155th.²³

Mortality information was supplied by the MRIS, which traced and flagged individuals with the Central Health Register Inquiry System for patients in England and Wales, and with equivalent sources in Scotland. Data used for tracing included name, sex, date of birth, NHS number, and postcode of last address. Individuals were followed up to Dec 31, 2009. Follow-up for individuals ended when they died or moved overseas. Cause-specific death rates in England and Wales were obtained from the Office for National Statistics.²⁴ We report age-standardised mortality ratios (SMRs) for individuals who were 15 years or older at the end of follow-up for natural causes (codes in International Statistical Classification of Diseases and Related Health Problems 10th Revision [ICD-10] A00–R99; major diagnostic categories) and external causes (ICD-10 codes V01–Y89, U509; accidental, intentional, and undetermined), and for each of these by sex (appendix).

Statistical analyses

All individuals traced by MRIS for any length of time were included in analyses. SMRs with 95% Poisson CIs for 2000–09 were calculated for individuals aged 15 years or older from the recorded and expected number of deaths (based on general population rates for England and Wales), by age groups (15–24, 25–34, 35–44, 45–54, 55–64, 65–74, 75–84, and ≥85 years) and sex. Poisson tests for trend (χ^2 trend) were used to test the linear association of SMRs against IMD quartile.

YLLs were calculated by sex from interim life tables for England for 2000–09.²⁵ The average period of expected life at exact age *x* was extracted for every individual at the age of death in the appropriate year, which corresponds to YLL. Mean values of YLL (total YLL divided by number of deaths) with 95% CIs for 2000–09 are reported, and findings by year and cause of death are presented graphically.

Pearson χ^2 was used to test associations between problems at the last self-harm episode and cause of death. The level of significance was Bonferroni corrected ($p < 0.003$) to adjust for several comparisons. Analyses were done in SPSS (version 18.0), Stata (version 10.0), and Excel 2007.

Role of the funding source

The sponsor had no role in study design, data collection, data analysis, and data interpretation, or the writing of the report. All authors had full access to all the data in the study; HB and KH had final responsibility for the decision to submit for publication.

Results

30950 individuals presented with self-harm to the six hospitals and were followed up for a median of 6.0 years (IQR 3.9–7.9). 748 (2.4%) individuals were not traced by the MRIS, 29 (0.1%) were younger than 15 years at the end of follow-up, and 41 (0.1%) were of unknown age and so were excluded from the analyses. Of the remaining 30132 individuals, 17671 (58.6%) were female and 12444 (41.3%) were male (17 individuals were of unknown sex). Age distributions by sex and centre are presented in the appendix. 17748 (58.9%) individuals received a psychosocial assessment by specialist mental health staff, 4821 (16.0%) by emergency department staff only, and 362 (1.2%) by specialist liaison service clinicians; 7201 (23.9%) had no assessment. 1832 (6.1%) individuals—of whom 1099 were male (60.0%) and 733 (40.0%) female—aged 15 years or older had died from any cause at the end of follow-up. Mean age at death was 49.6 years (SD 18.4) in male patients and 54.3 years (19.7) in female patients. The proportions of deaths in each centre were similar: 445 (6.2%) of 7170 individuals in Oxford, 865 (6.0%) of 14509 in Manchester, and 522 (6.2%) of 8453 in Derby died (χ^2 0.695; $p=0.71$). The underlying cause of death was suicide in 378 (20.6%) patients (intentional self-harm in 246 [13.4%] and undetermined intent in 132 [7.2%]), accidental in 242 (13.2%), and any other cause in 1212 (66.2%).

The reported number of deaths from all causes was more than three times higher than the expected number for the sexes combined (table 1). The SMR was greater in male

See Online for appendix

	Male patients			Female patients			Sexes combined		
	Reported number of deaths	Expected number of deaths	SMR (95% CI)	Reported number of deaths	Expected number of deaths	SMR (95% CI)	Reported number of deaths	Expected number of deaths	SMR (95% CI)
Natural causes*									
First quartile	160	75.6	2.1 (1.8–2.5)	140	74.3	1.9 (1.6–2.2)	300	149.9	2.0 (1.8–2.2)
Second quartile	152	53.0	2.9 (2.4–3.4)	120	55.3	2.2 (1.8–2.6)	272	108.3	2.5 (2.2–2.8)
Third quartile	141	47.5	3.0 (2.5–3.5)	116	42.9	2.7 (2.3–3.2)	257	90.4	2.8 (2.5–3.2)
Fourth quartile	195	49.7	3.9 (3.4–4.5)	118	38.8	3.0 (2.5–3.7)	313	88.5	3.5 (3.2–4.0)
External causes†									
First quartile	99	7.7	12.9 (10.5–15.7)	75	4.1	18.5 (14.6–23.2)	174	11.8	14.9 (12.8–17.2)
Second quartile	83	7.9	10.5 (8.4–13.1)	45	3.6	12.4 (9.0–16.5)	128	11.5	11.1 (9.3–13.3)
Third quartile	91	8.0	11.4 (9.2–14.0)	46	3.4	13.4 (9.8–17.9)	137	11.4	12.0 (10.1–14.2)
Fourth quartile	113	8.4	13.4 (11.2–16.1)	45	3.2	14.1 (10.3–18.9)	158	11.6	13.6 (11.6–15.9)
All causes‡									
First quartile	259	83.2	3.1 (2.7–3.5)	215	78.4	2.7 (2.4–3.2)	474	161.6	2.9 (2.7–3.2)
Second quartile	235	60.8	3.9 (3.4–4.4)	165	58.9	2.8 (2.4–3.3)	400	119.7	3.3 (3.0–3.7)
Third quartile	232	55.5	4.2 (3.7–4.7)	162	46.3	3.5 (3.0–4.1)	394	101.8	3.9 (3.5–4.3)
Fourth quartile	308	58.1	5.3 (4.7–5.9)	163	41.9	3.9 (3.3–4.5)	471	100.0	4.7 (4.3–5.2)

First quartile IMD scores <14.5; second quartile IMD scores ≥14.5 to <30.0; third quartile IMD scores ≥30.0 to <49.6; and fourth quartile IMD scores ≥49.6. All relative risks are greater than that for the general population. IMD=Index of Multiple Deprivation. SMR=age-standardised mortality ratio. ICD-10=International Statistical Classification of Diseases and Related Health Problems 10th Revision. *ICD-10 codes A00–R99. †ICD-10 codes V01–Y89 and U509. ‡ICD-10 codes A00–R99, U509, and V01–Y89.

Table 2: SMRs for external and all underlying causes of death in the study sample by socioeconomic deprivation category on the basis of the IMD 2007 for the postcode of the location of the most recent episode of self-harm

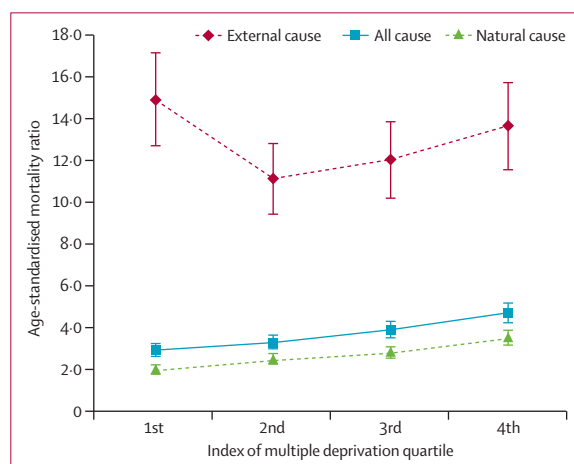


Figure 3: Age-standardised mortality ratios for cause of death by socioeconomic deprivation category. Bars indicate 95% CIs.

than in female patients (table 1). Accidental poisoning had the greatest risk of any cause of death (table 1). Risk of suicide was also high and was greater in female patients than in male patients (table 1). Deaths from natural causes were generally two or more times higher than was expected, with the greatest differences reported for digestive-system disease and mental and behavioural disorders (87% of these due to psychoactive substance use; table 1).

Figure 1 shows YLL of individuals who died. Mean YLL for natural-cause deaths was 25.9 years (95% CI 25.7–26.0) for male patients and 25.5 years (25.2–25.8) for female patients, and for external-cause deaths was 40.2 years (40.0–40.3) for male patients and 40.0 years (39.7–40.5) for female patients. For all-cause death, mean YLL was 31.4 years (30.5–32.2) for male patients and 30.7 years (29.5–31.9) for female patients.

The overall burden of mortality was greater in male patients (total YLL 34463 years) than in female patients (22482 years). The main contributors to YLL were accidents (19.3% in males; 13.6% in females) and intentional self-harm (18.5% in males; 14.2% in females; figure 2). Of natural causes, digestive-system disease (11.7% in males; 17.8% in females) and circulatory-system disease (13.1% in males; 13.0% in females) were the largest contributors to total YLL.

IMD scores ranged from 0.67 to 84.02. Mean IMD scores were 18.8 for Oxford, 26.2 for Derby, and 44.7 for Manchester. Socioeconomic deprivation scores were missing for 1475 (4.9%) of 30132 individuals. However, the proportion of deaths did not differ: 93 (6.3%) of individuals with missing scores died versus 1739 (6.1%) of those with known scores (χ^2 0.14; $p=0.710$).

All-cause mortality increased with each quartile of socioeconomic deprivation in male patients (χ^2 trend 39.6; $p<0.0001$), female patients (13.9; $p=0.0002$), and both sexes combined (55.4; $p<0.0001$; table 2, figure 3). A similar increase was noted for death by natural causes,

although differences were significant only for the sexes combined (51.0; $p<0.0001$; table 2, figure 3). We recorded no significant trend for death by external causes (0.30; $p=0.58$; table 2, figure 3).

More people with alcohol problems at the time of self-harm died (231 [7.8%] of 2970) than did those with none (1601 [5.9%] of 27162; χ^2 16.6; $p<0.0001$). Alcohol problems were more frequent in patients who died of digestive disease (55 [22.4%] of 245) than of other causes (176 [11.1%] of 1587; χ^2 24.9; $p<0.0001$).

More people with physical health problems at the time of self-harm died (374 [17.5%] of 2135) than did those with none (1458 [5.2%] of 27997; χ^2 526.5; $p<0.0001$). Additionally, physical health problems were more common in patients who died of circulatory disease (97 [28.3%] of 343) than of other causes (277 [18.6%] of 1489; χ^2 16.1; $p<0.0001$).

Illicit drug problems were not related to all-cause deaths, with 64 (6.9%) of 930 with such problems dying versus 1768 (6.1%) of 29202 without (χ^2 1.1; $p=0.298$). Finally, illicit drug problems were more common in patients whose death was related to mental and behavioural disorders (ten [10.1%] of 99) than other causes (54 [3.1%] of 1733; χ^2 13.6; $p<0.0001$; appendix).

Discussion

We have shown that individuals who presented to emergency departments after self-harm between 2000 and 2007 had a greater risk of death from any cause than did the general population. Roughly 6% of our cohort died, many prematurely, such that at least 30 years of life was lost by each individual. Deaths were not only due to external causes—as might be expected in view of the high suicide risk in this population^{2,3}—but also to natural causes. These findings are higher than estimates of a loss of 10–15 years in Nordic patients with psychiatric problems.¹⁵ We also reported an association between socioeconomic deprivation and all-cause and natural-cause mortality, but not deaths from external causes.

The difference between reported and expected all-cause mortality in our study is lower than that in Australian and Scandinavian studies (SMR 5–12),^{5,6,26} possibly because their cohorts were older and had greater psychiatric morbidity and suicide risk than ours did. It is higher, however, than that in cohorts of the 1980s and 1990s with similar sociodemographic and clinical characteristics drawn from Oxford, UK (SMR 2.2 [95% CI 2.1–2.3]),² Nottingham, UK (2.2),³ and Scotland (2.26 [2.13–2.26]).¹¹ These differences in excess all-cause mortality could suggest that improvements in cause-specific mortality in the UK population over the past three decades might not have occurred in the population who self-harm to the same extent as in other populations. Additionally, other societal changes could have adversely and disproportionately affected psychosocially vulnerable individuals who self-harm.

To assess these possible explanations, the three main causes of death in the UK should be considered. The numbers of deaths from circulatory-system disease in the general population have decreased between 1980 and 2007,²⁷ but the risk that we have reported is higher than has been recorded previously in similar studies.^{2,3,11} Therefore, mortality due to circulatory-system disease might have decreased in the population who self-harm to a lesser extent than in the general population. However, mortality from alcohol-related disease (largely digestive-system disease) has increased in the general population,²⁸ and the rise in excess risk in earlier studies (2.7–4.4 times)^{2,3,11} to 7.5 times in our study suggests that the increase has been greater in individuals who self-harm than in those who do not. Diseases of the circulatory and digestive systems caused a third of reported deaths in our study and were the main contributors to YLL from natural causes. Suicide rates have declined in the general population since the 1980s;²⁹ however, the higher number of deaths due to suicide in our study than in earlier studies (SMR 12–17)^{2,3,11} suggests that prevention strategies might have been less effective in the population who self-harm than in others. SMR was greatest for accidental poisoning deaths, some of which could have been suicides or deaths from substance-use disorders²¹ because of changes in the way coroners make verdicts.³⁰

Societal factors could be related to mortality in the general population.^{10,27} Although life expectancy in the UK is increasing, inequalities in premature mortality have risen steadily since 1990.¹² Individuals with chronic physical and mental disorders often live in deprived areas,³¹ and we reported a stepwise relation between increasing all-cause or natural-cause mortality and socioeconomic deprivation in our cohort. This finding could partly explain the apparent increase in all-cause mortality compared with earlier studies.^{2,3,11} Additionally, rises in alcohol-related mortality have been substantially greater for more disadvantaged socioeconomic classes³²—including individuals who self-harm—than in other populations.⁸ Access to health and social services, leisure space, and a clean environment (all included in the IMD measure) could be compromised in deprived areas, thus contributing to poor health outcomes.

The rise in SMR identified for most natural causes of death could be due to underlying psychiatric morbidity that incurs increased risk of premature death.^{14,15} This morbidity could occur because of poor physical health care, with patients with psychiatric problems less likely to receive appropriate medical care than are other patients,¹⁴ or because of problems inherent in comorbidity that lead to poor self-care for chronic physical disorders such as diabetes.³¹

General health risk behaviours such as alcohol and drug misuse also contribute to premature mortality. High levels of alcohol misuse are recorded in people who self-harm.³³ In our study, alcohol problems were more common in patients who subsequently died of digestive-

Panel: Research in context

Systematic review

We searched Scopus, PsycInfo, and Medline with a combination of terms: “self-harm”, “deliberate self-harm”, “self-injury”, “self-poisoning”, “mortality”, “premature death”, “excess mortality”, “standardised mortality ratio”, “all-cause mortality”, “years of life lost”, “socio-economic deprivation”, “physical illness”, and “life expectancy”. No date or language restrictions were applied. Two authors downloaded and read abstracts to identify studies of all-cause mortality or suicide in individuals who had self-harmed and in various other populations, such as people with mental illness. We made full-text copies of the 40 most relevant reports. Additionally, we searched Google, Google Scholar, and the Office for National Statistics website for reports of UK trends in mortality, alcohol use, physical health, and socioeconomic factors.^{10,27,28,31,32} An important review¹ and UK studies from the 1980s and 1990s^{2,3,11} showed that risk of all-cause death was two times higher in people who self-harm than in the general population. Similar studies from Europe and Australia^{4–6,26} showed an even greater excess risk, perhaps due to different sociodemographic and clinical characteristics of the populations. Little substantial investigation has been done in the UK since 2000;² small samples (eg, in Karasouli and colleagues’ investigation³) have prevented study of the full range of causes of death. A 2011 Nordic study estimated years of life lost in people with mental disorders,¹⁵ drawing attention to the premature mortality in these populations.¹⁴ A 2012 UK study of people with chronic physical disorders³¹ showed that morbidity increased when mental health problems coexisted. Integrated support for people with mental and physical health problems and other strategies were suggested to address this problem.

Interpretation

Our study confirms earlier findings that physical health is compromised in individuals who self-harm. It extends previous work by quantifying the extent of premature death in this population in terms of years of life lost and by investigating associations with socioeconomic deprivation. When individuals present with self-harm, opportunities exist to address problems such as alcohol and illicit-drug misuse, and poor self-care and adherence to drug regimens for physical disorders. Thus, assessment of individuals should include inquiry into physical health, health risk behaviour, psychosocial needs, and risks of further self-harm or suicide. Clinicians assessing and treating self-harm need to be aware of the effect that neglect of physical health needs can have. Policy makers should structure services to enable the integration of appropriate physical and mental health care.

system disease than in those who died from other causes, and illicit-drug problems were associated with deaths related to mental and behavioural disorders (most due to use of psychoactive substances). These disorders incurred the greatest excess risk of any natural cause in our study and others.^{3,11,26} This finding is important because these problems were identified during psychosocial assessment after presentation for self-harm, and such assessment provides an opportunity for identification and referral to specialist services.

The follow-up time in our study ranged from 2 to 10 years, which, although sufficient to examine relative risks for most deaths, might have been too short to identify some deaths due to risk behaviour with long-standing effects (eg, smoking). Additionally, problems could be identified only for patients who received a psychosocial assessment, and separate data for alcohol and drug problems were not collected in one centre between 2000 and 2004. Our cohort was from three centres with

varying socioeconomic demography, making our findings more generalisable to the whole of England than are those from one centre alone; however, the sample was not selected or weighted to match the exact demography of England. Because socioeconomic deprivation scores are region-based, they are not necessarily measures of socioeconomic status of individuals.

Our findings have large public health implications, and emphasise the important role of psychosocial assessment and the need for close attention to physical health disorders in the care of people who self-harm (panel). The relation between physical and mental health is complex, and neither should be assessed or treated in isolation.

Contributors

HB, KH, and NK conceived and designed the study and interpreted data. HB and KH searched the scientific literature. HB, KW, JN, JC, and SS collected data. HB analysed data and prepared the first draft of the report. All authors contributed to revision of the report and approved the final version.

Conflicts of interest

NK chaired the 2011 guidelines from the National Institute for Health and Clinical Excellence for long-term management of self-harm. The other authors declare that they have no conflicts of interest.

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