

Conclusions

The combination of increasingly pressured acute wards and high levels of casual staffing cannot be good for the care of patients. These problems are most severe in London, where patients have more severe problems, as evidenced by the higher proportion of patients on the ward who are detained under the Mental Health Act. The policy, managerial, and training focus has been on developing community services. This has resulted in a relative neglect of inpatient settings. The national visit has shown that attention must be given to inpatient wards, which are an essential and major element of mental health care.

Contributors: RF led discussions with the Mental Health Act Commission, initiated the study design (along with MM), and carried out analysis of the data. GD and LW helped with the study design, piloted methods, trained commissioners, and carried out analysis of the data. PH assisted with the study design, advised on all analysis and carried out analysis. This paper was written jointly by all authors. RF is guarantor for this paper.

Funding: The Mental Health Act Commission funded the national visit, and the Gatsby Charitable Trusts funded the design, methods, analysis, and reporting.

Conflict of interest: None.

- 1 Department of Health. *Health and personal social services statistics for England*. London: Stationery Office, 1996.
- 2 Audit Commission. *Finding a place: a review of mental health services for adults*. London: HMSO, 1994.
- 3 Department of Health. *The spectrum of care: local services for people with mental health problems*. Wetherby: DoH, 1996.
- 4 Shepherd G, Beadsmoore A, Moore C, Hardy P, Muijen M. Relation between bed use, social deprivation, and overall bed availability in acute adult psychiatric units, and alternative residential options: a cross sectional survey, one day census data, and staff interviews. *BMJ* 1997;314:262-6.
- 5 Department of Health. *In-patients formally detained in hospitals under the Mental Health Act 1983 and other legislation: 1989-90 to 1994-95*. London: Stationery Office, 1996. (Statistical bulletin 1996/10.)
- 6 Moore C. Acute in-patient care could do better, says survey. *Nursing Times* 1998;94(3):54-6.
- 7 Mental Health Act Commission. *Sixth biennial report 1993-95*. London: HMSO, 1995.
- 8 Mental Health Act Commission. *Deaths of detained patients*. London: Mental Health Foundation, 1995.
- 9 Howland G, ed. *The IHSM health and social services yearbook 1996/97*. London: Institute of Health Services Management, 1996.
- 10 Hurst K. Promotions and relegations in the psychiatric nursing league. *J Nurs Manage* 1995;3:43-6.
- 11 Royal College of Psychiatrists. *Not just bricks and mortar: a report of the Royal College of Psychiatrists Working Party on the size, staffing, structure & siting and security of new acute adult inpatient units*. London: RCP, 1997.
- 12 Mental Health Act Commission. *Seventh biennial report 1995-97*. London: Stationery Office, 1997.
- 13 Blom-Cooper L, Hally H, Murphy E. *The falling shadow—one patient's mental health care 1978-1993*. London: Duckworth, 1995.
- 14 Snell J. Mixed is no match. *Health Service Journal* 1997;107(573):26-9.

(Accepted 28 July 1998)

Suicide, deprivation, and unemployment: record linkage study

Glyn Lewis, Andy Sloggett

Abstract

Objectives To investigate the association between suicide and socioeconomic status, unemployment, and chronic illness.

Design Longitudinal study.

Setting England and Wales.

Subjects Individuals from the Office for National Statistics longitudinal study for whom 1981 census data were available. The longitudinal study is a representative 1% sample of the population of England and Wales in which census variables are linked to mortality data.

Main outcome measures Suicide and undetermined deaths occurring between 1983 and 1992. Odds ratios estimated with logistic regression adjusted for attrition of cohort members.

Results There was a strong independent association between suicide and individuals who were unemployed (odds ratio 2.6; 95% confidence interval 2.0 to 3.4) and permanently sick (2.5; 1.6 to 4.0). Those without access to a car had an increased risk (1.3; 1.0 to 1.5), but other measures of socioeconomic status were not associated with suicide.

Conclusions The association between suicide and unemployment is more important than the association with other socioeconomic measures. Although some potentially important confounders were not adjusted for, the findings support the idea that unemployment or lack of job security increases the risk of suicide and that social and economic

policies that reduce unemployment will also reduce the rate of suicide.

Introduction

Suicides make a substantial contribution to the numbers of premature deaths, and to inform policies that might prevent suicide there is a need for improved knowledge about risk factors. Previous studies have used data from death certificates to investigate the relation between registrar general's social class and suicide. Before the second world war there was an inverse gradient of social class with higher rates in social classes I and II than IV and V.¹ Subsequent findings have described a "U shaped" distribution with higher rates in both social classes I and V,² though this may be a cohort effect apparent only in older age groups.³ The most recent studies have found higher rates in lower social classes, though the relation does not look linear over the whole gradient of social class.³

There are also other variables that relate to socioeconomic status including educational attainment and standard of living, where housing tenure and access to a car can be used as indicators.^{4,5} These have been little studied in relation to suicide. There is evidence that the availability of methods for suicide can influence rate of suicide^{6,7} and poisoning with car exhaust fumes is becoming an increasingly common method.⁸ It is therefore possible that access to a car would increase the risk of suicide after adjustment for other socioeconomic differences between people.

Division of Psychological Medicine, University of Wales College of Medicine, Cardiff CF4 4XN

Glyn Lewis, professor of community and epidemiological psychiatry

Centre for Population Studies, London School of Hygiene and Tropical Medicine, London WC1E 7HT

Andy Sloggett, lecturer in medical demography

Correspondence to: Professor Lewis wpcghl@cardiff.ac.uk

BMJ 1998;317:1283-6

Table 1 Rates of suicide per 100 000 person years for 10 year periods from 1971 and 1981 (data from Office for National Statistics longitudinal study).^{*} An actuarial adjustment has been made for non-suicide deaths

Age at start of period (years)	Men			Women		
	1971-80	1981-90	% Change	1971-80	1981-90	% Change
15-24	8.40	17.50	108	4.03	4.74	18
25-44	14.49	19.46	34	7.70	5.70	-26
45-64	19.01	19.16	0.8	12.80	13.83	8
≥65	23.67	25.36	7	16.42	14.64	-11

^{*}In the 20 year period 676 men and 420 women aged ≥15 years killed themselves.

A strong association between unemployment and suicide has also been described in various studies that used different approaches.⁹ There is always the concern, however, that the relation could be confounded by psychiatric disorder, alcohol or substance misuse, or unspecified personality characteristics. The strongest evidence so far comes from the Office for National Statistics longitudinal study in which this association persists in a longitudinal design¹⁰ with a rate ratio of 1.7 (95% confidence interval 1.0 to 2.5).¹¹ This study, however, had relatively few suicides and low statistical power at that time. Unemployment tends to be more common in those with lower socioeconomic status and may explain some or all of the association between socioeconomic status and suicide.

In the Office for National Statistics longitudinal study, data from a 1% sample of the census has been linked to mortality data and this reduces the possibility of biased estimates that can occur when social class from death certificates is compared with census data. The longitudinal study also includes other measures of socioeconomic status in addition to social class and allows adjustment for some confounders. There has been little previous work on suicide with data from the longitudinal study because of the relatively small numbers,^{1 10 11} though the influence on other causes of mortality has been extensively studied.^{10 12}

We designed the current study to examine death by suicide in the Office for National Statistics longitudinal study. This benefits from the improved statistical power that results from the increased number of suicides that have accumulated. We examined the association between suicide and socioeconomic status, measured with registrar general's social class, educational qualifications, access to car, housing tenure, and economic activity. We further investigated the independence of any associations between those variables and suicide.

Methods

The longitudinal study, managed by the Office for National Statistics, is a record linkage study based on a sample of the population of England and Wales. Sampling was started at the time of the 1971 census and includes anyone born on one of four dates of any year. This yields a sample of roughly 1% of the population, effectively randomly selected, with at any one time records of about 530 000 living people in England and Wales (the study members) plus the accumulated records of former members who have died or emigrated since 1971. The sample is regularly updated to include new members with the index birth dates.

Details of deaths of study members are incorporated from records traced within the NHS central register. For this study deaths up to the end of 1992 were included. The main analysis included subjects for whom data from the 1981 census were available.

Deaths classified as suicide (E950-959) and as undetermined (E980-989) were combined in this analysis and are called suicide deaths in the text. We omitted E988.8 after 1978 following Charlton et al.⁸ This follows usual practice in the epidemiology of suicide. Many undetermined deaths may have been suicides as coroners tend to require proof of suicide.¹³

Analysis

Suicide rates were calculated for the periods 1971-80 and 1981-92 by four age categories and by sex. An actuarial adjustment was made for non-suicide deaths by reducing the denominator by half the number of non-suicide deaths.

Logistic regression was used to estimate the odds ratios for suicide with the program STATA.¹⁴ Because of the rarity of suicide odds ratios will have the same value as rate ratios. The analysis included data on individuals from the 1981 census, and the outcome was death by suicide between 1983 and 1992. Suicides in 1981 or 1982 were omitted to reduce selection effects. Deaths from other causes were censored so that individuals who died during the first time period (1983-7) were not included in the second time period. Controlling variables present in all models were age, in 5 year age groups from age 10 in 1981, and time period (1983-7 and 1988-92). Other adjustments are noted in the tables. For the analysis on transitions presented in table 3 records were excluded if the subject was permanently sick, retired, or in communal housing in 1971. The category of not unemployed included the employed, students, and "others," mostly housewives.

The "permanently sick" included unemployed disabled people, who categorise themselves as such at census. This group have higher all cause mortality (odds ratio about 3). We ignored the deaths occurring 2-3 years after the census to reduce the possibility that a psychiatric illness recently led to the designation of being permanently sick.

Results

In the 20 years from 1971, 676 men and 420 women in the cohort killed themselves. The suicide rates are shown in table 1 and illustrate the clear increase in rate of suicide previously described in young men up to 44 years between the 1970s and 1980s.⁸ For the subsequent analyses, deaths from suicide occurring between 1983 and 1992 were the outcome. In this period 383 men and 197 women killed themselves.

Table 2 shows the relation between a number of socioeconomic variables recorded in the 1981 census and suicide between 1983 and 1992 after adjustment for age, time period, and sex. There was a relatively weak relation between low social class and suicide, which was not significant, but there was a much stronger and significant association with unemployment, permanent sickness, and retirement. Those without access to a car and those who rented their home were also at increased risk. The small number of people living in communal accommodation had an

Table 2 Numbers of suicides, proportions of person years in each category, and odds ratios (data from Office for National Statistics longitudinal study)

Detail	No of Suicides	% Person years in category	Odds ratio* (95% CI)	P value	Adjusted odds ratio† (95% CI)	P value
Men	383	48.4	1.00		1.00	
Women	197	51.6	0.46 (0.39 to 0.55)	<0.001	0.41 (0.33 to 0.50)	<0.001
Social class:						
I	15	2.2	0.98 (0.56 to 1.70)	0.9	1.04 (0.59 to 1.86)	0.9
II	73	12.4	1.00		1.00	
III non-manual	61	12.9	1.12 (0.80 to 1.59)	0.5	1.01 (0.70 to 1.44)	1.0
III manual	112	14.4	1.15 (0.86 to 1.55)	0.3	1.00 (0.73 to 1.38)	1.0
IV and V	101	14.7	1.27 (0.94 to 1.73)	0.09	0.97 (0.69 to 1.34)	0.8
Other	218	43.4	1.89 (1.40 to 2.56)	<0.001	1.20 (0.81 to 1.77)	0.4
Educational level:						
A level or below	535	92.0	1.00		1.00	
Above A level	45	8.0	0.80 (0.58 to 1.09)	0.15	0.97 (0.67 to 1.39)	0.9
Economic activity:						
Employed	251	48.1	1.00		1.00	
Unemployed	85	5.0	3.14 (2.44 to 4.02)	<0.001	2.58 (1.97 to 3.38)	<0.001
Sick/disabled	27	1.4	3.71 (2.46 to 5.59)	<0.001	2.52 (1.60 to 3.96)	<0.001
Retired	69	7.4	2.02 (1.36 to 3.01)	0.001	1.86 (1.24 to 2.79)	0.003
Student	8	3.3	0.59 (0.28 to 1.23)	0.16	0.49 (0.22 to 1.06)	0.07
Other	140	34.9	1.76 (1.33 to 2.33)	<0.001	1.51 (1.02 to 2.25)	0.04
Access to car:						
Yes	341	70.3	1.00		1.00	
No	239	29.7	1.72 (1.45 to 2.05)	<0.001	1.25 (1.03 to 1.52)	0.03
Housing tenure:						
Owner occupier	301	60.9	1.00		1.00	
Renter	260	38.0	1.40 (1.18 to 1.65)	<0.001	1.11 (0.92 to 1.33)	0.3
Communal	19	1.1	3.25 (2.04 to 5.19)	<0.001	1.68 (1.00 to 2.85)	0.05

*Adjusted for age, time period, sex.

†Adjusted for age, time period, sex, marital status/living alone, and variables in table.

increased risk, but this category probably also includes people who live communally because of psychiatric disorder.

After adjustment for the other socioeconomic variables (adjusted odds ratios in table 2) suicide and social class were no longer associated, but there was still a strong association with unemployment and permanent sickness. There was also an association with having access to a car, though this was reduced in size after adjustment. We also investigated the strength of association between unemployment and suicide in those of working age. For men and women aged 15-54 in 1981 the adjusted odds ratio was 2.79 (95% confidence interval 2.07 to 3.77), only slightly higher than for the full age range.

Interactions by sex for socioeconomic status, access to a car, and housing tenure were noted, but these were of borderline significance and there was low statistical power. For example, low social class was associated with lower rates of suicide in men and higher rates in women, and the relation with unemployment was also somewhat stronger in women (5.8; 3.3 to 10.3). This may be because women are less likely to record themselves as unemployed if they have alternative housekeeping roles to perform.

Transitions in economic activity between 1971 and 1981 were also studied in relation to suicide between 1983 and 1992 (table 3). Subjects who were unemployed in both 1971 and 1981 had the highest rate of suicide (3.3; 1.7 to 6.3). Those who had become sick or unemployed in 1981 had lower rates, but these were still higher compared with those who were employed in both 1971 and 1981.

Discussion

There was a strong independent association with suicide in those who were classified as unemployed (2.6; 2.0 to 3.4) or permanently sick (2.5; 1.6 to 4.0) at the 1981 census. Some of the explanation for the increase of suicide in permanently sick people is that people with psychiatric disorder would have been included in this category. The association between being retired and suicide rates (1.9; 1.2 to 2.8) is also of note. Some of those declaring themselves retired will have retired early, and such people tend to have the same characteristics as the permanently sick. This is unlikely to be the complete explanation for the observed association, however, particularly as we adjusted for age in the analysis. Access to a car was associated with a decreased risk of suicide (0.8; 0.4 to 1.0), despite the fact that men are increasingly likely to use poisoning with exhaust fumes as a method of

Table 3 Transitions in economic activity between 1971 and 1981. Odds ratios for suicide 1983-92 (data from Office for National Statistics longitudinal study)

Detail	% Person years in category	Odds ratio* (95% CI)	P value
Employed† in both years	80.3	1.00	
Unemployed in both years	0.4	3.30 (1.73 to 6.32)	<0.001
Unemployed in 1971, employed† in 1981	1.6	1.48 (0.82 to 2.66)	0.2
Employed† in 1971, unemployed in 1981	4.8	2.39 (1.79 to 3.19)	<0.001
Became sick	1.2	2.63 (1.62 to 4.26)	<0.001
Became retired	11.7	1.21 (0.85 to 1.70)	0.3

*Adjusted for age, sex, time period, and transitions in access to car, housing tenure, marital and family status.

†Includes employed, students, and "others."

suicide. In this instance the possible association between socioeconomic status seemed to be more important than the availability of a common method of suicide. The possibility of some residual confounding, however, should be considered and a more general conclusion is that the association between economic activity and suicide explains most if not all of the relation between the other socioeconomic variables and suicide.

Psychiatric disorder could have confounded the relation between unemployment and suicide, and we were unable to adjust for this possibility in our analysis. We consider it unlikely, however, that this would have accounted for the whole of the observed association. There is no evidence that common mental disorders such as depression and anxiety increase the risk of unemployment. Unemployment, however, increases the risk of subsequently developing a common mental disorder, and re-employment is followed by a reduction in risk.¹⁵⁻¹⁷ Psychiatric disorders could therefore be considered as lying on the causal pathway between unemployment and suicide. If so it would be inappropriate to adjust the relation between suicide and unemployment for psychiatric disorder. Clinicians, however, come across many subjects with depression who give up work because of severe depression. These people would probably have recorded themselves as permanently sick in this study, though there remains the possibility of some confounding via this route.

Unemployment was assessed at the beginning of an 11 year follow up period during which many people would have found some employment. This misclassification would tend to have reduced the strength of the observed association. For example, those who were unemployed in both the 1971 and 1981 census had higher rates of suicide (3.3; 1.7 to 6.3) than those who were unemployed only in 1981. Unemployment in this study should probably be thought of as an indicator of those with insecure employment. On balance therefore we conclude that the association observed is unlikely to have been artefactual. If the relation between suicide and unemployment were causal, then unemployment would have a substantial population impact, with a population attributable fraction¹⁸ of 7.4%. One would expect the population impact to be larger in the population of working age. The population attributable fraction for the working age population (aged 15-54 in 1981) was 11.4% and for younger men (aged 15-44 in 1981) was 12.6%.

In comparison with findings for all cause mortality from the longitudinal study, suicide seems to have a particularly strong association with unemployment or insecure employment, whereas the relations with other measures of socioeconomic status were weak or absent once the association with economic activity had been taken into account. This also contrasts with the strong independent association between socioeconomic status and common mental disorders such as depression and anxiety.^{4,5} Employment may have a particularly important role in defining an individual's place in the community, and unemployment could lead to alienation from the rest of society. Durkheim's classic studies of suicide carried out over a century ago also concluded that alienation and anomie increase rates of suicide.¹⁹ Our results are consistent with the view that unemployment increases the risk of suicide and that

Key messages

- Suicide is a major cause of premature mortality and is increasing in young men
- Unemployment was associated with a doubling of the suicide rate in data from the Office for National Statistics longitudinal study
- There was little or no association between suicide and measures of socioeconomic status such as social class and housing tenure once the association with unemployment had been taken into account
- This study could not adjust for some potential confounders but provides strong support for the possibility that reduction in unemployment would also reduce rates of suicide

economic and social policies that reduce unemployment will also tend to reduce suicide rates.

We are grateful to the Office for National Statistics Longitudinal Study Unit for permission to use the longitudinal study. The views expressed in this paper are not necessarily those of the Office for National Statistics. We thank members of the Social Statistics Research Unit, City University, for advice and technical expertise in accessing the data. We also thank Louis Appleby, Keith Hawton, and David Gunnell for helpful comments on an earlier draft.

Contributors: The study was designed by GL and AS. AS performed the data management and analysis. The manuscript was prepared by GL with comments from AS.

Funding: Research and Development Division, Policy Research Programme, Department of Health.

Competing interests: None declared.

- 1 Charlton J, Kelly S, Dunnell K, Evans B, Jenkins R. Suicide deaths in England and Wales: trends in factors associated with suicided deaths. *Popul Trends* 1993;71:34-42.
- 2 Sainsbury P. The epidemiology of suicide. In: Roy A, ed. *Suicide*. Baltimore: Williams and Wilkins, 1986:17-40.
- 3 Kreitman N, Carstairs V, Duffy J. Association of age and social class with suicide among men in Great Britain. *J Epidemiol Community Health* 1991;45:195-202.
- 4 Lewis G, Bebbington P, Brugha T, Farre M, Gill B, Jenkins R, et al. Socio-economic status, standard of living and neurotic disorder. *Lancet* 1998;352:605-9.
- 5 Weich S, Lewis G. Material standard of living, social class and the prevalence of the common mental disorders in Great Britain. *J Epidemiol Community Health* 1998;52:8-14.
- 6 Kreitman N. The coal gas story: UK suicide rates 1960-1971. *Br J Prev Soc Med* 1976;30:86-93.
- 7 Marzuk PM, Leon AC, Tardiff K, Morgan EB, Stajic M, Mann JJ. The effect of access to lethal methods of injury on suicide rates. *Arch Gen Psychiatry* 1992;49:451-8.
- 8 Charlton J, Kelly S, Dunnell K, Evans B, Jenkins R, Wallis R. Trends in suicide deaths in England and Wales. *Popul Trends* 1992;69:10-6.
- 9 Platt S. Unemployment and suicidal behaviour—a review of the literature. *Soc Sci Med* 1984;19:93-115.
- 10 Fox AJ, Goldblatt P. *Longitudinal study series LS No 1: sociodemographic mortality differentials 1971-1975*. London: HMSO, 1982.
- 11 Moser KA, Fox AJ, Jones DR. Unemployment and mortality in the OPCS longitudinal study. *Lancet* 1984;ii:1324-8.
- 12 Goldblatt P. Office of Population Censuses and Surveys. *Longitudinal study. Mortality and social organisation—1971-1981*. London: HMSO, 1990.
- 13 Holding TA, Barraclough B. Undetermined deaths: suicide or accident? *Br J Psychiatry* 1978;133:542-9.
- 14 StataCorp. *Stata statistical software 4.0*. Texas: College Station, 1995.
- 15 Warr P, Jackson PR. Factors influencing the psychological impact of prolonged unemployment and re-employment. *Psychol Med* 1985;15:795-807.
- 16 Banks MH, Jackson PR. Unemployment and risk of minor psychiatric disorder in young people: cross-sectional and longitudinal evidence. *Psychol Med* 1982;12:789-98.
- 17 Warr P. *Work, unemployment and mental health*. Oxford: Oxford Science Publications, 1987:1-361.
- 18 Last JM, ed. *A dictionary of epidemiology*. New York: Oxford University Press, 1988:1-141.
- 19 Giddens A. *Durkheim*. Glasgow: Fontana/Collins, Fontana Modern Masters, 1978.

(Accepted 7 August 1998)