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RESEARCH

Suicide rates in young men in England and Wales in the 21st century: time trend study

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BMJ 2008;336:539-42
doi:10.1136/bmj.39475.603935.25

ABSTRACT

Objectives To explore trends in suicide in young people to investigate the recent observation that after year on year rises in the 1970s, 1980s, and early 1990s, rates in young men are now declining.

Design Time trend analysis.

Setting England and Wales, 1968-2005.

Population Men and women aged 15-34 years.

Results Since the 1990s, rates of suicide in young men have declined steadily and by 2005 they were at their lowest level for almost 30 years. This decline is partly because of a reduction in poisoning with car exhaust gas as an increased number of cars have catalytic converters; but there have been declines in suicides from all common methods, including hanging, suggesting a more pervasive effect. Other risk factors for suicide, such as unemployment and divorce, have also decreased. Possible recent reductions in alcohol use among young men and increases in prescribing of antidepressants do not seem to be temporally related to the decline in suicide.

Conclusions Suicide rates in young men have declined markedly in the past 10 years in England and Wales. Reductions in key risk factors for suicide, such as unemployment, might be contributing to lower rates.

INTRODUCTION

A striking features of the epidemiology of suicide in the late 20th century was the epidemic rise in suicide among young men in most industrialised nations.[1] Such trends have led to suicide becoming a major contributor to premature mortality[2] and are thought to indicate deteriorating mental wellbeing in younger people. Time series data show parallel increases in a range of risk factors including unemployment, divorce, substance misuse, and income inequality.[3] Changes in the availability of common methods of suicide, particularly domestic gas, barbiturates, and motor vehicle exhaust gases, have had an important impact on suicide rates and trends in the past 50 years.[4-6] There is a popular notion that rates of suicide in young people have continued to rise. A sharp downward trend in suicide in young men, however, has been reported in Australia,[7] and preliminary data suggest similar findings in England and Wales.[8] We explored recent trends in overall suicide and suicide by specific methods among young people.

This article is an abridged version of a paper that was published on bmj.com on 14 February 2008. Cite this article as: *BMJ* 14 February 2008, doi: 10.1136/bmj.39475.603935.25

METHODS

We used data from the Office for National Statistics on suicide in men and women aged 15-24 and 25-34 for the period 1968-2005, based on year of death registration up to 1992 and, from 1993 onwards, actual date of death. We included all deaths with a coroner's verdict of intentional self harm or of injury or poisoning of undetermined intent (open verdict),[9] the routine approach taken for government suicide statistics.[8 10] We refer to deaths in both these categories as "suicide" throughout.

Three successive revisions of the International Classification of Diseases (ICD-8 to ICD-10) covered the period examined. Previous analysis has shown no impact on the total number of suicides between revisions,[8] but there are differences in how method of injury is classified. We identified seven consistently coded methods of suicide: poisoning by solid or liquid (including drug poisoning); other poisoning (including domestic gas supply and vehicle exhaust); hanging (including suffocation); drowning; firearms (including explosives); jumping; and other (including injury from sharp object) (see table A on bmj.com). We also analysed trends in deaths recorded as accidental poisonings as decreases in suicide rates might be attributable to changes in coroners' recording practices; verdicts of "accidental death" are the most likely alternative to suicide or open verdicts.

We used age specific population estimates for England and Wales for the years 1968-2005 to calculate rates taking account of the 2001 census. The main analysis plotted trends in overall rates and rates for specific methods for men and women aged 15-24 and 25-34 separately. Time series data for divorce and unemployment (www.statistics.gov.uk/), alcohol use,[11] and antidepressant prescribing (http://research.imshealth.com/contactus.htm) for specific ages were compared with patterns in suicide, to identify possible associations. Age groups could not be matched exactly. Unemployment data were not available for those aged 16 and 17, alcohol data were available only for those aged 16-24 and 25-44, and prescribing data were available for those aged 20-29. To crudely assess associations of changing levels of risk factors with suicide rates we calculated correlations between differences in suicide and difference in risk factor levels in consecutive years.

RESULTS

Suicide trends in young men

Suicide rates in young men in England and Wales more than doubled from the early 1970s to the 1990s. Rates peaked in 1990 in 15-24 year olds and 1998 in 25-34 year olds and have since shown a steady decline in both age groups (fig 1). The year on year declines began around 1998-2000 in both age groups. By 2005, the rate in men aged 15-24 had fallen to almost half the peak rate (16.6 per 100 000 in 1990) and was 8.5 per 100 000. In men aged 25-34, the rate had decreased by a third from the peak rate of 27.8 per 100 000 in 1998 to 15.7 per 100 000. These were the lowest rates since 1974 and 1978, respectively. Rates for specific methods show a decline in all common methods, including hanging—the most commonly used method by young men.

The greatest decrease has been in suicides by "other poisoning," which previous analysis found were mainly deaths from exposure to motor vehicle exhaust gas.[8] Among 15-24 year old men "other poisoning deaths" declined from 4.8 per 100 000 in 1990 to 0.2 per 100 000 in 2005. Among 25-34 year old men "other poisoning deaths" declined from 7.3 per 100 000 to 0.7 per 100 000 over this period. Recent reductions in suicides by hanging and poisoning with liquids and solids have also contributed to the overall decline.

Suicide trends in young women

Female suicide rates in the 21st century are at the lowest recorded level for the time period analysed (fig 1). Suicide by hanging has increased among young women since the mid-1990s and has overtaken self poisoning as the most common method. In 1968, deaths by hanging accounted for just 5.7% of suicides in women aged 15-34. In 2005 this proportion was 47.3%. The corresponding proportions of self poisoning with solids or liquids were 64.1% in 1968 and 35.5% in 2005.

Accidental poisonings

From 1968 to 2005 rates of accidental poisoning in young men show a parallel pattern to that of overall suicide rates over the same period. See bmj.com. This provides some evidence that the recent downward trend in rates is not because of an increased use of accidental verdicts by coroners.

Risk factors: divorce, unemployment, alcohol use, and antidepressants

With the exception of the increase in divorces in 1972 after the Divorce Reform Act 1969 came into effect, rates of divorce closely followed trends in suicide in young men at the end of the 20th century (fig 2). Published data show that unemployment rose steeply in the early 1980s with a period of decline before rising again and peaking in the early 1990s.[3] Recent age specific data show that unemployment rates declined in parallel with declining suicide rates (fig 2). Data from the general household survey indicate that an upward trend in alcohol consumption throughout the 1990s may have peaked early in the 21st century with recent declines postdating declining rates of suicide (fig 2).

There were large year-on-year increases in antidepressant prescribing that began in the early 1990s. These rises corresponded to the levelling off of suicide rates in men aged 15-24 but predated the decline in those aged 25-34 by almost a decade (see bmj.com).

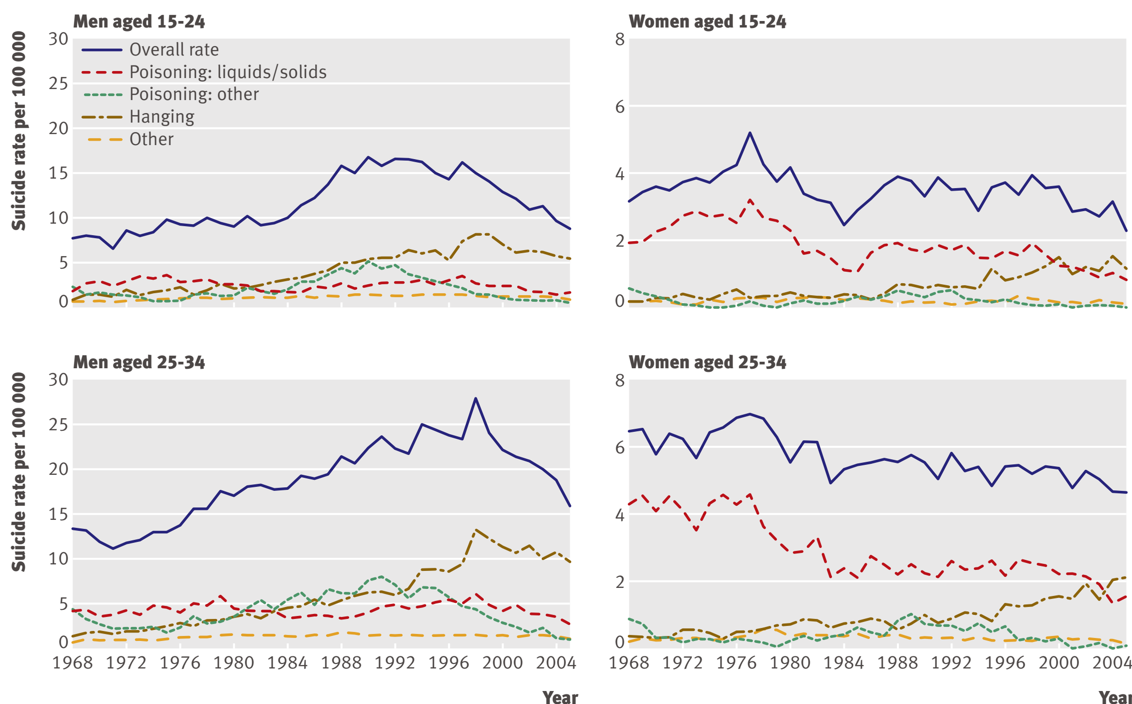

Fig 1 | Overall rates and rates for specific methods of suicide: England and Wales, 1968-2005. "Other" includes drowning, firearms, jumping, and sharp object

Correlations between changes in levels of risk factors and changes in suicide rates in young men between 1992-2005 were relatively uninformative (see bmj.com).

DISCUSSION

Main findings

Suicide rates in young men have declined over the past decade. Rates in 2005 were the lowest they have been since the mid-1970s. Reductions are apparent for all common methods of suicide, including hanging, suggesting a more pervasive change than that attributable to the changing availability of particular methods. Rates in young women are also at their lowest level for many years but deaths by hanging have increased and this is now the most commonly used method.

Strengths and limitations

There are limitations to our analysis. Firstly, trends in suicide with those for known risk factors should be interpreted cautiously in aggregate (ecological) analyses of population data as causality cannot be proved. Secondly, age specific data on relevant risk factors span too few years to enable a multivariable time series analysis of factors independently associated with recent trends. Thirdly, consistent series of age specific data on unemployment and alcohol consumption spanning the entire period of our analysis were not available. Furthermore we did not have secular trend data on two key risk factors for suicide: mental illness and self harm. Lastly, interpretation of time trends in divorce is problematic because recent declines in marriage mean that the population at risk has also declined. From 2001 to 2005 less than 20% of young men aged 16-34 were married (www.statistics.gov.uk/STATBASE/ssdataset.asp?vlnk=9535).

Previous studies

The reductions in suicides in young men corresponded to periods of decline in three risk factors for suicide—unemployment, divorce, and alcohol consumption—and an increase in antidepressant prescribing, although none corresponds closely to the declines in suicide. See

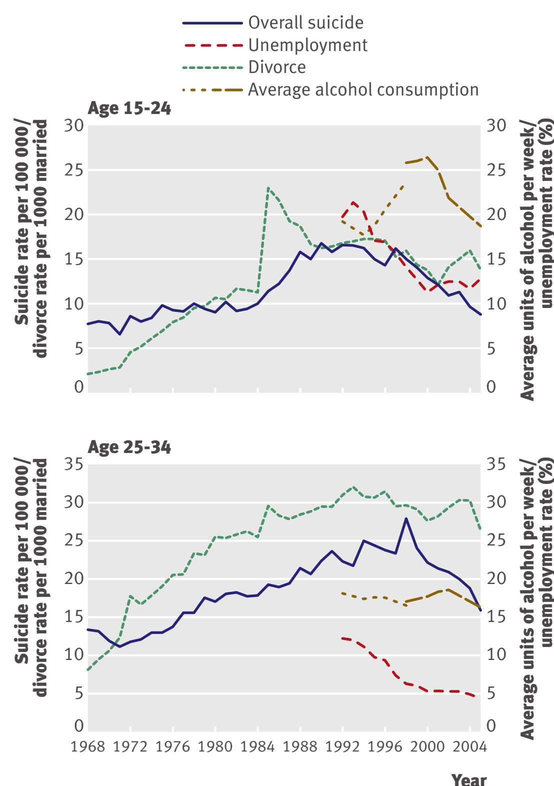

Fig 2 | Secular trends in suicide, divorce, unemployment, and alcohol consumption in men aged 15-34. Rise in divorce in 1972 corresponds to introduction in 1971 of the Divorce Reform Act 1969 and rise in 1985 to the Matrimonial and Family Proceedings Act 1984, which allowed divorce after one year. Unemployment rates shown are for men aged 18-24. Alcohol consumption rates are for men aged 16-24; dotted brown line represents data weighted to account for non-response, dashed brown line represents unweighted consumption (general household survey, 2005, appendix D)

bmj.com. Other possible influences on secular trends in suicide are changes in income inequality and the prevalence of substance misuse.[3] Income inequality fell from 2000-1 to 2004-5 (www.statistics.gov.uk/cci/nugget.asp?id=332), but these falls were slight and postdated the decline in suicide. There are no reliable data on time trends in the incidence of drug misuse.

In Australia, reductions in suicides in young men have been attributed to government suicide prevention strategies targeted at young people.[7] In England and Wales there have been major policy initiatives in 1992[12] and 2002.[10] The period of increased policy focus has been associated with the levelling off and subsequent declines in suicide, although it is not possible to determine causality.

Just as no single factor was clearly associated with the rise in suicide in young men in the 1950s-1990s,[3] favourable changes in several different factors—levels of employment, substance misuse, and antidepressant prescribing as well as policy focus on suicide and vehicle exhaust gas legislation—may have contributed to the recent reductions in England and Wales. Equally, it is possible that some broader societal

WHAT IS ALREADY KNOWN ON THIS TOPIC

There was an epidemic rise in suicide among young men in most industrialised nations in the late 20th century

In 1998, suicide in young men in England and Wales reached its highest level since the 1920s and men aged 25-34 had the highest rate of all age-sex groups

Such trends transformed suicide into a major contributor to premature mortality

WHAT THIS STUDY ADDS

Suicide rates in young men in England and Wales peaked during the 1990s and have since shown a steady decline; in 2005 rates were at the lowest level since the mid-1970s

These recent reductions are apparent for all common methods of suicide

Factors contributing to the decline include reductions in suicides using car exhaust gas after legislation in 1993, favourable changes in known risk factors for suicide such as unemployment, and, possibly, health policy focus on preventing suicide

change not captured in this analysis has contributed to recent favourable trends.

We thank Peter Stephens, IMS, for antidepressant prescribing data and Ben Wheeler, Department of Social Medicine, for extracting the data.
Contributors: See bmj.com.
Funding: None.
Competing interests: None declared.
Ethical approval: Not required.
Provenance and peer review: Not commissioned; externally peer reviewed.

1 Cantor C. Suicide in the western world. In: Hawton K, Van Heeringen K, eds. *The international handbook of suicide and attempted suicide*. Chichester: Wiley, 2000.
2 Gunnell D, Middleton N. National suicide rates as an indicator of the effect of suicide on premature mortality. *Lancet* 2003;362:961-2.
3 Gunnell D, Middleton N, Whitley E, Dorling D, Frankel S. Why are suicide rates rising in young men but falling in the elderly? A time series analysis of trends in England and Wales 1950-1998. *Soc Sci Med* 2003;57:595-611.
4 Amos T, Appleby L, Kiernan K. Changing rates in suicide by car exhaust asphyxiation in England and Wales. *Psychol Med* 2001;31:935-9.
5 Gunnell D, Wehner H, Frankel S. Sex differences in suicide trends in England and Wales. *Lancet* 1999;353:556-7.
6 Kreitman N. The coal gas story. *Br J Prev Soc Med* 1976;30:86-93.
7 Morrell S, Page A, Taylor R. The decline in Australian young male suicide. *Soc Sci Med* 2007;64:747-54.
8 Brock A, Griffiths C. Trends in suicide by method in England and Wales, 1979 to 2001. *Health Stat Q* 2003;20:7-17.
9 Linsley K, Schapira K, Kelly T. Open verdict v suicide—importance to research. *Br J Psychiatry* 2001;178:465-8.
10 Department of Health. *National suicide prevention strategy for England*. London: Department of Health, 2002.
11 Goddard E. *Smoking and drinking among adults. General Household Survey 2005*. London: Office for National Statistics, 2006.
12 Department of Health. *The health of the nation: a strategy for health in England*. London: HMSO, 1992.

Accepted: 11 January 2008

The population impact on incidence of suicide and non-fatal self harm of regulatory action against the use of selective serotonin reuptake inhibitors in under 18s in the United Kingdom: ecological study

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BMJ 2008;336:542-5
doi:10.1136/bmj.39462.375613.BE

This article is an abridged version of a paper that was published on bmj.com on 14 February 2008. Cite this article as: *BMJ* 14 February 2008, doi: 10.1136/bmj.39462.375613.BE

ABSTRACT

Objective To investigate the population impact on the incidence of suicide and non-fatal self harm of regulatory action in 2003 to restrict the use of selective serotonin reuptake inhibitors (SSRIs) in under 18s.

Design Ecological time series study.

Setting United Kingdom.

Populations Young people in the UK aged 12-19 years (prescribing trends), in England and Wales aged 12-17 years (mortality), and in England aged 12-17 years (hospital admissions).

Main outcome measures Deaths from suicide and hospital admissions for self harm.

Results Antidepressant prescribing doubled between 1999 and 2003 but fell to the 1999 level between 2004 and 2005. These large changes in prescribing did not seem to be associated with temporal trends in suicide or self harm. In the years 1993 to 2005 the annual percentage reduction for suicide among 12-17 year olds was −3.9% (95% confidence interval −6.2% to −1.5%) in males and −3.0% (−6.6% to 0.6%) in females, with no indication of a substantial change in this rate of decrease during that period. Similarly, hospital admission rates for self harm in the years 1999 to 2005 indicated an annual percentage increase for males of 1.1% (−0.5% to 2.7%) and for females of 5.7% (3.6% to 7.8%), again with no statistical evidence of a change in rate after the regulatory action.

Conclusions The noticeable reduction in prescribing of antidepressants since regulatory action in 2003 to restrict the use of SSRIs in under 18s does not seem to have been associated with changes in suicidal behaviour in young people. Specifically, these data for England do not indicate that reductions in antidepressant use have led to an increase in suicidal behaviour.

INTRODUCTION

In 2003 the UK's Medicines and Healthcare products Regulatory Agency contraindicated paroxetine, a selective serotonin reuptake inhibitor (SSRI), in under 18s. The decision was based on trial data indicating an increased risk of suicidal thoughts and behaviour in young people receiving the drug. In December 2003 the regulatory agency concluded that the balance of risk and benefits for the use of most SSRIs in young people was unfavourable.[1]

Some mental health professionals have expressed concern that a reduction in SSRI prescribing may result in increased levels of untreated depression and an adverse impact on suicide.[2] Following similar regulations in the United States and the Netherlands, studies have indicated a reduction in the diagnosis and treatment of depression[3] and increases in suicide rates[4 5]; likewise some ecological data have indicated that increased SSRI prescribing in young people coincides with reductions in suicide.[6]

We evaluated the impact of changing patterns of antidepressant use on incidence of self harm and suicide in young people in the UK following regulatory action against the use of SSRIs in under 18s.

METHODS

We created three time series for relevant age groups between 1993 and 2006. Firstly, we obtained data from IMS Health for prescriptions of antidepressants to 12-19 year olds in the UK between 1993 and 2006.[7] Secondly, we obtained data from the Office for National Statistics on annual deaths due to intentional self harm or events of undetermined intent among 12-17 year olds in England and Wales between 1993 and 2005.[8] Thirdly, we used the Department of Health's Hospital Episode