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A 20-year review of trends in deliberate self-harm in a British town, 1981–2000

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Abstract *Background* It is important to identify trends in deliberate self-harm because of potential links both with complex mental health problems and with suicide itself, and because of its significant impact on resources in both mental health and acute health services. *Method* Patients presenting at the A&E department at Kidderminster General Hospital following an act of deliberate self-harm between the years 1981 and 2000 were assessed by the Parasuicide Counselling Group. These data were used to examine trends in deliberate self-harm and patient characteristics. *Results* The 20-year study examined 4,474 episodes of deliberate self-harm in the Kidderminster district. Rates of deliberate self-harm were higher in females throughout, although the difference between the genders narrowed in the second half of the 1990s. In both males and females, the rate of deliberate self-harm was highest in those aged 15–24. Since the mid-1990s, there have been increases in the rate of deliberate self-harm in males aged 45–54 and in females aged 25–44. Rates were highest in males and females who were separated. Although the most common method of deliberate self-harm in both males and females was overdose, males used cutting and other methods of deliberate self-harm proportionally more than females. There was a relentless rise in paracetamol use until a decline at the end of the study period following the introduction of a restriction on sales. Alcohol use at the time of deliberate self-harm rose markedly in both genders. There was a significant increase in deliberate self-harm repetition in both males and females over the study period. In males and females, psychiatric involvement or admission increased in the 1990s compared to the 1980s. *Conclusions* Higher levels of deliberate self-harm repetition and psy-

chiatric involvement suggest increasing pressures on health services and a continuing need to develop understanding of deliberate self-harm.

Key words deliberate self-harm – parasuicide – Kidderminster – UK – trends – repetition – paracetamol

Introduction

The management of deliberate self-harm – otherwise termed parasuicide or attempted suicide – is a major problem affecting not only mental health services, but also acute and emergency services (Hawton and Catalan 1987; Wilkinson et al. 2002). The importance of psychosocial assessment of deliberate self-harm in reducing repetition risk has been stressed (Crawford and Wessely 1998; Kapur et al. 2002).

A number of studies have looked at demographic, background, episode, social and personality variables (Kreitman and Schreiber 1979; Hawton and Fagg 1992; Schmidtke et al. 1996; Michel et al. 2000; Hawton et al. 2000, 2001, 2003). Horrocks et al. (2003) looked specifically at self-injury, as opposed to self-poisoning. Risk of repetition has been examined (Zahl and Hawton 2004). There are no national data that record trends in the United Kingdom, although there is a valuable series of annual reports on data from Oxford (Hawton et al. 2002) and the Scottish SMR data set (McLoone and Crombie 1996; Platt et al. 1988). Suicidal behaviour and treatment implications have also been discussed (Campbell and Hale 1991; MacLeod et al. 1992; MacLeod 1995; Hawton and Van Heerington 2000).

Deliberate self-harm and suicide itself have played a significant role in shaping NHS policy, structurally as in the Health of the Nation (DoH 1992), Our Healthier Nation (DoH 1998), National Service Framework: Mental Health (DoH 1999), National Suicide Prevention Strategy for England (DoH 2002) and NICE Clinical Guideline on Self-Harm (2004) – and operationally in the area

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of risk assessment. Hawton et al. (2003) have looked at the risk of suicide following deliberate self-harm during a long follow-up period.

This paper focuses on trends in deliberate self-harm over a 20-year period from 1981 to 2000 in Kidderminster in north Worcestershire; suicide data are also included. The multi-disciplinary Parasuicide Counselling Group was established in 1981 to assess cases of deliberate self-harm referred to Kidderminster General Hospital; records of assessments were collected and computerised up until 2000 when the Accident and Emergency department, medical wards and ITU at the hospital were closed and moved to Worcester. This closure had a major, disruptive effect on the subsequent deliberate self-harm assessment service.

Kidderminster and the surrounding area served by the General Hospital has a mixed urban/rural population of around 110,000. The town itself, 18 miles west of Birmingham, is dominated by its carpet industry. The population is predominantly white with small Italian and Polish communities. The area has no specific socio-demographic variables that make generalisations to the wider population inappropriate.

This paper aims to add to the existing body of knowledge relating to deliberate self-harm by examining rates of deliberate self-harm over two decades using one of the largest sample sizes reported in the UK.

Subjects and methods

Episodes and rates

This review is based on an analysis of patients aged 15 and over assessed by the specialist service between 1981 and 2000 following presentation to Kidderminster General Hospital after an act of deliberate self-harm. The vast majority of such cases were initially referred to the Accident and Emergency department at the hospital; other cases were from within the psychiatric unit at the hospital or referred by GPs. In all known cases of deliberate self-harm, patients were offered a psychosocial assessment by the hospital's Parasuicide Counselling Group. Data were recorded on a four-page assessment form, and, from this, a number of variables were computerised and episode data were collected.

It is acknowledged that a proportion of A&E cases will fail to be passed on for psychosocial assessment, and that this non-assessed group is at higher risk of repetition (Crawford and Wessely 1998; Hickey et al. 2001; Runeson 2001; Kapur et al. 2002). Regular audits in Kidderminster suggest the non-assessed proportion in this study emanating from the A&E department was small. There was good liaison between the Parasuicide Counselling Group and the adjacent A&E department throughout, and referral criteria from A&E appeared to be stable over time. Provision of neighbouring A&E services was constant throughout the study period.

Rates of deliberate self-harm were calculated using both episodes and the number of individuals presenting to the hospital within each year (i.e. when an individual was involved in multiple episodes, they were only counted once within each 12-month period for the calculation of person-based annual rates). The mid-year population estimates for the Kidderminster area for each year between 1981 and 2000 provided by the Public Health Department (using data from the Office of National Statistics and the 2001 Census) were used to generate gender-specific and age-specific rates per 100,000. The official population figures in the district (age 15 and over) increased from 71,500 in 1981 to 79,100 in 2000; it is acknowledged that these figures

will inevitably have some minor boundary variance with the population of the catchment area of the hospital.

Variables

Variables examined were those relating to demographic information, those relating to the actual episode, and those, including historical information, emanating from the assessment. These data have been shown in other studies to be relevant. The variables were: (i) Demographic: gender, age, marital status; (ii) Episode: date, method, use of paracetamol, use of alcohol at time of episode; and (iii) Assessment: psychiatric opinion involved, admission to psychiatric ward, previous history of deliberate self-harm, previous psychiatric history.

Data analysis

Data were analysed using chi-square (χ^2) for trend on SPSS, version 10.0.7 (SPSS Inc. 1999). To account for the increased probability of Type I error due to multiple comparisons, the Bonferroni correction was applied, setting significance levels at $P < 0.001$. To meet the assumptions when calculating χ^2 for trend for two of the variables – age and method – the date of attempt variable was collapsed into four larger 5-year categories. This gives a cruder, but valid, indication of changes over time for these variables. This data compression was not necessary for all the other variables.

The data for 1981 (May–December only – service just getting underway) and 2000 (January–August only – as A&E service moved) were pro-rated to provide 3-year rolling averages for 1982 and 1999. Analysis of the overall data showed no significant variation between the first, middle and last 4-month periods of the year ($\chi^2 = 0.56$, $DF = 2$, $P = 0.76$) that would contaminate the pro-rating. Full data were available to calculate the 3-year figures for suicide.

Results

Episodes, rates and gender

The total number of episodes of deliberate self-harm and the rate of deliberate self-harm per 100,000 individuals in the Kidderminster district in the years 1981 to 2000 are shown in Table 1.

Over the 20-year study period, 3,151 separate individuals were involved in 4,474 episodes of deliberate self-harm (59% female, 41% male). Total episodes per year ranged from the lowest in 1982 and 1983 (181 in each of these years) to the highest of 289 in 1998, with an average of 224 episodes per year.

Trends of female and male individuals presenting each year were analysed for the period 1981–2000 (rate per 100,000), and no statistically significant changes were identified over time (χ^2 for trend = 5.45, $P = 0.02$). Person-based rates of deliberate self-harm per 100,000 were calculated for males and females, and are shown in Fig. 1 as 3-year rolling averages. The rate of deliberate self-harm in females was consistently higher than that of males throughout the 20-year study period. The rates for each gender generally followed a similar pattern throughout the years, with a peak between the years 1985 and 1990, followed by a dip in the years 1991 to 1993. After a steady increase in both genders up until 1998, the female rate appeared to decrease again, while the male rate was at its highest point at the end of the study period.

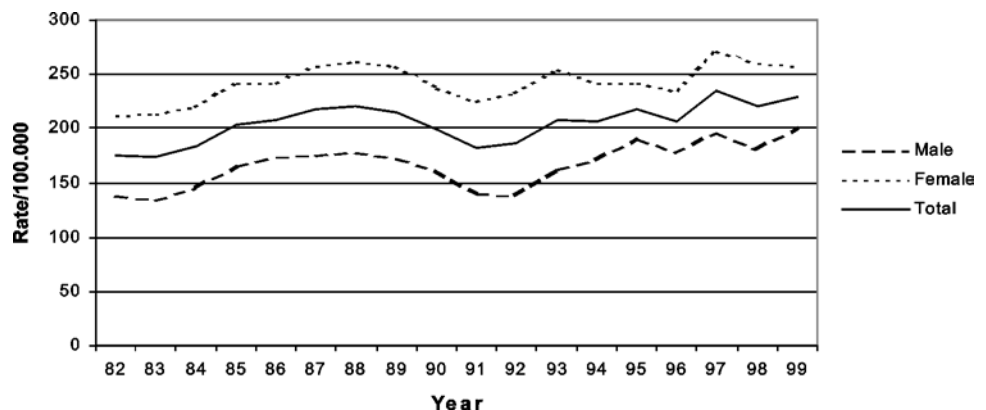
Table 1 Incidence of deliberate self-harm in Kidderminster, 1981–2000

Year	Number of episodes			Annual rate per 100,000		
	Males	Females	Total	Males	Females	Total
1981	89	125	214	163	226	195
1982	67	114	181	123	207	165
1983	70	111	181	128	202	165
1984	81	126	207	149	229	189
1985	86	128	214	158	233	195
1986	102	144	246	187	262	225
1987	96	126	222	176	229	203
1988	89	154	243	163	280	222
1989	106	152	258	196	277	237
1990	86	119	205	156	216	186
1991	69	120	189	128	218	174
1992	75	131	206	136	238	187
1993	81	134	215	149	244	196
1994	110	154	264	202	280	241
1995	88	110	198	161	200	181
1996	115	136	251	211	247	229
1997	88	140	228	161	255	208
1998	118	171	289	217	311	264
1999	90	117	207	165	213	189
2000	119	137	256	218	247	233
Mean	91	132	224	167	241	204
Total	1,825	2,649	4,474	–	–	–

(Figures for 1981 and 2000 are pro-rated)

The averaged annual rate in males rose by 10% in the second half of the study compared to the first half (from 160 to 175), with a smaller 4% increase for females (from 236 to 245).

The female to male ratio of episodes (3-year rolling averages) stayed fairly constant during the 1980s and the first part of the 1990s at around 1.5 to 1.6. However, in the second half of the 1990s, there was a marked increase in the proportion of males, reducing this ratio over the last 5 years of the study to a mean of 1.2; the lowest level (3-year rolling average) was 1.1 in 1996.

Fig. 1 Rates of deliberate self-harm in males and females, 1982–1999 (3-year rolling averages)

Age

The rate of deliberate self-harm in males (see Fig. 2) and females (see Fig. 3) peaked in early adulthood and then decreased steadily with age. Across the whole study, the modal age was 21 in males and 17 in females. There were no significant age trends over time in males (χ^2 for trend = 0.85, $P = 0.36$) or females (χ^2 for trend = 3.23, $P = 0.07$).

Males in the age group 15–24 had the overall highest rate of deliberate self-harm, peaking in the late 1980s and again in the late 1990s at a rate of around 550 per 100,000 population. There was some indication that rates in the 35–44 and 45–54 groups were higher at the end of the 1990s.

In females, the difference between those aged 15–24 and the other groups was more marked than in males. In the 15–24 age group, the rate nearly doubled during the 1980s from a starting point of around 400 per 100,000; in the 1990s, it fluctuated between 700 and 800 per 100,000. The rate of deliberate self-harm in females aged 25–34 and 35–44 appeared to be increasing in the second half of the 1990s. The rate in the age group 45–54 was higher towards the end of the 1980s, but by the end of the study period this had fallen to levels similar to those seen in 1981.

Rates in the two older age groups (55–64 and 65 and over) in both males and females remained low and stable over time.

Marital status

Between 1991 and 2000, the marital status of people attempting deliberate self-harm was recorded. Rates per 100,000 for this second half of the study period were calculated using marital status-specific data from the 2001 census (as this included the category 'separated', which was absent in earlier censuses).

In this analysis, 54% of males were single, 24% married, 11% separated, 8% divorced, and 3% widowed; among females, 49% were single, 30% married, 7% separated, 10% divorced, and 4% widowed.

Fig. 2 Rate of deliberate self-harm in males of different age groups, 1982–1999 (3-year rolling averages)

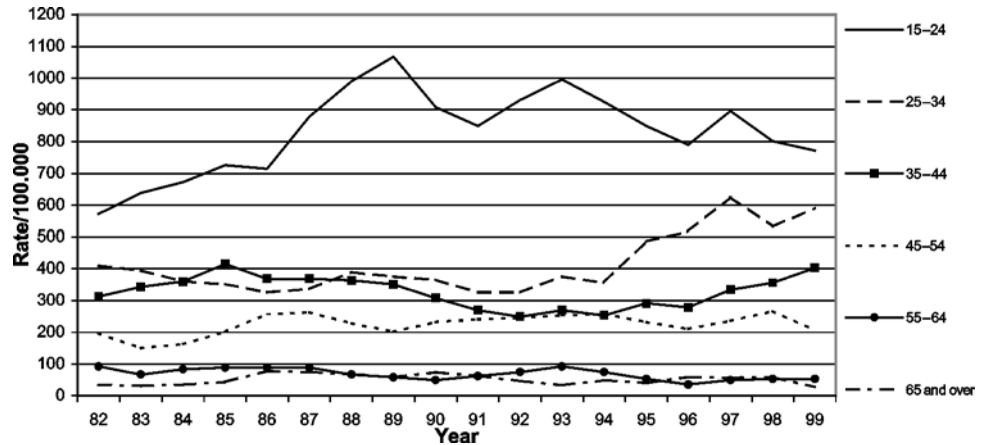
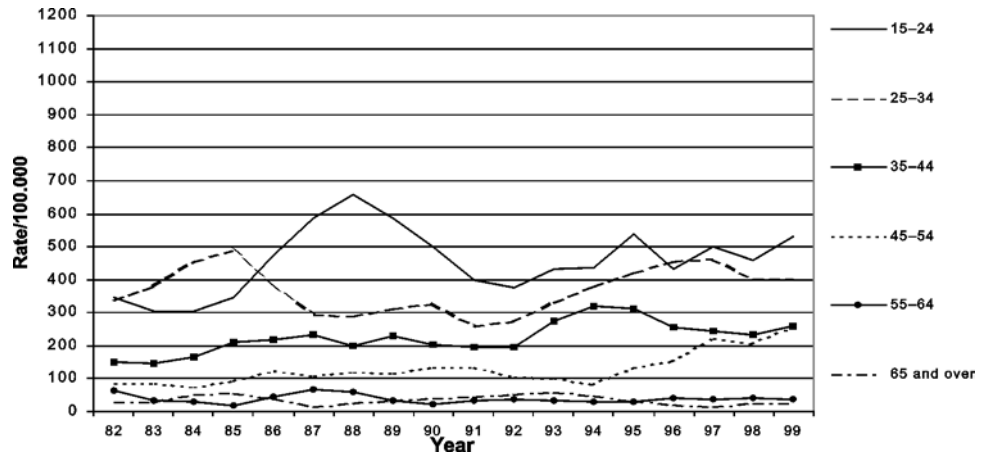


Fig. 3 Rate of deliberate self-harm in females of different age groups, 1982–1999 (3-year rolling averages)



The rates per 100,000 were: males, single (394), married (84), separated (988), divorced (1749), widowed (57); females, single (490), married (149), separated (913), divorced (294), widowed (114).

There were no significant trends in marital status over time (rate per 100,000) for males (χ^2 for trend = 1.65, $P=0.2$) or females (χ^2 for trend = 1.41, $P=0.24$). In both genders, the rates in those who were separated were startlingly high – double the rates of single people who numerically accounted for half the study sample. The rate for those who were married was half that of those who were divorced, but, in contrast to previous findings, the rate was lowest of all in both males and females who were widowed.

Method used

The methods used by males and females were compared. Method categories comprised: simple overdose, cutting combined with overdose, cutting wrist/arm, cutting other part of the body, hanging, jumping, drowning, alcohol overdose, car exhaust, crashing car, other and unknown. The methods were aggregated into three categories of overdose alone, cutting, and other for broader

comparison. Comparing these categories, there were no significant changes over time in the methods used by males (χ^2 for trend = 1.54, $P=0.22$) or in the methods used by females (χ^2 for trend = 0.5, $P=0.48$).

Taking the study period as a whole, the most common method used for deliberate self-harm by both groups was simple overdose, although this was used less frequently by males (82% in males, 90% in females). In contrast, males had higher levels of cutting (11% in males, 7% in females); incidence was higher in males than females in each of the three cutting groups. All other methods of deliberate self-harm were grouped together; more males than females used these 'other' methods of deliberate self-harm (7% in males, 3% in females) ($\chi^2 = 58.28$, $df = 2$, $P < 0.001$).

Use of paracetamol

The percentage of episodes in which paracetamol was used increased dramatically over the 20-year study period in both males (χ^2 for trend = 185.28, $P < 0.001$) and females (χ^2 for trend = 219.77, $P < 0.001$). In the early years of the study period, paracetamol was used in less than 5% of episodes in men and less than 10% in

women. There was a relentless rate increase in both genders to around a third of all episodes at the start of the 1990s and nearly half of all episodes by the mid-1990s. In 1998, legislation was introduced to restrict pack sizes of paracetamol, and use of paracetamol dropped in both genders subsequently (Fig. 4).

■ Use of alcohol

The percentage of episodes in which alcohol was used increased significantly over the 20-year period in males (χ^2 for trend = 359.21, $P < 0.001$) and females (χ^2 for trend = 521.05, $P < 0.001$). Fig. 5 shows parallel trends in both genders with higher rates in men throughout.

■ Repeaters

Two methods were used to analyse data involving repeaters. The first method was the proportion of patients assessed who had a previous history of deliberate self-harm. The percentage of episodes in which there was a previous deliberate self-harm history increased significantly over the 20-year study period in both males (χ^2 for trend = 211.4, $P < 0.001$) and females (χ^2 for trend = 355.54, $P < 0.001$). Fig. 6 shows that the percentage of 'repeat' episodes increased in males from around

40% to 55%, while in females there was an increase from 30% to 60% at the end of the study period.

The second method of measuring repetition was to look at the ratio of episodes to persons throughout the study period. This episode:person ratio showed an overall increase – a higher incidence of repetition – from 1.1 in 1981 to a peak ratio of 1.23 in 1997. This overall pattern reflects the ratio ranging between 1.1 and 1.16 in the years spanning 1981 to 1991, and between 1.17 and 1.23 in the years spanning 1992 to 2000. For the majority of years, the episode:person ratio was higher in males than females.

■ Psychiatric involvement

The percentage of episodes in which the person had a history of psychiatric input, a psychiatric opinion was sought, or there was admission to a psychiatric ward was examined.

Fig. 7 shows that in the 1990s a higher percentage of males had a history of psychiatric input compared to the 1980s, with the percentage rising from around 40% in the early 1980s and 30% in the late 1980s to around 50% at the end of the 1990s (χ^2 for trend = 178.03, $P < 0.001$). The percentage of males for whom a psychiatric opinion was sought increased over the study period, with a particularly steep increase during the 1990s (χ^2 for trend = 292.72, $P < 0.001$). A significantly higher per-

Fig. 4 Percentage of episodes involving paracetamol, 1982–1999 (3-year rolling averages)

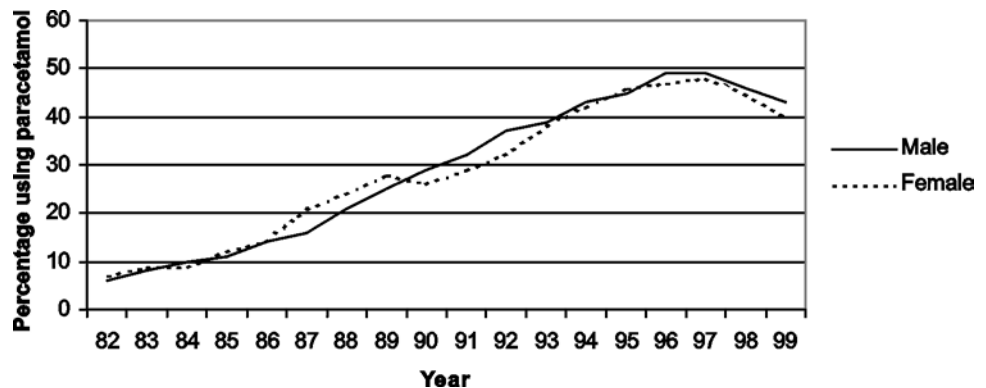


Fig. 5 Percentage of episodes involving alcohol, 1982–1999 (3-year rolling averages)

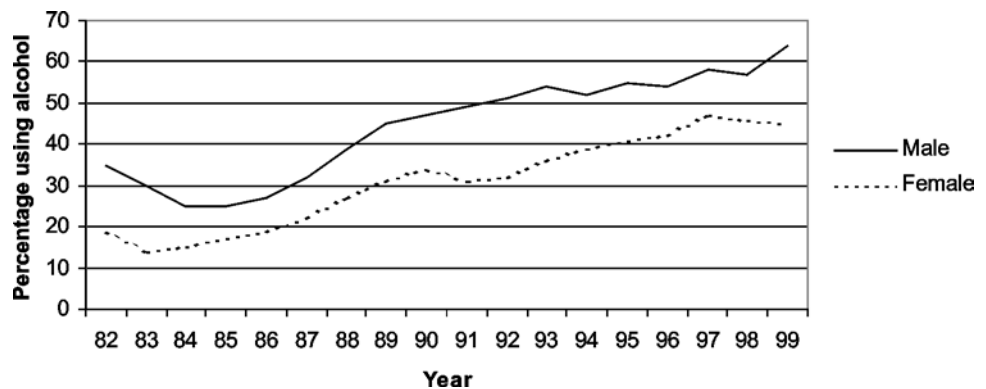


Fig. 6 Percentage of episodes involving 'repeaters', 1982–1999 (3-year rolling averages)

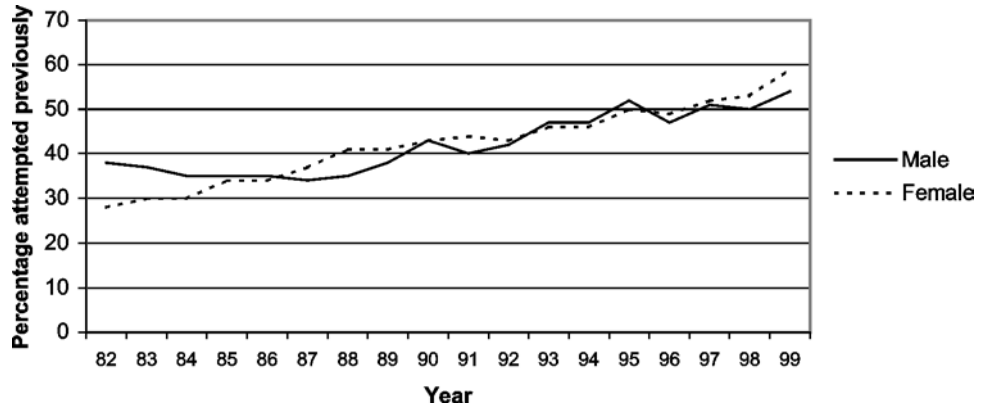
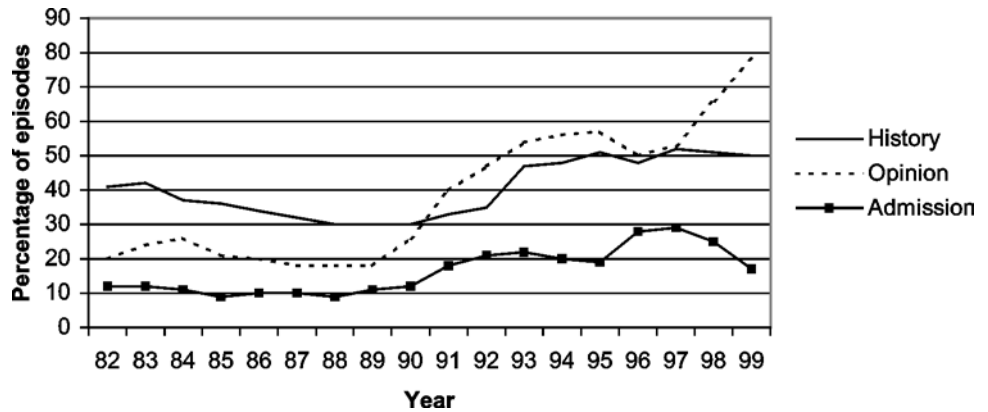


Fig. 7 Psychiatric details for male episodes, 1982–1999 (3-year rolling averages)



centage of males were admitted to psychiatric wards in the 1990s compared to the 1980s (χ^2 for trend = 32.28, $P < 0.001$).

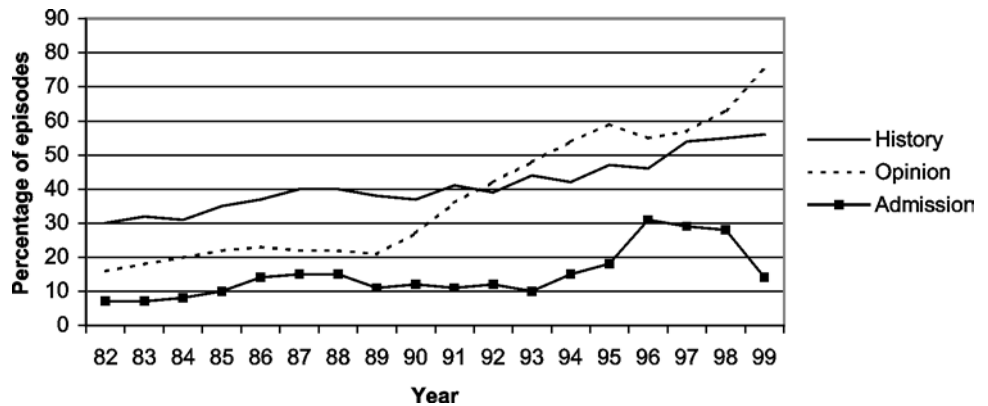
The percentage of females with a psychiatric history (Fig. 8) increased significantly from 30% in the early 1980s and 40% in the middle part of the study period to approximately 55% at the end of the 1990s (χ^2 for trend = 244.51, $P < 0.001$). The percentage of episodes involving females for which a psychiatric opinion was sought also increased sharply in the second half of the study period (χ^2 for trend = 416.57, $P < 0.001$). The percentage of females admitted to a psychiatric ward also follows a similar pattern to that seen in males, with high-

est levels in the mid-1990s (χ^2 for trend = 52.43, $P < 0.001$).

■ **Suicide**

As an adjunct to the study data on deliberate self-harm, rates of completed suicide (including death by undetermined injury) in the Kidderminster district were examined for males and females. In contrast to the trends in deliberate self-harm, as expected, the rate of suicide in males was higher than that in females in all years except 1987. The rate of suicide (both genders) ranged from a

Fig. 8 Psychiatric details for female episodes, 1982–1999 (3-year rolling averages)



low of 8 per 100,000 in 1996 to a high of 15 per 100,000 in the years 1981, 1999 and 2000, with a mean rate of 12 per 100,000 per year over the whole study period.

Discussion

This study has a number of limitations. Populations of geographical areas and hospital catchment areas are not precisely coterminous. As in all deliberate self-harm research, it is also difficult to estimate true incidence rates; many patients do not present to services and, of those who do, some will inevitably not be identified as deliberate self-harm cases.

In retrospect, we would have wished to look at more variables, and some data were only collected for part of the study. We feel that the quality of data collection improved as the service evolved, and this may have had a minor contaminating effect. We have already entered a caveat regarding the 3-year rolling average figures and pro-rating in the first and final years of the study.

That said, we feel that the Kidderminster population may be more representative of the UK as a whole than some other studies. The small size of the population under review and the close proximity on the hospital site of A&E and psychiatric services are likely to have enhanced the quality of data collection.

The annual age-standardised rate of deliberate self-harm per 100,000 (3-year rolling average) over the 20 years had a mean of 167 in males (range 123–218) and 241 in females (range 202–311). A multicentre study across local centres in 13 countries in 1989–92 (Schmidtke et al. 1996) showed a comparable rate in males of 136 per 100,000 (range 45 in Spain to 314 in Finland) and in females 186 (range 69 in Spain and 462 in France). Oxford was the UK representative in this study and was second highest both for males (251) and females (323). It is possible that demographic bias might inflate the Oxford figures and that the lower levels in Kidderminster – still higher than the ‘European average’ – might be more typical of the UK as a whole.

Deliberate self-harm incidents in Kidderminster in both males and females rose during the 1980s, dipped in the early 1990s and then rose again subsequently. There is no obvious explanation, such as the effect of service changes or practice, for the dip in the early 1990s – which interestingly partially mirrors the Oxford data.

The traditional gender differential between males and females appeared to be narrowing at the end of the study, the female:male ratio reducing from between 1.5 and 1.6 up until 1994 to a mean of 1.2 over the last 5 years of the study. It may be that the proportional rise in male deliberate self-harm may be connected with socio-economic or wider societal factors. In Oxford (Hawton et al. 2003), the ratio fell during the early 1990s from 1.45 to 1.26, but had risen to 1.6 in 2000.

This study confirms the traditional picture of deliberate self-harm rates being higher in the 15–24 age group both in males and, more markedly, in females.

Rates in the 15–24 group in Kidderminster were higher in males and females than in the Oxford, and indeed most other centres, in Schmidtke et al.’s 1989–92 review (1996).

The finding that separated people had the highest rate of deliberate self-harm – while incidence rates were much lower in those without a partner through divorce or bereavement – may suggest that risk may be highest when separation, either because of recency or longer-term ambivalence, has not been made more final through divorce. Being married has been seen traditionally as a protective factor (Platt et al. 1988), and, although supported in this study, rates in married people were higher than in those who were widowed in both genders. The pattern of people within each of the five marital status categories was remarkably similar to the findings of Hawton et al. (2002).

Overdose was easily the most common method, with rates in Kidderminster for both males and females at the top end of ranges found in other studies. The inexorable and linear rise in the rate of paracetamol use peaked in the late 1990s and then showed signs of declining. It was around this time that restrictions on the sale of paracetamol were introduced and this, plus associated publicity on the dangers of paracetamol overdose, may be responsible for the downturn (Hawton et al. 2001).

There was a similarly dramatic rise over time in the use of alcohol in connection with deliberate self-harm episodes for both males and females, and, through disinhibition, alcohol may both facilitate planned deliberate self-harm and provide the setting condition for unplanned episodes.

Horrocks et al. (2003) found self-injury (as opposed to self-poisoning) rates of 21 % of males and 15.6 % of females in a large sample in Leeds; they excluded combined presentation, but had wide inclusion criteria for self-injury. In the Kidderminster study, rates of cutting (including combined presentation) combined with all other non-overdose methods were 18 % in males and 10 % in females. These figures suggest higher rates of self-injury in males than is generally perceived, and this area merits further study.

Repetition (as analysed on two different measures), the percentage of incidents for which a psychiatric opinion was sought, the percentage of those presenting having a psychiatric history and the percentage of those presenting being admitted to a psychiatric ward all tended to be higher in the 1990s than in the 1980s, even though local provision was stable throughout the study period. These findings may suggest that those presenting have more psychiatric problems, and, thus, put greater pressures on those managing their care – not only in terms of increasing numbers, but also increasing complexity.

Service issues are addressed by the NICE Guidelines (2004) which stress the need for respectful medical management; comprehensive psychiatric, psychological and social assessment, including assessment of known risk factors; treatment options; and staff training.

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