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Deliberate self-harm in Oxford, 1990–2000: a time of change in patient characteristics

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ABSTRACT

Background. Trends in deliberate self-harm (DSH) are important because they have implications for hospital services, may indicate levels of psychopathology in the community and future trends in suicide, and can assist in identification of means of suicide prevention.

Method. We have investigated trends in DSH and characteristics of DSH patients between 1990 and 2000 based on data collected through the Oxford Monitoring System for Attempted Suicide.

Results. During the 11-year study period 8590 individuals presented following 13 858 DSH episodes. The annual numbers of persons and episodes increased overall by 36·3% and 63·1% respectively. Rates (Oxford City) declined, however, in the final 3 years. There were gender- and age-specific changes, with a rise in DSH rates in males aged $\geqslant$55 years and in females overall and those aged 15–24 years and 35–54 years. Repetition of DSH increased markedly during the study period. Antidepressant overdoses, especially of SSRIs, increased substantially. Paracetamol overdoses declined towards the end of the study period. Alcohol abuse, use of alcohol in association with DSH, and violence increased, especially in females, and the proportion of patients in current psychiatric care and misusing drugs also rose.

Conclusions. While overall rates of DSH did not increase markedly between 1990 and 2000, substantial changes in the characteristics of the DSH population and a rise in repetition suggest that the challenges facing clinical services in the management of DSH patients have grown.

INTRODUCTION

Monitoring of trends in deliberate self-harm (DSH) is important for several reasons in addition to providing information on changes in demands on hospital services. Trends in DSH may have implications for future trends in suicide, because although there are major differences in the epidemiology of DSH and suicide, there are also strong associations between the two phenomena (Sakinofsky, 2000). Trends in DSH can assist in identifying potential targets for prevention (e.g. paracetamol self-poisoning). Finally, they may provide an index of community levels of psychopathology and are also relevant to evaluating progress in achieving national suicide prevention targets (Department of Health, 1999, 2002).

Using data from the Oxford Monitoring System for Attempted Suicide we previously highlighted a substantial rise in DSH rates during the mid 1990s, especially in young males, and increases in self-poisoning with both paracetamol and antidepressants (Hawton *et al.* 1997). In this study we have used the same data source to examine trends in DSH during the 11 years 1990 to 2000 in order to determine whether these important changes have persisted and whether others have occurred.

In earlier studies DSH has been associated with certain sociodemographic characteristics, including being single or divorced (Platt *et al.* 1988), lower social class (Platt *et al.* 1988;

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Hawton *et al.* 2001*a*), and substance misuse (Murphy, 2000). We have investigated whether these associations have persisted. Suicidal behaviour is often linked to aggression (Nock & Marzuk, 2000) and we have investigated this specifically with regard to violence to others or being a victim of violence.

METHOD

Subjects

This study is based on all patients presenting to the general hospital in Oxford between 1990 and 2000 as a result of self-poisoning or self-injury. Such patients are identified through the Monitoring System maintained by the Centre for Suicide Research (Hawton *et al.* 1997). In the majority of DSH episodes a psychosocial assessment is conducted by a specially trained member of the psychiatric service in the hospital. The proportion of episodes in which an assessment took place was 75·3%. The annual proportion fluctuated, being at its highest in 1991 (86·1%) and at its lowest in 1995 (68·8%). In 2000 it was 73·0%. Details of the demographic and clinical characteristics are recorded by the clinical assessors on data sheets, which are then coded and the data entered into a computerized datafile. There is ongoing scrutiny of the computerized records of patients presenting to the Accident and Emergency Department to identify DSH patients not referred to the clinical service. This usually involves examination of case-notes. A limited amount of information is collected on such patients. This method of data collection has previously been shown to be reliable (Sellar *et al.* 1990*a*).

Self-poisoning is defined as the intentional self-administration of more than the prescribed dose of any drug, whether or not there is evidence that the act was intended to result in death. This also includes poisoning with non-ingestible substances and gas, overdoses of 'recreational drugs', and severe alcohol intoxication where the clinical staff consider these are cases of deliberate self-harm. Self-injury is defined as any injury which has been deliberately self-inflicted.

Calculation of rates

Calculation of rates is based on the number of DSH patients presenting to the general hospital from Oxford City and the mid-year population estimates for the city supplied by the Office for National Statistics, derived from 1991 Census data and other information (e.g. migration rates). The rest of the hospital catchment area is less well-defined and overlaps a little with areas served by other hospitals. Therefore, calculation of rates is based solely on presentations from the City. Age- and sex-specific rates per 100 000 population were calculated, using appropriate mid-year population estimates as the denominators. The rates were restricted to persons aged $\geqslant$15 years because of the relatively small numbers of DSH patients who are below the age of 15 years. Where a person was involved in multiple episodes in a calendar year and either moved into or away from the city during this period, they were included in the calculation of rates if half or more of the episodes occurred while they lived in the city.

In the calculation of person-based annual rates each individual was only included once in any one year. However, they were also included in calculations of rates for other individual years if they presented following further DSH episodes in those years.

Clinical variables

The total population of DSH patients referred to the hospital has been used in the analyses of findings with regard to demographic variables, methods of DSH and subsequent repetition of DSH. However, for some variables (e.g. problems faced by patients, previous DSH, psychiatric treatment, violence, etc.) the analyses are restricted to those patients who had a clinical assessment by the general hospital psychiatric service. Patients aged $\geqslant$55 years were more likely to be assessed than those in younger age groups. 'Problems' are defined as factors that were causing current distress for the patient and/or contributed to the episode of DSH. (It has not been possible to collect accurate information on psychiatric and personality disorders because of inconsistency in recording these.) 'Alcohol abuse' is defined as chronic alcoholism with physical symptoms, alcohol dependence, or excessive drinking. 'Violence' is defined as acts which either caused, or were likely to have caused, physical damage. For certain variables (e.g. living situation) where data for the whole study period were examined without subdivision by year, the analysis was restricted to each

Table 1. *Numbers of persons and episodes presenting to the general hospital following deliberate self-harm, by gender*, 1990–2000

	Males		Females		Both genders	
Year	Persons	Episodes	Persons	Episodes	Persons	Episodes
1990	331	411	480	551	811	962
1991	318	365	448	507	766	872
1992	302	359	500	586	802	945
1993	344	451	495	589	839	1040
1994	419	539	564	728	983	1267
1995	452	607	571	753	1023	1360
1996	446	549	630	805	1076	1354
1997	453	639	675	904	1128	1543
1998	436	592	669	921	1104	1513
1999	415	552	624	881	1039	1433
2000	428	614	677	955	1105	1569
1990–2000*	3512	5678	5078	8180	8590	13858

* 1990–2000 total persons, each individual is counted only once; for the annual persons figures, each individual may be included in the total for >1 year.

individual's first episode for which they were clinically assessed.

Repetition of DSH has been examined in terms of: (*a*) episodes : persons ratio; (*b*) previous DSH (irrespective of whether or not this resulted in hospital presentation) that occurred before the first episode during the study period or the first episode in any calendar year; and (*c*) repeat episodes of DSH resulting in re-presentation to the same hospital.

Statistical analysis

The data were analysed using SPSS version 9 (SPSS Inc., 1999) and EpiInfo (Dean *et al*. 1994). The analyses included calculation of relative risk, χ^2 and χ^2 for trend where trends were approximately linear. Where χ^2 for trend analyses were conducted these were based on raw data.

RESULTS

Study population

During the 11 year study period, 1990–2000, a total of 8590 individuals presented to the hospital following 13 858 DSH episodes (Table 1). Admission to a hospital bed occurred in 87·4% of episodes, a figure that varied little annually.

During the study period there was an increase in both the number of persons presenting per year (+36·3%; mean annual change +3·3% per year) and in the number of episodes (+63·1%; mean annual change +5·4% per year). The gender ratio (F : M) declined during the initial part of the study period, from 1·45 in 1990 to 1·26 in 1995, but thereafter rose back to 1·6 in 2000.

Rates of DSH

Small increases in person-based (⩾15 years) DSH rates for Oxford City were seen in males during the first 2 years of the study period and females during the first 3 years. Rates in both genders then rose quite steadily until 1997, following which there was a down-turn, especially in males (Fig. 1). There was a significant increase in rates in females (χ^2 for trend = 13·62, $P<0·001$), but no linear trend was observed among males (χ^2 for trend = 2·40, $P=0·12$). As with the raw data, the gender ratio of rates decreased during the initial part of the study period but subsequently increased again.

Rates in males (Fig. 2) increased for those aged ⩾55 years (χ^2 for trend = 16·19, $P<0·0001$). Because of the marked variation in rates in 15–24 year-olds during the study period the raw data were not subjected to trend analysis. There was, however, a clear increase in rates in this age group between 1992 and 1996, followed by a subsequent decline. Rates in 25–34 year-old males rose markedly in the first five years of the study period and then remained fairly steady. In females, there was a significant increase in rates in 15–24 year-olds (χ^2 for trend = 10·84, $P<0·001$) and 35–54 year-olds (χ^2 for trend = 6·03, $P<0·02$) (Fig. 2). There was no linear trend in rates among 25–34 and ⩾55 year-old females.

Marital status, social class and unemployment

Rates according to marital status were higher for both genders in the divorced and single (Table 2). Rates in both genders were also far higher in social classes IV and V compared with social classes I and II, but this difference was significantly greater in males than females. The relative risk of DSH was much greater in the unemployed than the employed for both genders.

Living situation

A large proportion of individuals assessed by the clinical service were living in the same household as other people, such as their spouse, partner, parents, siblings, children, or other relatives

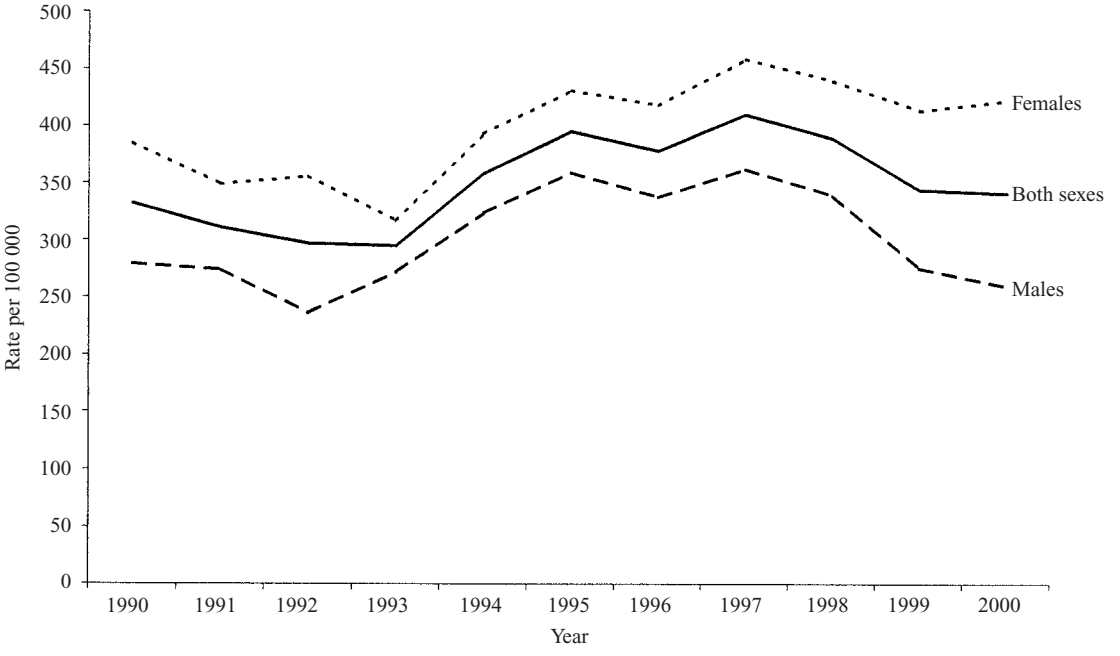

FIG. 1. Rates of DSH in Oxford City (aged ⩾15 years) 1990–2000.

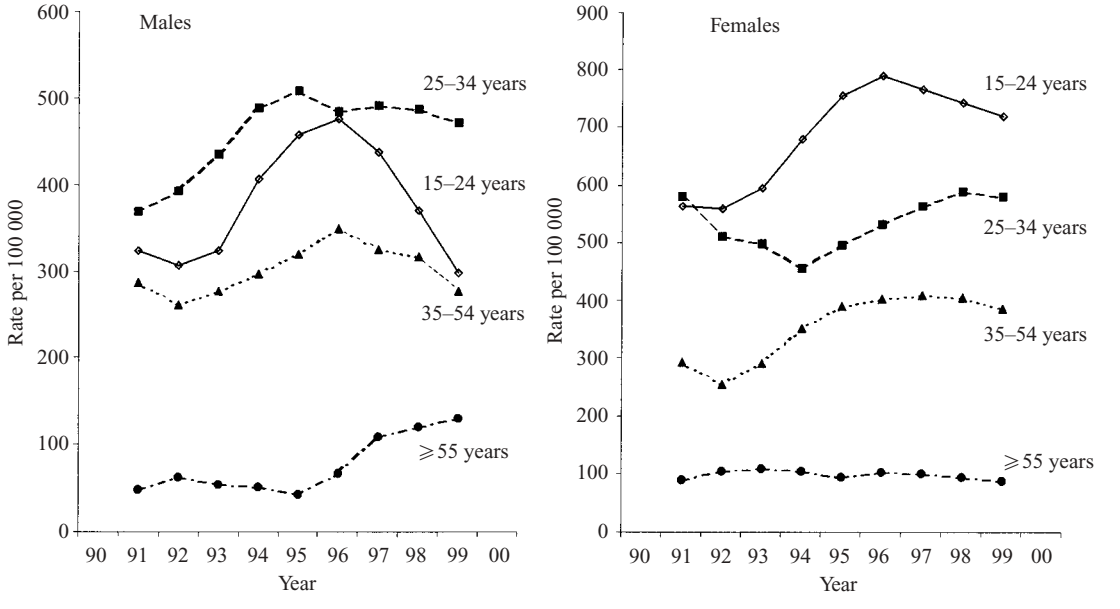

FIG. 2. DSH rates in Oxford City, by age groups, 1990–2000 (3 year moving averages).

(72·2%). This applied more to females (77·0%) than to males (64·9%; $\chi^2 = 137{\cdot}46$, $P < 0{\cdot}0001$), in part reflecting the generally younger age of females. Most of the remainder were living in lodgings/hostels, other institutions or alone (25·3%). This applied to more males (30·2%) than females (22·2%). In males, 5·0% were of no fixed abode, compared with 0·7% of females.

Table 2. *Risk of DSH by marital status, employment status and social class*

	Males			Females		
	Rate per 100 000	Relative risk	(95% CI)	Rate per 100 000	Relative risk	(95% CI)
Marital status						
Married	87	1·00		148	1·00	
Single	487	5·60	(4·8–6·5)	645	4·34	(3·9–4·9)
Widowed	150	1·73	(1·1–2·6)	126	0·85	(0·7–1·1)
Divorced	581	6·60	(5·5–8·2)	573	3·86	(3·3–4·6)
Employment status						
Employed	155	1·00		220	1·00	
Unemployed	1387	8·97	(8·0–10·1)	2181	9·92	(8·8–11·2)
Social class						
I+II	74	1·00		155	1·00	
III	640	4·60	(3·6–5·8)	438	2·82	(2·4–3·4)
IV+V	449	6·07	(4·8–7·7)	454	2·02	(2·4–3·6)

Repetition of DSH

There was a marked increase in repetition of DSH as indicated by the episodes : persons ratio, which rose from a mean annual figure of 1·17 in 1990–1992 to 1·39 in 1998–2000. This magnitude of increase was found in both genders. The annual rate of repetition based on re-presentation to the general hospital in Oxford within a year of a first episode in each calendar year also increased, from a mean of 14·4% for 1990–1992 to 21·4% for 1997–1999 (χ^2 for trend = 52·28, $P < 0{\cdot}00001$). A similar increase occurred in both genders. The increase in repetition was also reflected in an increase in the proportion of patients assessed by the clinical service who had a history of previous DSH. Thus, in 1998–2000 the mean annual figure was 58·3% compared with 47·8% in 1990–1992 (χ^2 for trend 25·63, $P < 0{\cdot}00001$). This size of increase occurred in both genders.

Methods used for DSH

During the study period 85·5% ($N = 11\,846$) of DSH episodes involved self-poisoning, 10·1% ($N = 1406$) self-injury and 4·4% ($N = 606$) both self-poisoning and self-injury. There were some changes in the proportion of self-poisoning episodes involving specific groups of substances (Fig. 3). The most noticeable change was an increase in the use of antidepressants (χ^2 for trend = 70·82, $P < 0{\cdot}00001$). Of 1008 antidepressant overdoses between 1998 and 2000, 39·7% ($N = 400$) involved tricyclics and 45·6% ($N = 460$) SSRIs. Between 1995 and 2000 the proportions of antidepressant overdoses involving tricyclics decreased from 58·9% to 33·5%, whereas SSRI overdoses increased from 29·5% to 50·4%. The proportion of overdoses involving paracetamol increased during the first two-thirds of the study period, from 42·0% in 1990 to 50·0% in 1997, and then declined, being 44·0% in 2000. There was a noticeable increase in the proportion of self-poisoning episodes involving minor tranquillizers during the last 3 years of the study period. Of the self-injuries during the whole study period, 73·3% involved self-cutting of the wrist or arm, 11·0% cutting of other parts of the body and 15·7% other methods of injury (e.g. attempted hanging, jumping from a height).

Alcohol consumption as part of DSH, while more common in males than females (31·9% of episodes *v.* 22·8%; $\chi^2 = 96{\cdot}4$, $P < 0{\cdot}0001$), increased during the study period in both males (from 27·8% in 1990–92 to 35·7% in 1998–2000; χ^2 for trend = 13·12, $P < 0{\cdot}001$) and females (from 18·0% to 27·4%; χ^2 for trend = 40·09, $P < 0{\cdot}0001$).

Problems preceding DSH

Relationship difficulties were by far the most common type of problem. These particularly included problems with partners (51·3%) and other family members (41·6%), the latter being more common in females than males. Other common problems were employment (32·3%), alcohol (24·9%) and finances (22·3%), all of

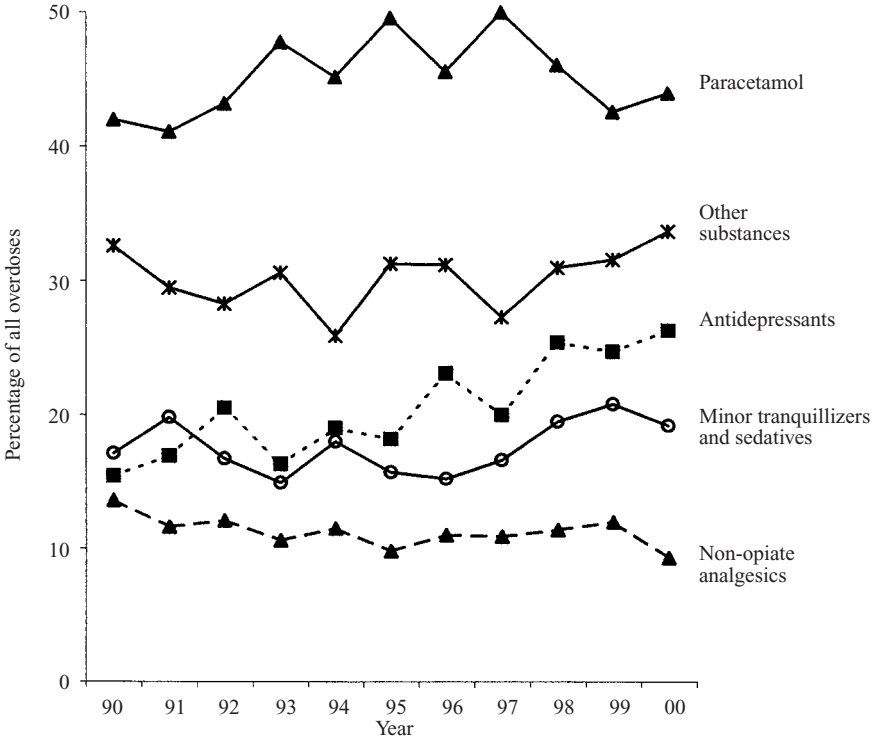

FIG. 3. Substances used in self-poisoning 1990–2000.

which were more common in males than females, and social isolation (19·4%).

Psychiatric treatment

The proportion of patients who were in psychiatric treatment at the time of their DSH episodes increased in both genders (χ^2 for trend = 19·14, $P < 0{\cdot}00001$), with a mean of 16·5% in the first 3 years of the study period and 21·9% in the final 3 years.

Substance misuse

There were increases in alcohol misuse and drug misuse over the study period. While the proportion of males with alcohol abuse remained stable, it increased in females (χ^2 for trend = 35·45, $P < 0{\cdot}00001$), with a mean of 22·1% in the first 3 years and 29·6% in the last 3 years. In keeping with this pattern, consumption of alcohol during the 6 hours before DSH rose only in females during the study period, from 36·5% in 1990–1992 to 45·3% in 1998–2000 (χ^2 for trend = 35·45, $P < 0{\cdot}00001$). In males, alcohol was consumed during the 6 hours before DSH in an average of 55·8% of episodes.

Drug misuse (data for 1993–2000), which was more common in males (23·7%) than females (9·5%; $\chi^2 = 219{\cdot}6$, $P < 0{\cdot}0001$), also increased somewhat. This trend occurred in both males (from 21·7% in 1993–1995 to 25·4% in 1998–2000; χ^2 for trend = 4·67, $P < 0{\cdot}05$) and females (from 7·8% to 11·3%; χ^2 for trend = 6·47, $P < 0{\cdot}05$).

Violence

Violence to others in the 5 years preceding DSH was far more common in males than females (22·9% *v.* 7·0%; $\chi^2 = 334{\cdot}0$, $P < 0{\cdot}0001$). There was a small increase in this in males during the study period, from 21·6% in 1990–1992 to 25·5% in 1998–2000 (χ^2 for trend = 5·39, $P < 0{\cdot}03$), with a more marked increase in females (from 5·9% to 9·8%; χ^2 for trend = 17·4, $P < 0{\cdot}0001$). Being a victim of violence in the five years preceding DSH was more frequent in females (20·3%) than males (11·4%; $\chi^2 = 79{\cdot}1$,

$P<0{\cdot}0001$), and also increased markedly in females during the study period, from 16·0% in 1990–1992 to 23·5% in 1998–2000 (χ^2 for trend = 22·9, $P<0{\cdot}00001$). There was a less marked increase in males, from 11·2% in 1990–1992 to 14·5% in 1998–2000 (χ^2 for trend = 5·39, $P<0{\cdot}03$).

DISCUSSION

The method of data collection in the Oxford Monitoring System for Attempted Suicide has for many years been consistent and comprehensive. Care is taken to identify all patients who present to the general hospital following DSH, irrespective of whether or not they are assessed by the general hospital psychiatric service (although information on some variables is only available for those who are assessed). The trends in Oxford also appear to be reasonably representative of those from elsewhere in the UK (Platt *et al*. 1988; Bialas *et al*. 1996), although it is clearly desirable that the findings reported here are verified in other centres. As most of the findings of this study were highly significant we have not subjected the results to correction for multiple testing.

Changes in rates of DSH

Following several years of fairly steady rates in Oxford City during the early part of the study period there was a marked increase between 1993 and 1997 followed by a decrease in 1998 to 2000. A more or less similar pattern was seen in both genders, but rates of DSH increased overall in females. However, the female-to-male ratio for episodes decreased to close to parity during the first half of the study period and then increased again. While overall rates in Oxford City were similar at the beginning and end of the study period the number of hospital presentations increased substantially. This was probably the result of the considerable population expansion in the district area outside the city.

The increase in rates of DSH in 15–24 year-old males during the later 1980s and 1990s, which we highlighted in a previous report (Hawton *et al*. 1997), showed some reversal in the second half of the 1990s. This is somewhat similar to the trends in suicide in this group over the same time period (Office for National Statistics, 1997–2000). There were, however, increasing DSH rates in 25–34 year-old males during the study period, raising the possibility of a cohort effect. This was also a time which witnessed a steady rise in suicides in this age group (Office for National Statistics, 1997–2000). A rise in DSH rates in males aged $\geqslant 55$ years was noted, especially in the last couple of years of the study period. This clearly warrants further monitoring. In females, the most noticeable trend was an increase in rates in 15–24 year-olds, which is of concern as this age group has the highest rates, despite the strong indication during the 1980s that rates in very young females were decreasing following the large increase seen during the late 1960s and 1970s (Kreitman & Schreiber, 1979; Platt *et al*. 1988; Sellar *et al*. 1990*b*). There was also an increase in rates in 35–54 year-old females.

Applying the Oxford rates to the population of England and Wales, we previously estimated on the basis of findings for 1995 that there were approximately 142 000 presentations to general hospitals per year (Hawton *et al*. 1997). The estimate for the end of the 1990s would be very similar.

Repetition of DSH

One of the most notable findings was a very marked rise in repetition of DSH, as indicated by the annual episodes-to-persons ratios, repetition within a year of episodes in each calendar year and the proportion of individuals with a history of previous episodes. While the reasons for this are unclear, it may reflect an increase in the extent of psychopathology within the DSH population (Haw *et al*. 2001). This would also have been in keeping with the increase in the proportion of patients in current psychiatric care at the time of DSH. It is an important trend, especially in view of the association between repetition of DSH and subsequent suicide (Sakinofsky, 2000).

Substances used for self-poisoning

Antidepressant overdoses nearly doubled in frequency during the study period. This reflects the increase in antidepressant prescribing (Townsend *et al*. 2001). By the end of the study period the proportion of antidepressant overdoses involving SSRIs was greater than that involving tricyclics. Self-poisoning with SSRI antidepressants is less dangerous than with tricyclics,

and involves lower hospital costs (Ramchandani *et al*. 2000).

Following the trend reported previously (Gunnell *et al*. 1997; Hawton *et al*. 1997), paracetamol self-poisoning continued to increase until 1997, but decreased in the latter part of the study period. In September 1998 legislation was introduced in the United Kingdom to reduce maximum pack sizes of paracetamol and salicylate preparations, although changes in pack sizes were already occurring in the months beforehand in anticipation of the legislation. The decrease in paracetamol overdoses might be a consequence of this legislation, although the main effect was intended to be a reduction in the size of overdoses and hence their danger, a strategy which appears to have had at least short-term success (Hawton *et al*. 2001*b*).

Patients' problems

The pattern of problems faced by patients at the time of DSH was similar to that found previously (Hawton *et al*. 1997). There is a relatively small but important subgroup of mainly male DSH patients who are of no fixed abode. This is a group that merits further attention as such patients are likely to be at particularly high risk of suicide (Cullum *et al*. 1995).

The marked increase among females of both alcohol abuse and use of alcohol before DSH may reflect increases in general population rates of drinking in females (Office for National Statistics, 2001). These trends and the increase in drug abuse by both genders may also be associated with the rise in the number of younger DSH patients during the study period. Whatever the reason, these findings are of concern because of the clear association between substance misuse and both suicide risk (Murphy, 2000) and repetition of DSH (Sakinofsky, 2000).

Violence and aggression are also strongly linked to suicidal behaviour (Nock & Marzuk, 2000) and their increase during the study period, especially in females, may also have implications for future risk.

Clinical management

The proportion of DSH patients who are admitted to the general hospital in Oxford, rather than being discharged directly from the Accident and Emergency Department, is higher than in most hospitals (Kapur *et al*. 1998; Bennewith *et al*. 2001) and this proportion showed only a small decrease during the study period. This pattern, which is partly due to the availability of a short-stay ward, clearly facilitates assessment by the general hospital service.

Conclusion

If the recent trends in Oxford reflect the pattern for the rest of the United Kingdom the twentieth century ended with a downturn in rates of DSH. There were, however, important different trends within gender- and age-specific subgroups. Also, there were rather more ominous trends regarding the clinical characteristics of the population suggesting an increase in severity of problems, as reflected in alcohol and drug misuse, violence and the proportion of patients in current psychiatric care. A marked rise in repetition of DSH also occurred. There may therefore be increasing challenges to clinical services in managing this important patient population effectively. This is of considerable relevance to achieving the aims of the National Suicide Prevention Strategy for England (Department of Health, 2002).

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