

The epidemiology and management of self-harm amongst adults in England

David Gunnell, Olive Bennewith, Tim J. Peters, Allan House and Keith Hawton

Abstract

Background Previous research into the epidemiology and management of self-harm has been largely based in centres with a special interest in this behaviour or focused on hospital admissions only. There are no national data on the characteristics and management of people presenting to hospital following self-harm.

Methods Data were collected from 8-week service audits carried out in a stratified random sample of 31 general hospitals in England.

Results 4033 episodes of self-harm resulting in presentation to Accident and Emergency Departments were identified. Overdose alone accounted for 79 per cent of episodes, 80 per cent of presentations were outside normal office hours (9am – 5pm, Monday to Friday) and the peak period of attendance was from 8pm to 2am. In only 56 per cent of episodes was a specialist psychosocial assessment conducted prior to discharge and less than half (46 per cent) led to admission to a hospital bed. Psychiatric admission occurred in 10 per cent. Episodes involving older subjects (>45 years) and those using methods other than laceration or overdose were the most likely to lead to assessment and admission.

Conclusions Non-fatal self-harm is one of the strongest predictors of suicide, yet nearly half of all hospital attendances in England following self-harm do not lead to a specialist assessment. Patterns of service provision should take account of the observation that most self-harm attendances occur outside normal working hours and those at greatest risk of repetition are the least likely to receive assessments.

Keywords: self-harm, suicide, service provision, epidemiology

Introduction

Self-harm (self-poisoning and self-injury) is one of the commonest reasons for emergency hospital attendance in England and Wales, with an estimated 140–150,000 hospital presentations each year.¹ Up to half of these presentations are for repeat episodes. Self-harm is important not only as a common cause for hospital admission, but also as one of the strongest predictors of suicide.² In the National Suicide Prevention Strategy for England those who self-harm have been identified as one of the key high-risk groups.³ Despite its importance, little is known about the occurrence and management of self-harm nationally.

Studies of its epidemiology have generally been confined to observations from single localities^{1,4} or restricted to hospital admissions.^{5,6} As only about half of self-harm patients are admitted to hospital,⁷ studies based on admitted patients alone will give a distorted picture of the epidemiology and management of this problem. Here we describe the characteristics and management of a nationally representative sample of self-harm episodes presenting to 31 hospitals in England in 2001–2002. The data were collected in a study designed to investigate variations in the hospital management of self-harm and their relation to repetition.⁸ In this paper our aim was to use the data to give a national picture of self-harm presentations and management.

Methods

Study centres

Following Multi-Centre Research Ethics Committee approval, a stratified random sample of 32 hospitals was selected from a list of all general hospitals in England providing an accident and emergency (A&E) service. Four hospitals were selected within each of the 8 former Health Regions in England from four strata reflecting above or below median estimated self-harm admission and readmission rates. We excluded hospitals from the sampling frame if the trusts they were part of had more than one, or no accident and emergency department.

All but one of the 32 hospitals initially approached agreed to take part. The hospital that declined to participate was replaced by another randomly selected hospital from within the appropriate

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stratum. Trust chief executives or service directors were asked to provide names of those involved with the provision of services for self-harm patients at the hospital. Arrangements for carrying out an 8-week audit were agreed with relevant staff members. Data from one participating hospital ($n=189$ episodes) are excluded from this analysis as they were provided in aggregate form using that hospital's detailed in-house audit. All analyses are therefore based on the remaining 31 hospitals.

Audit

A standard one-page audit form was completed for each episode of self-harm, amongst those aged 18 and over, presenting to the hospital's A&E department over a consecutive 8-week period. Forms were completed for all self-harm attendances whether they were for overdoses, self-laceration or 'other' methods. Audits were carried out between September 2001 and September 2002. The duration of the audit in one participating hospital was only six weeks.

Prior to the commencement of the audit, a discussion was held with the staff responsible for the audit to ensure that episodes of both self-injury and self-poisoning were included. These discussions were based on our definition of self-harm which was: "A deliberate non-fatal act whether physical, drug overdosage or poisoning, done in the knowledge that it was potentially harmful and in the case of drug overdose that the amount taken was excessive."⁹ The following categories of self-harm method were listed on the audit forms: (a) legal drugs; (b) illegal drugs/alcohol; (c) self-laceration; and (d) other. A space was left for additional information on the method used for those episodes of self-harm coded 'other'. Where illegal drugs/alcohol were selected alone the person who completed the form was contacted to elicit further information to ensure that the episode was not accidental. Episodes were included if the context indicated that self-harm was the intention even if this was not carried out, e.g. 'threatening to jump off flyover on to road beneath – persuaded to come to A&E by police.' Episodes were excluded if they involved punching walls or head injuries from head banging.

We collected the following information on each self-harm episode: patient age, sex, method of self-harm, date and time of patient arrival in A&E, whether they were admitted to a hospital bed, whether a psychosocial assessment was carried out (and if so, when and by whom), if they were in existing receipt of mental health services, whether they had previously self-harmed, and if any follow-up was arranged for the current episode. Each audit form contained our definition of a psychosocial assessment: "an interview carried out by a member of mental health staff who has been trained in the process, is usually of about 30 min duration, and covers the assessment of factors such as: the causes and degree of suicidal intent, current mental state and level of social support, psychiatric history, personal and social problems, future risk and need for follow-up." For those patients admitted to a psychiatric bed we assumed a psychosocial assessment had been carried out even if this was

not indicated on the audit form. The figures presented for psychiatric admissions include both new admissions following episodes in the community and readmissions of patients who were sent to an A&E department following an act of self-harm whilst they were a psychiatric inpatient, since we were unable to distinguish between the two.

Regular contact was kept with each hospital over the course of data collection and at the end of the 8-week period systematic searches, using hospitals' A&E attendance databases or registers, were carried out to identify episodes that were missed in the audit. Where individuals were identified as having been missed from the audit, forms were completed by trust staff using the subject's A&E, medical and mental health records. Similarly, these sources were used to obtain information where the audit forms had not been fully completed.

Data analyses

Statistical analyses were carried out using Stata software (version 8).¹⁰ To examine patterns of management we used logistic regression, adjusting p -values and confidence intervals to take account of clustering effects as our sample data were derived from 31 different hospital sites. For reasons of data protection we were unable to collect individual identifying information (name/date of birth). Consequently all the analyses were based on episodes rather than persons. Due to missing data on some items on the audit forms, the number of episodes included in each analysis varied.

Results

Hospital characteristics

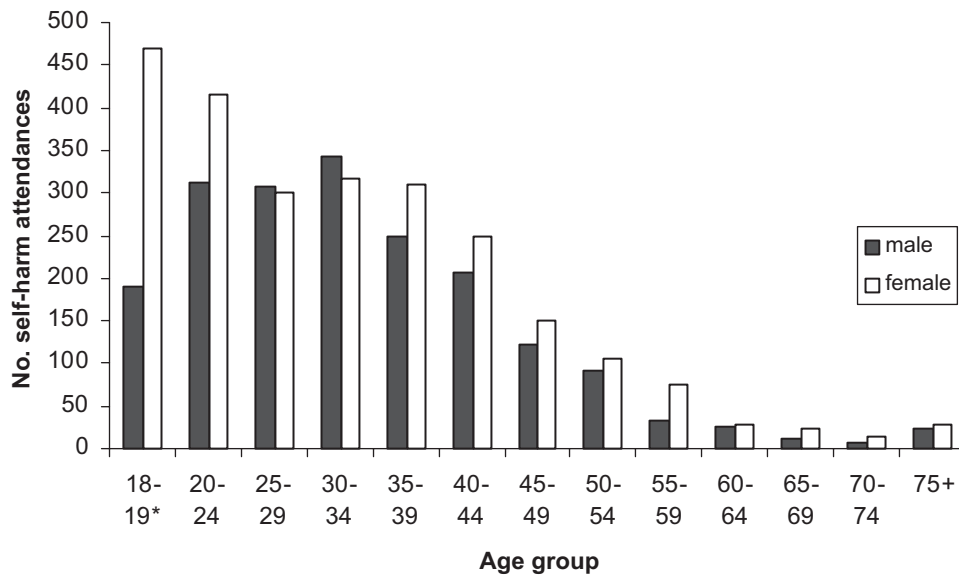
The hospitals included in our sample ranged in size from <250 to over 1000 acute beds and were based in areas with varying levels of socioeconomic deprivation (Townsend scores: -4.06 to 14.74). Over the 8-week audit the total number of self-harm attendances across the hospitals ranged from 64 to 268 (median 132).

Demographic characteristics of self-harm attendances

Information was obtained on 4033 episodes of self-harm; of these 1823 (45.2 per cent) involved men and 2,209 (54.8 per cent) women. In one case the sex of the subject was not known. The median age of the males was 33.0 (range 18–95) and females 33.0 (range 18–90). The age–sex distribution of the self-harm attendances is shown in Figure 1.

Methods of self-harm

The method used for self-harm was recorded for 4026 (99.8 per cent) of the episodes. Of these, 3198 (79.4 per cent) were overdoses, 457 (11.4 per cent) self-laceration, 193 (4.8 per cent) a combination of laceration and overdose and 178 (4.4 per cent) involved other methods. The most commonly used other methods were: poisoning using non-medicinal products (for example



* as the data for 18-19 year olds are for 2 years compared with 5 years for other age groups, numbers have been multiplied by 5/2 for purposes of comparison

Figure 1 Age and sex of self-harm attendances across the 32 hospitals.

bleach, weedkiller) ($n=30$); attempted hanging/self-strangulation ($n=27$); jumping ($n=22$); and carbon monoxide poisoning ($n=19$).

Timing of attendance

There was little variation in incidence according to the day of the week (Figure 2); although there was a small peak on Sunday for attendances by females ($n=346$; 16 per cent), the peak day for males was Monday ($n=284$; 16 per cent). There was a striking diurnal variation in the timing of attendance, with the highest number occurring between 8 pm and 2 am (Figure 3). These patterns were similar in males and females and on all days of the week. Indeed 39 per cent (1560/4020) of attendances occurred in this 6-hour period. Nearly 80 per cent (3208/4024; 79.7 per cent) of self-harm attendances occurred outside normal working hours (9 am to 5 pm, Monday to Friday).

Patterns of management

The main aspects of management are summarized in Table 1. A psychosocial assessment was conducted in just over half (2236/4007; 56 per cent) of the self-harm attendances on which information was recorded. Factors influencing the likelihood of an assessment being carried out are given in Table 2. The proportion of episodes assessed was similar in males and females, higher in older (>45 years) than younger (<45 years) individuals, and higher in those admitted to a hospital bed. People attending after an episode of self-laceration were least likely to be assessed (49 per cent), while those who used methods other than laceration or overdose were the most likely to receive an

assessment (66 per cent). Levels of assessment were slightly higher for episodes presenting between 9 am and 5 pm on Monday to Friday than out of hours.

Table 3 shows the professional background and grade of staff carrying out the psychosocial assessments. As information was often missing on who carried out the assessments for people referred for psychiatric admission the table excludes these episodes (10 per cent of episodes). Data from two hospitals were excluded from this analysis as this information was missing for over 10 per cent of assessments.

Under half (1837/4023; 46 per cent) of the self-harm episodes resulted in admission to a hospital bed and about one-tenth (405/3963; 10 per cent) resulted in an admission to a psychiatric inpatient unit. Levels of psychiatric inpatient admission were the same in females and males [10 versus 10 per cent; OR 1.07 (0.83 to 1.36); $p=0.61$] but were lower in younger (<45 years) than older (>45 years) subjects [9.4 versus 13.5 per cent; OR 0.67 (0.51 to 0.86); $p<0.01$]. Where methods of self-harm other than overdose or laceration were used, these were most likely to result in admission to a psychiatric bed [OR 3.57 (2.63 to 5.00); $p<0.01$]. For those episodes that did not result in admission to a hospital bed the median time between attendance in A&E and assessment was 3.9 h.

Just over a half (2109/3933; 54 per cent) of episodes resulted in some type of specialist mental health service follow-up being arranged. The proportions were similar in females and males [55 versus 52 per cent; OR 1.12 (0.96 to 1.31); $p=0.14$] but were lower in younger (<45) than older (>45) patients [52 versus 63 per cent; OR 0.63 (0.55 to 0.73); $p<0.01$]. Episodes where the patients had self-lacerated were more likely to result in follow-up

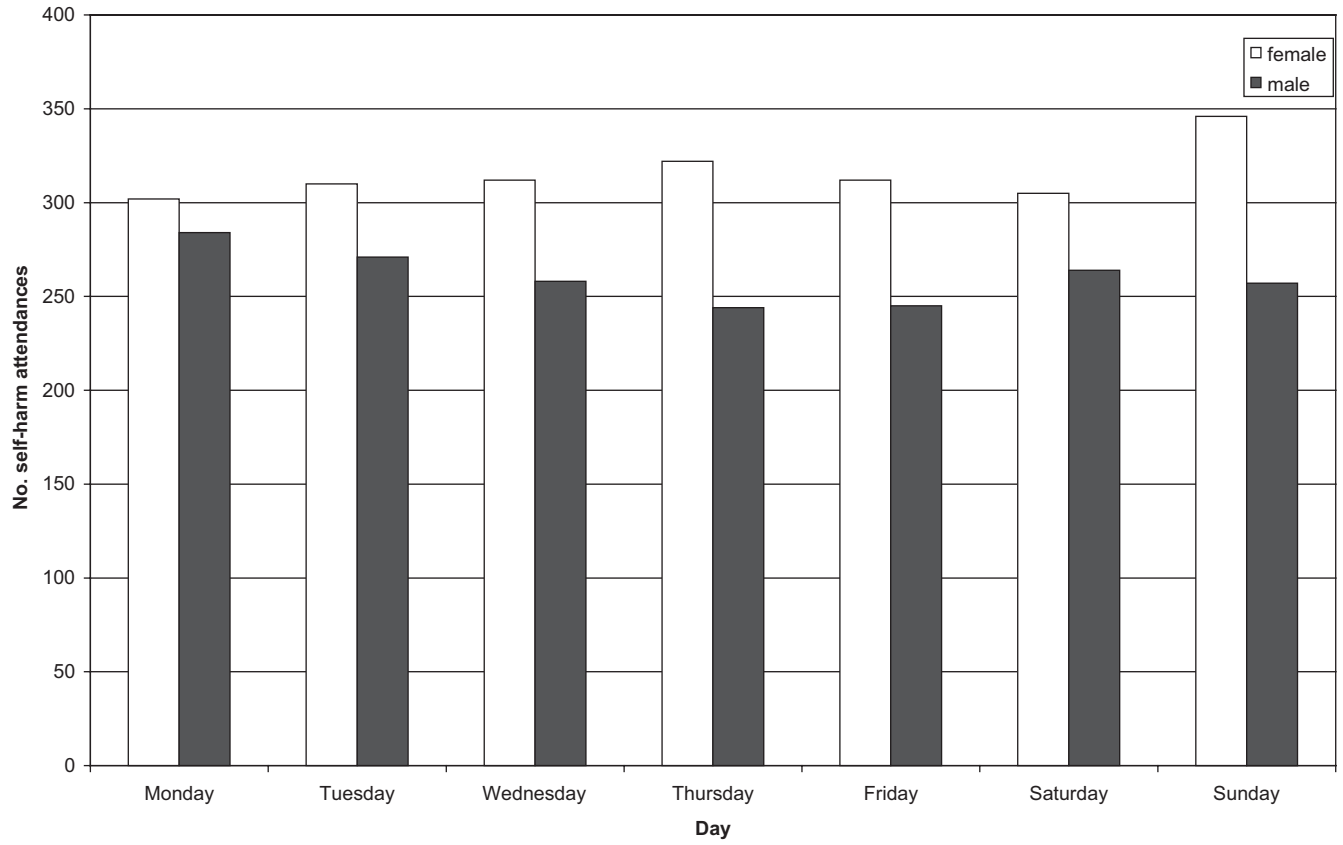


Figure 2 Day of A&E attendance across the 31 hospitals.

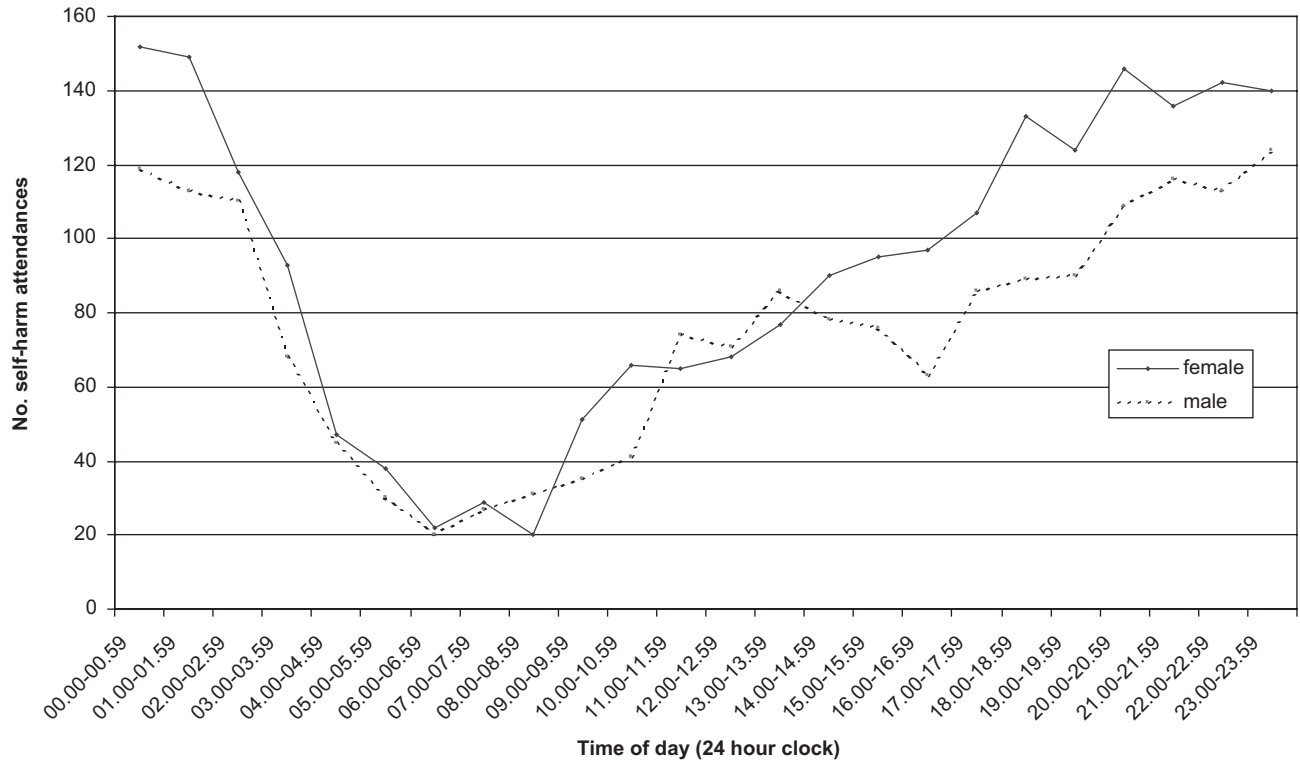


Figure 3 Number of self harm attendances in relation to time of presentation.

Table 1 Summary of main aspects of patient management

| Aspect of management | |
|---|-----------------|
| Proportion of episodes resulting in assessment | 56% (2236/4407) |
| Median time between attendance and assessment in episodes resulting in discharge from A&E | 3.9 h* |
| Proportion of episodes admitted to a hospital bed | 46% (1837/4023) |
| Proportion admitted to a psychiatric bed | 10% (405/3963) |
| Proportion offered specialist mental health follow-up | 54% (2109/3933) |

*Nine trusts were omitted from the analysis because of missing data on assessment time; those assessments where time to assessment was >24 h were also omitted since it was assumed these must have been follow-up appointments carried out after hospital discharge.

Table 2 Factors influencing the likelihood of a psychosocial assessment being carried out

| Factor | OR (95% CI) | p-value |
|---|---------------------|---------|
| Sex (females versus males) | 1.06 (0.92 to 1.23) | 0.40 |
| Age (<45 years versus ≥45 years) | 0.64 (0.55 to 0.75) | <0.01 |
| Admission to a hospital bed (admitted versus not admitted) | 9.09 (6.25 to 12.5) | <0.01 |
| Self-harm method (laceration versus all other methods) | 0.74 (0.56 to 0.98) | 0.04 |
| Time of attendance (9–5 Monday to Friday versus out of hours) | 1.33 (1.06 to 1.69) | 0.02 |

Table 3 Professional background and grade of staff undertaking psychosocial assessments

| Staff type (alone) | Number (%) of assessments* |
|--|----------------------------|
| Liaison/self-harm service nurse | 722 (41.8%) |
| SHO | 462 (26.7%) |
| Staff grade psychiatrist | 178 (10.3%) |
| Social worker | 102 (5.9%) |
| CPN | 52 (3.0%) |
| Other | 48 (2.8%) |
| Consultant psychiatrist | 22 (1.3%) |
| Clinical psychologist | 1 (0.1%) |
| Assessments carried out by >1 staff type | 141 (7.9%) |

*Because of missing data, figures given are for episodes where the patient was not admitted to a psychiatric hospital. Data for hospitals 24 and 32 were omitted from analyses as >10% of data on assessor were missing.

arrangements than those where the patient had taken an overdose [61 versus 52 per cent; OR 1.43 (1.07 to 1.89); $p < 0.01$].

Discussion

This is the first nationally representative study of patterns of self-harm attendance and subsequent specialist management in England. In a previous paper we have shown wide variation between hospitals in England in their management of self-harm.⁸

Nonetheless there are common themes that emerge from the national survey we report here; our findings about the nature of self-harm presentations and self-harm services are of relevance to all providers and commissioners of services.

The age- and sex-patterns of the episodes recorded in our study were similar to those reported in other UK-based studies of single centres.^{1,4} The ratio of male:female episodes was 1:1.2 and around 20 per cent of episodes were due to self-injury other than overdose alone. Nearly half of the attendances (44 per cent) in England following self-harm did not lead to a psychosocial assessment being carried out. Well over half of self-harm episodes presented to hospitals outside conventional office hours – the peak time of attendance was between 8 pm and 2 am.

Suicide prevention and the management of self-harm

Self-harm is one of the strongest predictors of suicide, with an estimated 30–40 per cent of those who die by suicide having harmed themselves in the previous year.² The Suicide Prevention Strategy for England has identified the management of self-harm in A&E Departments as one of the main areas for action in reducing the number of suicides.³ Our data show, however, that at present almost half (44%) of all self-harm attendances in A&E departments in England do not lead to psychosocial assessment. This finding is in keeping with levels of 46 per cent reported in a recent four-centre study of four teaching hospitals.⁷ Previous research from Oxford suggests that non-assessed patients tend to be those whose characteristics place them at greater risk of repeat self-harm.¹¹

Around a quarter of assessments were carried out by junior training grade doctors (senior house officers). Such assessments are more likely to be performed in trusts where there is no designated self-harm service,⁸ highlighting the need for specific development of such services in all trusts.

In keeping with other studies we found that those receiving assessments tended to be older¹² – a factor associated with a greater subsequent suicide risk¹³ – indicating that some degree of screening is occurring. However, assessment rates were no higher in males compared to females, whereas suicide risk following self-harm is two to three times higher in males.¹³ As recently reported in Leeds, we found that episodes of self-laceration were the least likely to have psychosocial assessments.¹⁴ An important priority, therefore, is to design services in such a way that a higher proportion of patients are assessed.

Patterns of self-harm attendance

The times when most self-harm patients attend A&E departments are outside of normal working hours – the peak times being between 8 pm and 2 am. Whilst a higher proportion of attendances between 9 am and 5 pm on Mondays to Fridays were assessed (61.4 versus 54.3 per cent) the difference is surprisingly small (7.1 per cent). This small difference is likely to reflect, at least in part, the fact that many individuals are unfit for immediate assessment upon arrival and the existence of arrangements to keep patients in hospital until an assessment has been conducted.

A recent Oxford-based study found that whereas 59 per cent of patients attending between 9 am and 5 pm received assessments, only 29 per cent attending outside these hours were assessed. Similarly, levels of assessment were higher amongst those attending on weekdays compared to weekends.¹¹ There is some evidence that patients who have a psychosocial assessment are at reduced risk of repeat self-harm despite having more risk factors for repetition,^{11,15} and in view of this it would seem important that service provision is designed in such a way as to maximize levels of assessment and ensure reasonable cover is available 24 h a day, 7 days a week.

Strengths

We used a nationally representative sample to investigate the epidemiology and management of self-harm in England. Previous assessments have been based either in single centres¹¹ or in single regions of the country.¹⁵ As only around half of self-harm attendances result in admission to hospital and rates of admission vary markedly from hospital to hospital, analysis of data from routinely available sources – such as Hospital Episode Statistics data which only reports on admissions – is of limited value in assessing the management of this condition. Our sampling strategy and high participation rate (97 per cent) avoids the possible selection biases in these smaller investigations. Such biases may be particularly important when using data collected from centres which take a special interest in the clinical management of self-harm as the services provided at such centres may be very different to that generally provided nationally. In addition, checks carried out in all centres in our study ensured that case ascertainment was as complete as possible for the 8-week audit.

Limitations

Since the data in this study were part of a larger investigation of adult self-harm services, we did not collect information on patterns of self-harm or management amongst people aged under 18 years. Service provision for young people has, however, been the subject of a recent investigation¹⁶ which found that less than half of 12–24-year-old self-harm patients had specialist assessments.

The audit forms used in our study were designed to be simple to complete, and we therefore did not collect detailed information on the socioeconomic circumstances or past medical history of patients. Whilst we did ask whether subjects had previously self-harmed there was a high level of missing data for this item. Furthermore, for data protection reasons, we did not collect patient identifiers and so were unable to identify repeat episodes of self-harm occurring within the 8-week study period. The lack of accurate catchment population data for each hospital meant we could not estimate rates of self-harm. Lastly, as we were unable to distinguish new admissions to psychiatric beds from those sent back to these beds following an in-patient self-harm episode; we will have over-estimated new admissions to these beds. Data from Leeds and

Oxford^{17,18} indicate that 30–50 per cent of post self-harm admissions to psychiatric units are simply re-admissions of people from such units who self-harmed whilst in-hospital. From the limited free text data collected on the audit forms in our study at least 17 per cent of the patients discharged to psychiatric hospitals in our study had self-harmed whilst on an inpatient unit.

Implications for services

Over the 8-week audit 4033 self-harm episodes occurred across the 31 trusts included in this analysis – an average of 2.3 episodes per trust per day. Because of these relatively low numbers many trusts do not have a 24-h service. Most attendances occur at night when they are more likely to be assessed by a junior on-call psychiatrist. Supervision and support for people carrying out these assessments may be lacking. Service planners need to acknowledge patterns of timing of self-harm presentation – having an office-hours only service is inadequate. One approach would be to ensure a nurse fully trained in carrying out assessments is present on all A&E shifts.

Despite the strong link between self-harm and suicide^{2,13} together with some evidence of a beneficial effect of assessments,¹⁵ it is concerning that only just over half of attendances received a psychosocial assessment. Recent self-harm guidelines developed by the National Institute for Clinical Excellence¹⁹ may provide impetus for change. However, tackling variability⁸ in service provision as well as identification of those aspects of service most beneficial to patient outcomes should be a priority for the National Suicide Prevention Strategy.³

Over 15 per cent of cases of self-harm involved self-injury, most commonly cutting. Much less is known about this problem than self-poisoning, and in keeping with other research we found that such patients are less likely to receive assessments,¹⁴ a greater proportion, however, were offered follow-up appointments. There is a need for specific staff training in this area as well as further research into its outcome and appropriate management.¹⁴

An important challenge for those responsible for providing services is that the peak times of hospital attendance by self-harm patients is late at night. Research is required to inform the development of those components of services that maximize levels of assessment and improve patient outcome.

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Declaration of interest

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References

- 1 Hawton K, Fagg J, Simkin S, Bale E, Bond A. Trends in deliberate self-harm in Oxford, 1985–1995. Implications for clinical services and the prevention of suicide. *Br J Psychiatry* 1997; **171**: 556–560.
- 2 Owens D, Horrocks J, House A. Fatal and non-fatal repetition of self-harm. Systematic review. *Br J Psychiatry* 2002; **181**: 193–199.
- 3 Department of Health *National suicide prevention strategy for England*. London: Department of Health, 2002.
- 4 McEvedy CJB. Trends in self-poisoning: admissions to a Central London Hospital, 1991–1994. *J Roy Soc Med* 1997; **90**: 496–498.
- 5 Wilkinson S, Taylor G, Templeton L, Mistral W, Salter E, Bennet P. Admissions to hospitals for deliberate self-harm in England 1995–2000: an analysis of Hospital Episode Statistics. *J Publ Hlth Med* 2002; **3**: 179–183.
- 6 Gunnell DJ, Brooks J, Peters TJ. Epidemiology and patterns of hospital use after parasuicide in the south west of England. *J Epidemiol Commun Hlth* 1996; **50**: 24–29.
- 7 Kapur N, House A, Creed F, Feldman E, Friedman T, Guthrie E. Management of deliberate self poisoning in adults in four teaching hospitals: descriptive study. *Br Med J* 1998; **316**: 831–832.
- 8 Bennewith O, Gunnell D, Peters TJ, Hawton K, House A. Variations in the hospital management of self-harm in adults in England: an observational study. *Br Med J* 2004; **328**: 1108–1109.
- 9 Morgan HG, Pocock H, Pottle S. The urban distribution of non-fatal deliberate self-harm. *Br J Psychiatry* 1975; **126**: 319–328.
- 10 Stata Corporation. *Intercooled Stata 7.0 for Windows*. Texas: Stata Corporation, 2001.
- 11 Hickey L, Hawton K, Fagg J, Weitzel H. Deliberate self-harm patients who leave the accident and emergency department without a psychiatric assessment: a neglected population at risk of suicide. *J Psychosom Res* 2001; **50**: 87–93.
- 12 Marriott R, Horrocks J, House A, Owens D. Assessment and management of self-harm in older adults attending accident and emergency: a comparative cross-sectional study. *Int J Geriatric Psychiatry* 2003; **18**: 645–652.
- 13 Hawton K, Zahl D, Weatherall R. Suicide following deliberate self-harm: long-term follow-up of patients who presented to a general hospital. *Br J Psychiatry* 2003; **182**: 537–542.
- 14 Horrocks J, Price S, House A, Owens D. Self-injury attendances in the accident and emergency department. *Br J Psychiatry* 2003; **183**: 34–39.
- 15 Kapur N, House A, Dodgson K, May C, Creed F. Effect of general hospital management on repeat episodes of deliberate self-poisoning: cohort study. *Br Med J* 2002; **325**: 866–867.
- 16 Hurry J, Storey P. Assessing young people who deliberately harm themselves. *Br J Psychiatry* 2000; **176**: 126–131.
- 17 Hawton K, Casey D, Hall S, Simkin S, Harriss L, Bale E *et al*. *Deliberate self-harm in Oxford 2001*. Oxford: The Centre For Suicide Research, Department of Psychiatry, University of Oxford, 2002.
- 18 Horrocks J, House A, Owens D. *Attendances in the Accident and Emergency Department following self-harm: a descriptive study*. University of Leeds, 2002, 2003.
- 19 National Institute for Clinical Excellence Clinical Guideline 16: Self-harm: the short term physical and psychological management and secondary prevention of self harm in primary and secondary care. NICE July 2004, London.