ONE YEAR OF DELIBERATE SELF-POISONING PRESENTATIONS AT A WEST LONDON EMERGENCY DEPARTMENT

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Fiona Wisniacki

ABSTRACT

Aim: To provide an up-to-date assessment of the demographics, patient characteristics and substances involved in deliberate self-poisoning (DSP) presentations to a UK emergency department (ED).

Method: A retrospective observational study was undertaken at Ealing Hospital ED between 1st August 2011 and 31st July 2012. Scanned ED records were reviewed to collect data from potential DSP presentations.

Results: 368 DSP presentations were identified, accounting for 0.9% of total ED attendances. The mean age was 34.2 years and the female : male ratio 1.85 : 1. All 12 patients under 16 years were female. 561 substances were used in total. Paracetamol was the most frequently used substance, taken by 150 (40.8%) patients (with the addition of compound analgesics). The next most frequent substances were NSAIDs (16.8% of patients), hypnotics and anxiolytics (15.2%), SSRIs (13.9%), compound analgesics (8.7%) and atypical antipsychotics (8.4%). 533 (95.0%) of the substances were medications listed in the BNF. Household cleaning products were the most common of five other groups. Specific treatments were administered to 77 (20.9%) patients. 122 (33.2%) patients required specialty admission.

Conclusion: DSP remains a common ED presentation and presents the challenge of managing both medical complications and psychiatric risks. Observational studies on DSP are an important source of information on trends in demographics and substances; this can inform future prevention strategies. A detailed assessment of DSP presentations is provided in this study. A national surveillance system or study is recommended to improve knowledge and a consensus on classification of substances would aid comparisons between studies.

KEYWORDS

Poisoning; deliberate self-poisoning; deliberate self-harm; toxicology

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INTRODUCTION

Deliberate self-poisoning (DSP) is a frequent presentation encountered at UK emergency departments (EDs) and has previously been shown to account for between 1.1% to 2.1% of ED attendances in UK studies. [1,2,3] Yearly hospital attendances have been estimated to be between 170 000 and 185 000 per year. [4,5] DSP is the most common type of deliberate self-harm; 85% of deliberate self-harm patients presenting to hospital in a multi-centre study had self-poisoned. [5] Patients require both medical and psychosocial assessments and management. In the UK, NICE guidelines recommend the use of TOXBASE to guide medical management following DSP. [6,7]

One in four patients dying as a result of suicide had been treated in hospital for self-harm in the preceding year [8] and in 2011 there were 6045 suicides in the UK. [9] Patients with a history of self-harm are identified as a high risk group for suicide and emergency departments play an important role in managing these patients with ensuring future follow up a key aim. [8]

Monitoring DSP presentations allows for the identification of high risk groups and types of substances used which can be managed by improving knowledge and education on management and prevention strategies such as legislation on paracetamol pack sizes in 1998 and the withdrawal of co-profamol between 2005-2008. [10,11]

This study aims to provide an up to date analysis of patient demographics, relevant additional information, substances involved, treatments and discharge destinations for patients presenting throughout a year to the ED at Ealing Hospital, a London district general hospital. Ealing is the 11th largest borough in London with a population of 338 449 which is 50.01% female. [12]

METHOD

A retrospective observational study was undertaken at Ealing Hospital ED over a period of one year between 1st August 2011 and 31st July 2012. Presentations due to DSP were indentified from the Symphony Ascribe system which requires mandatory coding of a provisional diagnosis for all ED presentations. The eAudit function was used to search for potential DSP presentations and the scanned ED records were reviewed to collect data.

Patients of all ages were included and no substances were excluded from the study. Presentations excluded were those with clear documentation of accidental or recreational ingestion and those presenting with suicidal ideation or deliberate self-harm but no episode of self-poisoning.

For each presentation the patient’s age, gender, presenting time, substances used, number of substances, presenting GCS, alcohol consumption, previous history of DSP, specific treatments administered in the ED and discharge destination were recorded. Data was collated on a Microsoft Excel spreadsheet for analysis. Medications were classified according to British National Formulary sections. [13] Analgesics were classified
differently with non opioid analgesics split into individual categories of paracetamol, NSAIDs (non steroidal anti-inflammatory drugs) and aspirin and compound analgesics (preparations containing a simple analgesic with an opioid component) [14] were also separate. This was done in order to reflect the high prevalence and different medical management required for these substances. Specific treatments were defined as activated charcoal, elimination techniques, antidotes and treatments for common or serious effects of substances (for example, the use of glucose to treat hypoglycaemia caused by insulin). Statistical analysis was performed with Chi-squared tests for comparisons of groups, calculated using GraphPad software.

RESULTS

Three hundred and sixty-eight presentations of DSP were identified from a total of 531 scanned ED records reviewed. Presentations were excluded because either no DSP had taken place or the use of the substance was clearly documented as being due to accidental or recreational intent. DSP presentations accounted for 0.9% of total ED attendances during the study period.

Figure 1 Age and gender of patients presenting following DSP.

The age and gender of patients presenting is shown in figure 1. The female : male ratio was 1.85 : 1. The mean age was 34.2 and median 30.0 years. The age distribution was skewed towards younger groups and this was much more marked for females. For the under 16 age group there were 12 female patients compared to no male patients. For the 16-20 years group the female to male ratio was 6.83 : 1, by the 31-35 age group the female : male ratio was 0.94 : 1. The peak age group for both genders was 21-25 years.
There were no patients in the 76-80 years group and three patients over the age of 80 years.

Presentation time to the ED is shown in figure 2. There was a trend for a gradual increase from the least frequent time of presentation at 0600 up until the period between 0000 and 0100 which was the most frequent with a subsequent decline in frequency. Two hundred and forty-eight (67.4%) presentations were outside of traditional 0900-1700 working hours.

Figure 2 The timing of presentation to the ED following DSP.

A total of 561 substances were used. The numbers of substances used are shown in figure 3, 244 (66.3%) patients used one substance and there was a range from one to five substances. The 20 most frequently used substances (or types of substance) are shown in table 1. Paracetamol was the most frequently used substance. Almost a third (118, 32.1%) used tablets with paracetamol as the single substance; with the addition of compound analgesics, the proportion of patients using paracetamol was 40.8% (150), which accounted for 26.7% of the total substances used. Other frequently used substances included non-steroidal anti inflammatory drugs (NSAIDs) (16.8% of patients), hypnotics and anxiolytics (15.2%), selective serotonin reuptake inhibitors (SSRIs) (13.9%), compound analgesics (8.7%) and atypical antipsychotics (8.4%). The substance used was unknown or unreported in two (0.5%) cases.
Figure 3 Number of substances taken by patients (n=368).

![Pie chart showing the number of substances taken by patients. One substance is taken by 66% of patients, two by 21%, three by 9%, four by 3%, and five by 1%.]

Table 1 The 20 most frequent substances used in DSP

<table>
<thead>
<tr>
<th>Substance</th>
<th>Number of patients using the substance</th>
<th>% of patients using the substance</th>
<th>% of total substances used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paracetamol</td>
<td>118</td>
<td>32.1</td>
<td>21.0</td>
</tr>
<tr>
<td>NSAIDs</td>
<td>62</td>
<td>16.8</td>
<td>11.1</td>
</tr>
<tr>
<td>Hypnotics &amp; Anxiolytics</td>
<td>56</td>
<td>15.2</td>
<td>10.0</td>
</tr>
<tr>
<td>SSRIs</td>
<td>51</td>
<td>13.9</td>
<td>9.1</td>
</tr>
<tr>
<td>Compound analgesics</td>
<td>32</td>
<td>8.7</td>
<td>5.7</td>
</tr>
<tr>
<td>Atypical antipsychotics</td>
<td>31</td>
<td>8.4</td>
<td>5.5</td>
</tr>
<tr>
<td>Antiepileptics / Antimanics</td>
<td>22</td>
<td>6.0</td>
<td>3.9</td>
</tr>
<tr>
<td>Sedating antihistamines</td>
<td>17</td>
<td>4.6</td>
<td>3.0</td>
</tr>
<tr>
<td>Aspirin</td>
<td>15</td>
<td>4.1</td>
<td>2.7</td>
</tr>
<tr>
<td>Codeine</td>
<td>15</td>
<td>4.1</td>
<td>2.7</td>
</tr>
<tr>
<td>Other antidepressants</td>
<td>14</td>
<td>3.8</td>
<td>2.5</td>
</tr>
<tr>
<td>Tricyclic antidepressants</td>
<td>14</td>
<td>3.8</td>
<td>2.5</td>
</tr>
<tr>
<td>Antibiotics</td>
<td>12</td>
<td>3.3</td>
<td>2.1</td>
</tr>
<tr>
<td>Vitamins &amp; Minerals</td>
<td>11</td>
<td>3.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Household cleaning products</td>
<td>10</td>
<td>2.7</td>
<td>1.8</td>
</tr>
<tr>
<td>Tramadol</td>
<td>10</td>
<td>2.7</td>
<td>1.8</td>
</tr>
<tr>
<td>Recreational / Illicit drugs</td>
<td>8</td>
<td>2.2</td>
<td>1.4</td>
</tr>
<tr>
<td>Oral antidiabetic drugs</td>
<td>7</td>
<td>1.9</td>
<td>1.2</td>
</tr>
<tr>
<td>Beta-blockers</td>
<td>6</td>
<td>1.6</td>
<td>1.1</td>
</tr>
<tr>
<td>Non-sedating antihistamines</td>
<td>6</td>
<td>1.6</td>
<td>1.1</td>
</tr>
</tbody>
</table>

Note: Use of multiple substances by some patients is the reason for the difference between the percentage of patients using the substance and the percentage of total substances used.
Five hundred and thirty-three (95.0%) of the substances used are medications listed in the BNF. There were five other groups of substances. Household cleaning products were used by 10 (2.7%) patients, with bleach the most common substance within the group, accounting for 60%. Recreational drugs were used by eight (2.2%) patients, and IV heroin was used in 75% of these cases. Other groups were herbal medicines in four (1.1%) cases and personal hygiene products and pesticides by two (0.5%) patients.

Alcohol was documented to have been consumed either during or prior to DSP in 129 (35.1%) cases. A history of previous DSP was documented in 144 (39.1%) cases. 52 (14.1%) patients presented with a GCS of less than fifteen and of those, 11 (3.0%) had a GCS of less than eight.

The vast majority (548, 98.0%) of substances were taken orally. There were six (1.1%) cases of intravenous injection, all of which were heroin and five (0.9%) cases of subcutaneous injection, all insulin. There were no incidences of inhalation or other methods of poisoning.

Seventy-seven (20.9%) patients required specific treatments which are shown in table 2. Activated charcoal was administered to 17 (4.6%) patients and no patients were treated with gastric lavage, haemofiltration or other elimination techniques in the ED. Regarding antidotes, 39 (10.6%) patients were treated with N-acetylcysteine; this accounted for 26% of those that had ingested paracetamol. Sixteen (4.35%) patients were given naloxone (which was 23.5% of patients using any type of opioid). Other treatments included IV glucose, vitamin K, flumazenil and glucagon.

### Table 2 Treatments administered in the ED following DSP.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Number of patients (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activated charcoal</td>
<td>17 (4.6%)</td>
</tr>
<tr>
<td>N-acetylcysteine</td>
<td>39 (10.6%)</td>
</tr>
<tr>
<td>Naloxone</td>
<td>16 (4.4%)</td>
</tr>
<tr>
<td>IV glucose</td>
<td>5 (1.4%)</td>
</tr>
<tr>
<td>Vitamin K</td>
<td>2 (0.5%)</td>
</tr>
<tr>
<td>Flumazenil</td>
<td>1 (0.3%)</td>
</tr>
<tr>
<td>Glucagon</td>
<td>1 (0.3%)</td>
</tr>
</tbody>
</table>

Regarding disposition from the ED, 246 (66.8%) patients were discharged directly from the ED (many after a period of observation) following psychiatric review and once medically well. 87 (23.6%) were admitted under medicine, 12 (3.3%) to paediatrics, eight (2.2%) to intensive care and 15 (4.1%) to inpatient psychiatry. One (0.3%) patient died during hospital admission and this was following admission to the intensive care unit.

For patients admitted to intensive care, six out of eight used a single substance. Two patients used an atypical antipsychotic and the others each used IV heroin, codeine, a benzodiazepine and methadone. The two patients
using multiple substances used a combination of SSRIs, TCAs, atypical antipsychotics and sedating antihistamines.

In comparison between males and females there was no significant difference between single and multiple ingestion (66% single ingestion vs 66% multiple ingestion, p = 0.969). Men were more likely to have had alcohol (42.6% vs 32.9%, p = 0.034), present with reduced conscious level, defined as GCS <15 (12.8% vs 10.0%, p = 0.004) and be admitted to intensive care (4.7% vs 0.8%, p = 0.043). The difference between admissions to medicine (28.6% vs. 20.9%, p = 0.122) was not statistically significant. There was no significant difference between activated charcoal (3.1% vs 5.4%) but significantly more men required other specific treatments (20.9% vs 15.5%, p = 0.006).

There were no statistically significant differences between the use of alcohol or documented previously history of DSP and medical admission, ITU admission or treatments required.

**DISCUSSION**

Deliberate self-poisoning is a common presentation to EDs and in this study accounted for 0.9% of all ED attendances. This figure was slightly lower than other recent UK studies with a range from 1.1% to 2.1% [1,2,3]. DSP has previously been demonstrated to be more common in females but the overall female : male ratio of 1.85 : 1 in this study was higher than those in previously published UK studies on DSP which found ratios of between 1.2 : 1 and 1.6 : 1. [1,2,3,15] The gender difference was most marked in patients younger than 20 years and notably all 12 patients under the age of 16 years were female. NICE guidelines make a number of specialist recommendations for managing those under 16 presenting following self-harm which includes admission under the paediatric team and assessment by professionals with specialist training in managing children following deliberate self harm; all of those under 16 in this study were admitted under paediatrics. [6]

A possible explanation for the higher proportion of female patients may be related to ethnic origin. Ealing has a large Asian community, accounting for 29.7% of the population. [12] Previous studies on deliberate self-harm have suggested an increased rates in Asian women, including a West London study which showed that Asian women were 1.6 times more likely to present to hospital following attempted suicide compared to white women and for Asian women under 30 the rates were 2.5 times those of white women and 7 times those of Asian men. [16,17] It has been recommended that assessment of suicide risk in Asian patients should also include assessment of social or cultural alienation, less traditional thinking and family expectations. [18]

There was a mean age of 34.2 and the peak age group for both genders was 21 to 25 years demonstrating that DSP is a predominantly a problem of young adults. Despite the declining frequency in DSP presentations with age there was a notable slight increase in the number of patients over the age of 85.
years, albeit involving very small numbers. This has not previously been described and may be of significance in managing elderly patients; a group which are already considered to be high risk. [6]

Paracetamol was the most common substance used in DSP both as a single substance and in combination with other medications. This is in keeping with other recent UK studies on DSP. [1,2,3,5,19] Just over a quarter of these patients required treatment with antidote N-acetylcysteine. A recent study demonstrated that legislation to restrict paracetamol pack sizes has resulted in significant reduction in deaths and registrations for liver transplant due to paracetamol overdose. [10] The authors note however, there remains a significant morbidity and mortality from paracetamol overdose. This study has shown that a considerable proportion of patients are requiring treatment and therefore have taken dangerous doses. The study was conducted before the changes to paracetamol overdose management, including the change to a single treatment line on the normogram, were introduced in September 2012.

Comparison of substances between studies is difficult due to the differing classifications used by each study. However, the majority of the most common substances used are similar to those in other recent studies with the most common being paracetamol, NSAIDs, SSRIs and benzodiazepines. One of the most striking differences was a higher frequency of atypical antipsychotics which in this study were used by 8.4% of patients and accounted for 5.5% of total substances. This is compared to the 2.8% of total substances found by Cook et al in 2008 [2] and there was no mention of atypical antipsychotics in the most common substances found by Prescott et al in 2009. [3] Atypical anti-psychotics are now the first line treatment for schizophrenia and other causes of psychosis and in overdose commonly cause pronounced sedation and cardiovascular side effects and other rarer effects such as neuroleptic malignant syndrome. [20] Although this study did not directly assess outcome, three out of the eight patients admitted to intensive care had taken atypical antipsychotics, and therefore the demonstrated apparent increase in use of these drugs in DSP should be a cause for concern.

Compared to TOXBASE searches performed nationally the top 10 substances were broadly similar, with paracetamol and ibuprofen being the most common and the differences being sedating antihistamines and atypical antipsychotics being more frequent in this study and tramadol higher on TOXBASE searches. However, the use of the search figures is significantly limited as many will have been related to accidental exposure, therapeutic errors and other reasons rather than self-poisoning. For NPIS telephone enquiries only 24% involved intentional poisoning. [21]

Despite the large range of substances which are taken in DSP, the top 10 substances account for 75% of total substances. This is important for teaching junior doctors in the ED because teaching sessions covering these top 10 substances will allow junior doctors to be familiar with the management of most of the substances they will encounter.
The vast majority of substances used were medications. However, 7.6% of patients used substances not listed in the BNF. Studies in developed countries where medications are by far the most common substances used [22] often neglect this other area and in some cases it is not clear if non-medication substances have been included. In this study household cleaning products were the 15th most frequent substance used for deliberate self-poisoning, of these the most common substance was bleach. Herbal medicines, recreational drugs, pesticides and personal hygiene products were also used by patients. It is important that these other substances are included in surveillance studies on DSP so increasing use of certain substances can be acted upon such as consumer restrictions, chemical alterations or safety mechanisms.

Consumption of alcohol during or prior to use of substances in DSP was documented in 35.1% of cases. The actual figure is likely to be higher as this relied on both patient reporting and documentation by medical staff. Hawton et al (2007) found an even higher rate of involvement of alcohol at 54.9%, but this was for all types of deliberate self-harm. Patients presenting following consumption of excess alcohol should be targeted for brief intervention by alcohol specialist services; at Ealing Hospital patients are either reviewed at the time of presentation by an alcohol specialist nurse during working hours or referred to specialist clinics within a few days when presenting out of hours.

39.1% of patients were documented to have a previous history of DSP. ED attendance following self-harm is strongly associated with suicide, particularly within the first 6 months. [23] Many patients use the same method of previous self-harm to complete suicide; a Swedish study found 61% of those presenting previously following DSP and completing suicide, used the same method. [24] Early and effective interventions for these patients are therefore vital to reduce rates of suicide and repeat DSP. At Ealing there is a psychiatric liaison nurse specialist on site in the ED 24 hours a day available to assess and support patients presenting following self-harm.

One third of patients required admission to a speciality from the ED and 20.9% required treatment with activated charcoal, antidotes or other specific medications. Mortality for patients presenting following DSP was low with one death (0.3%) which is consistent with previous DSP studies. Despite the low mortality rate, as discussed above, this group of patients remains a significant risk for future suicide.

Single centre studies on DSP remain an important source of information for demographic and specific substance trends. High risk groups can be identified and therefore targeted for intervention; for example, in this study a higher proportion of female and in particular young females were found to present following DSP. Recognising specific substance trends can lead to increased awareness of potential effects, identifying substances to teach staff about and prevention strategies (such as reducing paracetamol pack size and the change in prescribing practice for SSRIs to be recommended as first line antidepressants in part due to their relative safety in overdose). [10,25]
Considering the high number of presentations, frequent re-attendance and high associated risk of future suicide there have been relatively few studies on deliberate self-poisoning presentations. There have been very few multicentre studies. [5] The University of Oxford Centre for Suicide Research provide an important yearly overview in DSP trends with statistics dating back to 1976, [26] but this is only relates to one centre.

A national surveillance system is recommended which would provide up to date information on demographics, risk factors and substances used. A system in the style of the College of Emergency Medicine audits; data collected on 50 consecutive cases from each ED would be a potential method to collect this information. This would allow for early identification of new trends, monitoring and comparison between departments on areas such as the proportion of patients receiving an appropriate psychiatric risk assessment and follow up plan. For future studies or surveillance systems it would be useful for there to be a consensus on classification of substances because currently each study uses a different method, making comparisons and assessment of trends difficult.

LIMITATIONS

The study was retrospective and relied on accurate completion of ED notes. There was a heavy reliance on patient reporting of substances and other details. Despite compulsory coding of presentations by ED medical staff there is a possibility that some cases of DSP may have been missed if this was incorrect. The study was at one centre only and therefore apparent differences observed compared to previous studies may be due to local or study design differences rather than an observation of a new national trend. Finally, the difference in classification of substances between studies on DSP complicated comparisons.

REFERENCES
[27]British National Formulary Committee. Section 4.3. Antidepressant drugs. British