

A multicentre programme of clinical and public health research in support of the *National Suicide Prevention Strategy for England*

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Disclaimer: This report contains transcripts of interviews, and similar, conducted in the course of the research and contains language which may offend some readers.

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Scientific summary

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Scientific summary

Background

Suicide and non-fatal self-harm are major, potentially preventable causes of premature mortality and morbidity accounting for >4000 deaths and 200,000 hospital presentations every year in England. The Department of Health's *National Suicide Prevention Strategy for England* (2002) aimed to reduce these outcomes.

Rationale and objectives

Our overall aim was to carry out a programme of linked research studies to provide evidence to improve the management of self-harm, reduce the incidence of suicide and assess the reliability of the suicide mortality statistics used to monitor the impact of the prevention strategy. The rationale and objectives for each of our research streams are outlined in the following sections.

1. Suicide statistics

In the UK, official suicide statistics may be affected by variations in coroners' classifications of deaths as suicide. Coroners may give possible suicides one of four verdicts: suicide, open (given if insufficient evidence to determine suicidal intent), accidental/misadventure (given to a death resulting from actions of the deceased or others that have unintended consequences) or narrative (records in several sentences how, and in what circumstances, the death occurred). The objective of our first work stream was to quantify the extent to which suicide rates, secular trends in suicide, and suicides from co-proxamol, paracetamol (acetaminophen) and tricyclic antidepressant (TCA) poisoning may have been over- or underestimated when based on deaths given suicide or open verdicts by coroners.

2. Medicines commonly taken in fatal overdoses

In the 1990s, overdoses of paracetamol, co-proxamol and dosulepin accounted for approximately 10% of all suicides in England. Consequently, legislation to limit the size of paracetamol packs was introduced in 1998, and co-proxamol was withdrawn in the UK between 2005 and 2007. In this work stream we investigated (a) the long-term impact of the 1998 legislation restricting pack sizes of paracetamol; (b) whether or not the current limit on sales of paracetamol is appropriate and being adhered to; (c) the impact of differing paracetamol regulations in the UK and Ireland; (d) whether or not any increased use of alternative non-steroidal anti-inflammatory drugs (NSAIDs) had led to increased rates of gastrointestinal (GI) haemorrhage; (e) the impact of the withdrawal of co-proxamol on suicide and self-harm in the UK; and (f) the relative toxicity of specific antidepressants.

3. Assessment and management of people who self-harm

The NHS's response to self-harm may be crucial in preventing repeat episodes and ultimately suicide. However, uncertainty as to the most appropriate management of self-harm patients has led to wide variations between hospitals. The objectives of this work stream were to investigate variations in management between hospitals and to determine whether or not the management of self-harm influenced patient outcome, as indicated by self-harm repetition.

4. Trials of interventions to reduce self-harm in high-risk clinical populations

There is a lack of high-quality evidence concerning clinical interventions to reduce suicide rates in two key high-risk groups: patients who have self-harmed and people discharged from psychiatric hospitals. Trials of contact-based (e.g. mail, telephone) interventions have shown some promise. Our objective in this work package was to develop and pilot contact-based interventions aimed at reducing self-harm.

Methods

1. Suicide statistics

We studied inquest records from 12 coroners' jurisdictions in England for deaths that had occurred in 1990–1, 1998, 2005 and, for some methods, also 2006 and 2007. Three researchers rated each case of possible suicide (those given open, narrative or accident/misadventure verdicts by coroners) as being of high, moderate, low or unclear likelihood of suicide. Time trends in the use of different verdicts for these researcher-defined suicides were investigated. We compared researcher-defined suicides for 1998 and 2005 with the way that the Office for National Statistics (ONS) coded these deaths. We specifically investigated verdicts given to deaths from co-proxamol, paracetamol and TCA poisoning. Ministry of Justice data on inquests held between 2008 and 2009 and local authority suicide data (2001–2 and 2008–9) were used to investigate variations between coroners in their use of narrative verdicts and the impact of these on suicide rates, using 'other' verdicts (79% of which are narrative verdicts) as a proxy for narrative verdicts.

2. Medicines commonly taken in fatal overdoses

Paracetamol

We assessed the effects on overdoses of the 1998 legislation limiting pack sizes of paracetamol in four ways:

1. *Poisoning deaths and liver transplants.* To determine the long-term impact of the paracetamol legislation we examined ONS paracetamol mortality data for England and Wales (1993–2009), and liver unit registrations for transplantation and actual liver transplants for paracetamol-induced liver failure in England and Wales between 1995 and 2009 (data from NHS Blood and Transplant). Trends in the data were compared for the period before and the period after the introduction of the legislation.
2. *Patient interview study.* To determine the characteristics of people who take paracetamol in overdose and to examine adherence to paracetamol sales guidelines, we interviewed 60 patients who presented to an Oxford (UK) hospital after taking an overdose of > 16 tablets of paracetamol. We asked about the circumstances of the overdose, the source of the tablets, whether or not they had tried to buy more than the recommended amount and the expected effects of the overdose.
3. *Pack size and size of overdose.* To determine whether or not smaller pack sizes sold in Ireland compared with those sold in England have resulted in a smaller number of tablets being taken in non-fatal overdoses in Ireland, we compared hospital presentations to six hospitals in England for non-fatal self-harm using paracetamol with data from Ireland's National Registry of Deliberate Self Harm for the period 2003–7.
4. *NSAIDs and GI haemorrhage.* To assess whether or not legislation restricting pack sizes of paracetamol resulted in increased use of NSAIDs and a consequent increase in GI symptoms, we examined UK prescription data for analgesics and antiulcerants (used to combat GI irritation) and English hospital admission data for GI bleeds for a period before (1994–8) and a period after (1999–2004) the introduction of the legislation.

Co-proxamol

We examined ONS data on drug-poisoning deaths and national prescribing data for analgesics from England and Wales from three time periods: preceding co-proxamol withdrawal (1998–2004), during its phased withdrawal (2005–7) and following completed withdrawal (2008–10). Trends in drug-poisoning deaths over these three periods were examined, as were the associations between reduced prescribing of co-proxamol and prescribing of alternative analgesics.

Antidepressants

We examined the relative toxicity of TCAs, selective serotonin reuptake inhibitors (SSRIs), venlafaxine (a serotonin–noradrenaline reuptake inhibitor) and mirtazapine (a noradrenergic and specific serotonergic antidepressant). We calculated, using national data, each drug's fatal toxicity index (mortality rate from self-poisoning with the drug/prescription rate) and case fatality index (mortality rate from self-poisoning with the drug/non-fatal self-poisoning rate), and assessed their relative toxicity compared with amitriptyline (a TCA).

3. Assessment and management of people who self-harm

Over a 3-month period we collected patient and in-hospital management data from 32 hospitals in England related to presenting episodes of self-harm. Re-presentations for self-harm within 6 months were also recorded. Key mental health and emergency department staff were interviewed regarding current service structures for self-harm management and a standard measure of service quality was calculated. Data were examined for relationships between provision of aspects of self-harm management and repetition of self-harm. Using data collected in a previous study (2001–2), we also examined the changes in self-harm management that had occurred over time.

4. Trials of interventions to reduce self-harm in high-risk clinical populations

We carried out two pilot studies to assess the feasibility of conducting full randomised trials of a series of letters sent to patients over a 12-month period following (a) presentation to hospital for self-harm and (b) psychiatric hospital discharge from three different inpatient units. Both interventions also included provision of a leaflet listing local sources of help. The letters (eight in Bristol and six in Manchester) expressed concern and encouraged service engagement. The Manchester intervention also included two follow-up calls to patients in the 2 weeks following discharge. These interventions were developed in consultation with service users and hospital staff using questionnaires, interviews and focus groups.

Key findings

1. Suicide statistics

- We reviewed 2086 inquest records. Between 1990 and 2005, the proportion of researcher-defined suicides with a coroner's suicide verdict decreased by almost 7% (from 72.0% in 1991 to 65.4% in 2005), largely because of an increase in researcher-defined suicides given misadventure/accident verdicts by coroners [from 4.6% to 9.1%, $p(\text{trend})=0.001$]. Half of the medicine poisoning deaths given accidental verdicts at inquest were researcher-defined suicides.
- The numbers of suicides by co-proxamol, paracetamol and TCA poisoning are underestimated by between 12% (co-proxamol) and 26% (paracetamol) when estimates are based on suicide and open verdict deaths alone.
- There was a marked rise in the number of narrative verdicts and wide geographical variation in their use.
- Coroners who gave more narrative verdicts also gave fewer suicide verdicts. In the 10 coroners' areas with the highest proportion of narrative verdicts the official incidence of suicide decreased by 16% between 2001–2 and 2008–9, but in those coroners' areas where narrative verdicts were used least frequently the official incidence of suicide increased by 1%.

2. Medicines commonly taken in fatal overdoses

Paracetamol

- There were significant reductions in suicide deaths from paracetamol overdose [estimated average = –17 suicide deaths per quarter, 95% confidence interval (CI) –25 to –9 suicide deaths per quarter] during the 11 years following the legislation, equating to approximately 765 fewer deaths (–43%). There were an estimated 990 fewer deaths when accidents were included.
- Registrations for liver transplantation for paracetamol-induced hepatotoxicity were reduced by 10.7 per quarter during the 11 years following the legislation (95% CI –20 to –1 registrations per quarter) or 61%.
- Overdoses of paracetamol were often impulsive, and some were influenced by the media, including the internet. Participants often chose paracetamol because it was cheap and easily available. Most outlets adhered to the guidance restricting sales.
- The median number of tablets taken in non-fatal overdose did not differ significantly between England (22 tablets) and Ireland (24 tablets), although more pack equivalents were taken in overdose in Ireland

(2.63, 95% CI 2.57 to 2.69 packs) than in England (2.07, 95% CI 2.03 to 2.10 packs) ($\chi^2=215.6$, $p<0.001$).

- Introduction of smaller pack sizes was followed by a gradual increase in prescribing of NSAIDs (along with other analgesics). However, there was no apparent consequent increase in GI adverse effects (hospital admissions for GI bleeds decreased by 0.4 per 100,000 per quarter; $p=0.012$), although increased prescribing of antiulcerants may have offset any negative effects.

Co-proxamol

- There were approximately 500 fewer deaths from suicide involving co-proxamol ingestion between 2005 and 2010 than would have been expected without the withdrawal (600 including accidental deaths).
- There is no evidence that there has been significant substitution by poisoning with other analgesics, in spite of increased prescribing of some of them.

Antidepressants

- The TCAs dosulepin and doxepin (Sinepin[®], Marlborough) had the highest toxicity levels of all antidepressants.
- Venlafaxine appears to be less toxic than the TCAs but more toxic than the SSRIs and slightly more toxic than mirtazapine.
- Fatal toxicity was three times higher for citalopram than for the other SSRIs.

3. Assessment and management of people who self-harm

- Our audits included 6442 individuals presenting with self-harm across the 32 centres. We identified a 3.5-fold difference between hospitals in the proportion of individuals who received a specialist assessment (median 59%, range 28–91%) and a fivefold difference in the proportion of individuals receiving specialist follow-up (median 26%, range 11–61%).
- A hospital-based analysis suggested little association between management and subsequent self-harm repetition, but an individual-level analysis suggested that specialist psychosocial assessment might be associated with reduced risk of repetition.
- Levels of specialist assessment had remained static between 2001–2 and 2010–11, but scores on a service quality scale increased by 26%.

4. Trials of interventions to reduce self-harm in high-risk clinical populations

Patients presenting with self-harm

- The intervention was challenging although feasible to administer, with just under half of eligible patients being recruited to the trial.
- The 12-month repeat rate for self-harm was 34% for the intervention group ($n=32$) compared with 12.5% for the usual treatment group ($n=32$).

Psychiatric inpatient discharges

- The intervention was feasible to administer.
- 102 patients involved in the pilot study received at least one letter; however, because of dropout, largely relating either to readmission ($n=26$) or to patients opting out ($n=24$), only 45 (44.1%) received the full series of letters.
- Patients did not feel that the intervention added to their existing levels of support after discharge, although some thought that it might be more useful for those new to the mental health system or who were receiving less support but that fewer letters should be sent.

Conclusions

This programme of research has a number of findings that have important implications for public health and clinical practice, as well as future research relevant to suicide prevention.

Implications for public health practice

1. Small-area (primary care trusts/local authorities) suicide rates and changes in these rates over time since 2000 should be interpreted with caution in those areas where coroners make high use of narrative verdicts.
2. Further increases in the use of narrative verdicts will compromise the quality of national suicide statistics.
3. Coroners could be required to provide both a short form verdict and a longer narrative account of the death (when appropriate).
4. The ONS might consider including in their suicide statistics deaths from medicine poisoning given a verdict of accident/misadventure by coroners.
5. The Department of Health might consider carrying out surveillance to enable the early identification of increases in the use of high-lethality, easily accessible suicide methods, to enable timely response.
6. Estimates of the numbers of suicides by co-proxamol, paracetamol and TCA poisoning would be more reliable if they included accidental poisonings from these drugs as well as deaths given suicide and open verdicts by coroners.
7. There should be an in-depth analysis of the proportion of suicides in which the internet may have played a contributory role, assessed alongside evidence of the beneficial effects on mental health and suicide.

Implications for clinical practice

1. Services should ensure optimal treatment for those who self-harm, in particular prioritising the provision of psychosocial assessment, as emphasised in national guidelines.
2. When prescribing antidepressants, clinicians should take account of the risk of overdose (especially in patients at risk of self-poisoning) as well as their relative efficacy, acceptability and possible interactions with other medication and alcohol, and patients' concurrent physical morbidity.
3. To prevent ongoing deaths involving paracetamol, further measures might be aimed at reducing breaches of sales guidelines and at encouraging media and internet site producers to follow guidelines on the reporting of suicide.
4. National, multicentre research work would benefit from a simplified system of centralised approval for local research governance permissions.
5. Despite their low cost and apparent simplicity, contact-type interventions following psychiatric hospital discharge or self-harm cannot be recommended for widespread introduction.

Recommendations for future research

1. Variability in self-harm services should continue to be monitored to gain a greater understanding of aspects of treatment that are beneficial for preventing repeat self-harm.
2. Further work is needed to elucidate the active components of therapeutic contact following self-harm and to understand in which groups treatments might have the most impact.
3. Trends in the use of narrative verdicts and their impact on national and small-area suicide rates should be reassessed following recent ONS-led interventions to improve the accuracy of suicide reporting.
4. An assessment should be made of the feasibility and costs of developing a surveillance system to identify as quickly as possible rises in the use of novel methods of suicide, to enable rapid interventions to restrict ease of availability to at-risk individuals.
5. The relative toxicity of other drugs commonly used for intentional self-poisoning should be evaluated to assist clinicians in making prescribing decisions and for informing regulatory agencies.

6. Future changes in availability of medication that is used for self-poisoning should be evaluated, both in terms of impacts on self-harm and suicide, and in terms of indirect consequences resulting from altered availability of other drugs.
7. The effect on the quality of services and patient outcomes of new guidance and future policies on management of self-harm (such as the November 2011 National Institute for Health and Care Excellence guidelines on the longer-term management of self-harm) requires careful evaluation.
8. Assessment of the relative toxicity of antidepressants should continue as new antidepressants are marketed, and international comparisons are warranted in view of differences in prescribing practices between countries.

Registration

The pilot study entitled 'A pilot study of a contact and information based intervention to reduce repeat self-harm' is registered as ISRCTN65171515.

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