Are hospital services for self-harm getting better? An observational study examining management, service provision and temporal trends

Journal:	*BMJ Open*
Manuscript ID:	bmjopen-2013-003444
Article Type:	Research
Date Submitted by the Author:	19-Jun-2013
Complete List of Authors:	Cooper, Jayne; University of Manchester Steeg, Sarah; University of Manchester, Psychiatry Bennewith, Olive; University of Bristol, Lowe, Matthew; University of Central Lancaster, School of Psychology Gunnell, DJ; University of Bristol, Social Medicine House, AO; Academic Unit of Psychiatry Hawton, Keith; Centre for Suicide Research Oxford University, Psychiatry Kapur, Navneet; University of Manchester, Centre for suicide prevention
Primary Subject Heading:	Mental health
Secondary Subject Heading:	Emergency medicine
Keywords:	Suicide & self-harm < PSYCHIATRY, Adult psychiatry < PSYCHIATRY, ACCIDENT & EMERGENCY MEDICINE

Title page:

Are hospital services for self-harm getting better? An observational study examining management, service provision and temporal trends

Cooper, J.[1], Steeg, S.[1], Bennewith, O.[2], Lowe, M.[1], Gunnell, D.[2], House, A., Hawton, K.[3], Kapur, N[1]

1. Centre for Suicide Prevention, University of Manchester, UK
2. School of Social and Community Medicine, University of Bristol, UK
3. Centre for Suicide Research, University Department of Psychiatry, Warneford Hospital, Oxford, UK

Corresponding author: Dr Jayne Cooper

Address: Jean McFarlane Building, University of Manchester, Oxford Road, Manchester M13 9PL

Telephone: +44 (0)161 275 0718

Email: jayne.cooper@manchester.ac.uk

Abstract

Objectives: To describe the characteristics and management of individuals attending hospital with self-harm and assess changes in management and service quality since 2001, a period in which national guidance has been available

Design: Observational study.

Setting: A stratified random sample of 32 hospitals in England, UK. Participants: 6442 individuals presenting with 7689 episodes of self-harm during a three-month audit period between 2010-2011.

Outcome: Self-harm episodes, key aspects of individual management relating to psychosocial assessment and follow up, and a 21-item measure of service quality.

Results: Overall, 56% (3583/6442) of individuals were female and 51% (3274/6442) were aged under 35 years. Hospitals varied markedly in their management. The proportion of episodes that received a psychosocial assessment by a mental health professional ranged from 22%-88% (median 58%, IQR,48-70%); the proportion of episodes resulting in admission to general hospitals varied from 22-85% (median 54%, IQR, 41-63%); a referral for specialist mental health follow up was made in 11-64% of episodes (median 28%, IQR 22-38%); a referral to non-statutory services was made in 4-62% of episodes (median 15%, IQR, 8-23%); 0-21% of episodes resulted in psychiatric admission (median 7%, QR, 4-12%). Specialist assessment rate varied by method of harm; the median rate for self-cutting was 45% (IQR 28-63%) v. 58% (IQR 48-73%) for self-poisoning. Compared to 2001, there was little difference in the proportion of episodes receiving specialist assessment, there was a significant increase in general hospital admission, but a decrease in referrals for specialist mental health follow up. However, scores on the service quality scale had increased from a median of 11.5-14.5 (a 26% increase).

Conclusions: Services for the hospital management of self-harm remain variable despite national guidelines and policy initiatives. We found no evidence for increasing levels of assessment over time but markers of service quality may have improved.

This paper forms part of the study 'Variations in self-harm service delivery: an observational study examining outcomes and temporal trends'. The National Institute for Health Research Clinical Research Network (NIHR CRN) Portfolio database registration number: HOMASH 2 (7333). The NIHR Coordinated System for gaining NHS Permission (CSP) registration number: 23226

Article Summary

1. Article Focus

We aimed to:

- describe the characteristics and hospital management of self-harm across the same sample of 32 hospitals that took part in our earlier study
- compare our findings with the results from the earlier study conducted in 2001 in order to explore whether the service variability had decreased and service quality had improved over a 10-year period.

2. Key Messages

- Despite national clinical and government guidelines, there was marked variability in service provision for patients presenting to Emergency Departments with self-harm between the 32 study hospitals in England
- Overall, four out of ten individuals left hospital without having had an assessment with a mental health specialist; this is important because the management patients receive in hospital (particularly the provision of psychosocial assessments) may well have an impact on outcomes
- Compared to 2001, there was little difference in the proportion of episodes receiving specialist assessment, a significant increase in general hospital admission, and a decrease in referrals for specialist mental health follow up but limited evidence for progress in markers of overall service quality

3. Strengths and Limitations

This was a large study of hospital attendances to emergency departments following self-harm using recent data at individual and episode level from multiple sites randomly selected from across England. We were able to include 31 of the original 32 sites. However, we only collected data on self-harm attendances at hospitals and did not record episodes that did not come to medical attention. As a country-wide descriptive study, the data sources were based on clinical records rather than in-depth interviews. If there was no information in the notes of an item of interest then this was coded as absent. As a consequence, some of our findings may underestimate the true prevalence of particular characteristics or associated factors.

Acknowledgements

This paper presents independent research funded by the National Institute for Health Research (NIHR) under its Programme Grants for Applied Research Programme (Grant Reference Number RP-PG-0606-1247). The views expressed are those of the author(s) and not necessarily those of the NHS, the NIHR or the Department of Health.

Avon and Wiltshire Mental Health Partnership NHS Trust host the research programme. KH and DG are NIHR Senior Investigators. KH is also supported by Oxford Health NHS Foundation Trust and NK by the Manchester Mental Health and Social Care Trust. We would also like to thank the Local Collaborators at each of the 62 NHS Trusts, NHS staff and Clinical Science Officers attached to Mental Health Research Network who assisted locally in the setting up and data collection for this study.

Conflicts of Interest

DG, KH and NK are members of the Department of Health's (England) National Suicide Prevention Advisory Group. NK was chair of the NICE guideline development group for the longer term management of self –harm, and currently chairs the NICE Topic Expert Group (which is developing quality standards for self-harm services) and the NICE evidence update for self-harm.

Contributorship

NK and JC designed the study with input from DG, OB, AH and KH. DG, KH and NK obtained funding to conduct the study. JC was responsible for data collection with assistance from OB and ML. JC and SS extracted and processed the data. SS analysed the data with assistance from NK and JC who also interpreted the results. JC wrote the first draft of the paper. All authors contributed to subsequent drafts and have approved the final version of the manuscript.

Data Sharing

There are no additional data available.

Introduction

Self-harm is a major cause of presentation to hospitals and is linked to an elevated risk of early death[1]. Hospital services for self-harm in the UK over the past four decades have been characterised by variability of service provision [2] and contrasting patient experiences of care[3 4]. During the 1970's, wide variation in the management of patients with self-harm was found in ten psychiatric teams in one English city[5]. Twenty years later a two-fold difference was seen in the proportion of patients receiving a psychosocial assessment following self-harm in four hospitals in the north west of England[6]. The most comprehensive study of the management of self-harm to date, conducted in 2001/02 in 32 hospitals in England, found a two fold variation across hospitals in the levels of psychosocial assessment, a four-fold variation in general hospital admission, a ten-fold variation in psychiatric hospital admission and striking differences in the organisation and provision of services for patients with self-harm[7]. Subsequent to this there have been several policy documents giving guidance on appropriate service structures and the hospital management of self harm.

In 2004 two sets of clinical guidelines on the management of self-harm were published which included the recommendation that every patient presenting to hospital with self-harm should receive a psychosocial assessment before discharge from hospital[8,9]. In addition, the Royal College of Psychiatrists initiated the *Better Services for People who Self-harm Project*[10], an audit-based quality improvement project involving surveys of service users' experiences, staff attitudes and training, and care pathways. The two sets of guidelines and the *Better Services Project* might be expected to reduce the variability of services and improve the quality of care for self-harm patients.

In the current study we aimed to (i) describe the characteristics and hospital management of self-harm across the same sample of 32 hospitals that took part in our earlier study (ii) compare our

findings with the results from the earlier study in order to explore whether the service variability had decreased and service quality had improved over a 10-year period.

Methods

Setting and sample

A random sample of 32 hospitals was identified in our earlier investigation [7]. The sample was stratified so that four hospitals were selected within each of the eight former Health Regions in England. Thirty-one of the original 32 hospitals agreed to take part in the current study. The one hospital that declined to participate was replaced by an alternative randomly selected hospital from within the appropriate stratum. Hospitals provided data on episodes of self-harm presenting to the Emergency Department (ED) (for the service audits) and on the structure of self-harm services (the service interviews).

Data collection

Descriptive study

Descriptive data were collected and recorded locally on site by clinical staff or Clinical Studies Officers (employed by the Trusts or national research networks), with the central research team overseeing the set up and administration of the data collection process. Guidelines for inclusion/exclusion criteria of individual items of data were provided to ensure data consistency between centres, with the research team answering specific queries. For each audit, data were collected on all episodes of self-harm in those aged 18 and over occuring during a three-month period. Service configurations for young people were likely to be markedly different from adult services and therefore those under 18 were excluded from this study. The exact time period varied between centres but all audits took place between May 2010 and June 2011.

Episodes of self-harm were identified from ED records using relevant search terms from our previous study [7] and from current self-harm monitoring systems in England [11,12]. The individual

medical records of possible cases were examined to confirm case inclusion. As in the previous study, self-harm was defined as 'a deliberate non-fatal act whether physical, drug over-dosage or poisoning, done in the knowledge that it was potentially harmful and in the case of drug overdose that the amount taken was excessive' [13]. The robustness of this methodology was tested in each hospital in a pilot data collection exercise against all presentations for a brief period (one to two weeks) and/or against lists of presentations compiled by mental health teams, to identify missed cases. Search terms were adjusted accordingly to maximise case ascertainment. All data were anonymised at source (at the participating hospital) before being sent to the research team. A named person within the trust held the key to enable subsequent patient attendances/episodes to be identified.

Individual-level data were collected using a one page data collection sheet (see *Appendix 1*), which included demographic and clinical data, method of harm and the patient's recent contact with specialist mental health services. Details of in-hospital management were also recorded, specifically whether the individual received a psychosocial assessment (defined as 'an interview carried out by a member of mental health staff who has been trained in the process, is usually of about 30 minutes 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'[13]), whether they were admitted to a psychiatric or medical bed and whether they were referred for psychiatric follow up. Data were collected from both acute hospital and mental health medical records systems.

Service interviews

A key mental health and ED clinician involved in the provision of self-harm services, identified by the Local Collaborator at each Trust, were interviewed on the telephone or in person about current service structures. Using the staff responses, hospitals were then rated on a measure of service quality developed as part of our previous study[7] (see *Appendix 2*: 21 Items of Service

Quality) and based on the Royal College of Psychiatrists Guidelines for the general hospital management of self-harm [9]. These included the presence of a psychiatric liaison team within the ED, with appropriate support, training and supervision available for both ED clinicians and psychiatric staff, regular multi-disciplinary management meetings, contact arrangements with primary care and the existence of formal links with non-statutory services. Twenty-one items were scored '1' or '0' depending on the presence or absence of a particular aspect of the service. For two items (supervision arrangements for mental health staff who undertake psychosocial assessments and emergency attendance by a mental health worker available to the hospital ED within one hour) where such a strict categorisation was not possible, scores of '0', '0.5' or '1' were given in consultation with the research team. Therefore, hospitals could be potentially scored up to 21 on the Service Scale.

Analysis

Analysis of the descriptive data was carried out at both individual patient level and at episode level. The characteristics of the cohort were examined based on each individual's first hospital presentation within the study period, the 'index' episode. Key aspects of clinical management were then measured using *all episodes* of self-harm (including any repeat presentations by the same individual during the data collection period) in the 31 hospitals that were included in the both studies. This approach allowed us to make direct comparisons with the earlier study, where individuals were not identified.

Aggregated hospital level data were used to compare the Service Scale scores of the hospitals and to examine changes in total Service Scale score and levels of hospital management over time. Spearman's rank correlation coefficient was used to measure associations between levels of hospital key management and total service score. Differences in scores between the two time periods were tested using the matched-pairs signed-rank test. Analyses were conducted using Stata Version 11 [14] and SPSS Version 19 [15].

Local and ethical approval

This study received ethical approval from Tameside and Glossop NHS Research Ethics Committee in August 2009. Local approval was sought to carry out the study through the Research and Development departments at each participating NHS Trust. As part of this process, we approached potential local collaborators at each Trust commonly through the assistance of national research networks (for example Mental Health Research Network [MHRN]).

Results

Characteristics of individuals

A total of 6442 individuals presented with 7689 episodes of self-harm at the 32 hospitals during the three-month data collection period. Overall, 56% (3583) of individuals were female and 51% (3274) were aged under 35 years (age range, 18-94; median age, 34; interquartile range [IQR], 24 to 45). Information on ethnicity was not widely available for seven of the hospitals. Data were 85% complete in the remaining hospitals (4333); 93% (4017) of individuals were white, 3% (124) South Asian, 2% (78) black and 3% (114) were from other ethnic groups.

The main method of self-harm was known in 99.7% (6424/6442) of index episodes: self-poisoning with drugs in 79% (5073) of individuals, self-poisoning (other, for example bleach, anti-freeze, batteries) in 2% (102), self-cutting in 14% (890) and other methods of harm (including burning, attempted hanging and jumping) in 6% (359). Data completeness was at least 90% for all other variables. Alcohol was taken within six hours of the self-harm act in 53% (3111/5828) of cases and recreational drugs in 7% (385/5828); previous self-harm had occurred in 51% (3173/6237) of individuals; patients were receiving psychiatric treatment at the time of their index self-harm episode in 32% (1982/6181) of cases; and 10% (636/6269) had been an inpatient in a psychiatric ward in the twelve months prior to the self-harm presentation.

Specialist assessment (all episodes)

A psychosocial assessment by a mental health specialist took place in 57% of all presentations. Seventy-six percent (3109/4075) of assessments were carried out by a mental health nurse (including mental health liaison nurses and those from specialist self-harm teams and crisis teams), 20% (799) by a psychiatrist (any grade) and 4% (167) by another mental health professional (such as a social worker). The median number of hours between time of hospital presentation and time of assessment was 11 (IQR, 5 to 21). For those not admitted to a medical bed, the median time to assessment was five hours (IQR, 3 to 9). A Wilcoxon signed-rank test showed that assessment rate was lower amongst those who self-cut as a method of harm ($z = -3.745$, $p = <0.001$) than those who self-poisoned, with a median hospital rate of 45% (IQR 28 to 63%) v. 58% (IQR 48 to 73%) respectively.

Table 1 about here

Variation in management of episodes between hospitals

There was wide variation between the 32 study hospitals in the proportion of episodes in which patients received key aspects of clinical management (Table 1). The proportion in which a psychosocial assessment was conducted varied from 24% to 88%; the proportion admitted to a medical ward varied between 22% to 85%; and admission to a psychiatric ward ranged from one hospital where there were no admissions to another where 21% of episodes resulted in in-patient care. The proportion of episodes resulting in a referral for specialist mental health follow up (excluding admission to a psychiatric ward) ranged from 11% to 64% (median 28%; IQR, 22 to 38%).

Comparison between 2001-2002 and 2010-2011

Whilst we could identify repeat episodes by the same individuals in the present study, the 2001/02 study was solely episode based. To enable like-for like comparisons with the earlier

study the following analyses are based on all episodes presenting to the 31 hospitals (of the original 32) that were recruited for the current study.

As the duration of data collection for the earlier study and the present study varied, we compared the average number of self-harm attendances per four-week period in 2001/02 and 2010/11. We found an overall 24% increase in episodes (2075 v. 2563) and a 15% increase in the median number of episodes per hospital (65 (IQR 42 to 80) v. 75 (IQR 54 to 104)). Twenty-five out of 31 hospitals had a higher number of episodes in 2010/11 than in 2001/2. We compared the overall median proportions of episodes receiving key aspects of clinical management in the two time periods (Table 2). The proportion of episodes in which psychosocial assessment occurred was similar, with wide variation in assessment rates between hospitals in both study periods. A higher proportion of episodes in the present study resulted in admission to a medical ward compared to the previous study (an increase of 15%). The type of general hospital medical ward admitted to differed in the two time periods (2010/11 v. 2001/02): 32% v. 56% were to a general medical bed; 63% v. 28% to a short stay Medical Assessment Unit/Clinical Decision Unit attached to the ED; and 5% v. 16% other bed (not specified). The median proportion of episodes receiving specialist mental health follow up (including inpatient admission, referral to outpatient psychiatric care, Crisis Teams, Community Mental Health Teams and statutory drug and alcohol services) decreased by 13%.

Table 2 about here

Comparison of service provision between 2001-2002 and 2010-2011 (service interviews)

The total Service Scale score had increased in 23 out of 31 hospitals (Figure 1). The median score had increased from 11.5 to 14.5 in the present study, an increase of 26%. The difference between the distribution of the scores in the two time periods was statistically significant (P = 0.006) using a matched pairs test and the range in scores in the earlier study (three-fold) was greater than in the current study (two-fold difference).

Figure 1 about here

The individual items which had shown improvement in the greatest number of hospitals were presence of a formal arrangement with Social Services to visit and offer advice to self-harm patients, regular (at least once a year) service planning/ strategy meetings taking place between the specialist mental health and general medical services, and supervision arrangements in place for staff members who undertook psychosocial assessments. Most hospitals (28/31) now had a designated self-harm service (defined as 'any liaison psychiatric service with at least one member of staff located within the ED'), compared with the earlier time period, where this service was available in 23/31 hospitals. Amongst the 22 hospitals where the Service Scale score had increased (and where the assessment status of patients was known), 59% (13/22) had a rate of assessment greater than the median, compared to 25% (2/8) amongst those with no increase in Service Scale score (chi- square = 2.72, P=0.099). Amongst the seven hospitals whose score had decreased since 2001 (one had remained the same), six no longer had private rooms available in which to carry out assessment, four no longer allowed all patients admitted to a medical bed to remain in hospital until a psychosocial assessment could be carried out, four no longer routinely provided printed material about local services and four had not audited self-harm services in the past two years.

Figure 2 about here

Service Score and management

We found no association between measures of service quality (the total Service Scale score) and the proportion of episodes receiving a specialist psychosocial assessment at each hospital (Spearman's $r = 0.141$, $P = 0.46$); there was a positive correlation between total score and rate of specialist mental health follow up (Spearman's $r = 0.381$, $P = 0.038$) [see Figure 2]. There was no

significant association between a change in score since the previous study and a *change* in the rate of specialist mental health follow up (Spearman's $r = 0.171$, $P = 0.37$).

Discussion

Main findings

We collected data on over 6400 individuals who had presented with self-harm to 32 general hospitals across England in a three-month period. The characteristics of our sample were broadly consistent with other hospital-based studies in the UK [12], with the majority of episodes related to self-poisoning, and self-harm being more common in younger age groups and women. Alcohol was involved in just over half of cases and half of individuals had a previous history of self-harm. There was marked variability in service provision with an approximate 3.5-fold difference between hospitals in the proportion of episodes receiving a specialist assessment, a four-fold difference in medical admission, and an almost six-fold difference in the proportion of episodes referred for specialist follow up care. Frequency of admission to a psychiatric ward ranged from one hospital where there were no admissions to another where one in five episodes resulted in in-patient psychiatric care. Overall, four out of ten individuals left hospital without having had an assessment with a mental health specialist.

Disappointingly, given the introduction of clinical guidelines and policy emphasis, variations in service provision were as wide as ten years previously with no apparent improvement in key aspects of clinical management. Since the earlier study, the proportion of individuals receiving assessment from specialist services had remained static despite the NICE recommendation that *all* patients should receive an assessment of risk and needs. People who self-cut were even less likely than others to be assessed and yet this group have been shown to be of greater risk of future suicide[16]. Levels of referral for specialist follow up had decreased, perhaps due to a greater involvement of primary care in follow up arrangements [17], pressures on specialist mental health services with a higher throughput of patients [18], problems with accessing specialist services

[19], or constraints in referral due to Department of Health recommendation for Community Mental Health Teams to focus care on the severely mentally ill [20]. It should also be noted that nearly one-fifth of individuals were referred for follow up from non-statutory services in this study.

The increased proportion of episodes resulting in medical admission may well have reflected the greater use of ED observation and assessment wards rather than an increase in acute admissions to general medical beds. This may partly have been driven by the policy emphasis on reduced waiting times in EDs [21]. The overall decrease in the proportion of psychiatric admissions may be a reflection of trends in reducing the number of hospital beds and strengthening community ties.

A measure of service quality developed as part of the previous study did show an improvement in 23 of the 31 hospitals with an overall 26% improvement in the median service quality score. The individual service items that showed an improvement in the greatest number of hospitals related to the availability of supervision, social services input, and joint service planning meetings between mental health and acute care services. Considering changes over time, we found the overall number of episodes of self-harm in the study centres increased by around one quarter. However, other studies have found no such increase[22] and our findings might have partly reflected service consolidation rather than a true increase in incidence. We found that 24 of the 25 hospitals with an increased number of self-harm episodes also had an increased number of beds, perhaps suggesting higher levels of activity overall or reflecting hospital mergers.

Strengths and Limitations

This was a large study of hospital attendances to emergency departments following self-harm using recent data at individual and episode level from multiple sites randomly selected from across England. Different electronic systems in the study hospitals required individual methodologies to identify and capture data. However, the robustness of data was affirmed at each study site by the individual data collectors, and pilot data collection was carried out in each centre.

Nevertheless, our findings should be interpreted in the context of a number of methodological limitations. We only collected data on self-harm attendances at hospitals and did not record episodes that did not come to medical attention. As a country-wide descriptive study, the data sources were based on clinical records rather than in-depth interviews. If there was no information in the notes of an item of interest then this was coded as absent. As a consequence, some of our findings may underestimate the true prevalence of particular characteristics or associated factors. Another potential weakness was that our data on follow up were based on referral to services rather than actual receipt of interventions following discharge from hospital. Although data completeness was high overall and we were able to include 31 of the original 32 sites, there were some difficulties relating to individual hospitals. For example, in one acute Trust, patients received mental health care from a variety of mental health providers, so mental health data were unavailable for a small proportion of presentations. Within another site, data sharing agreements between acute and mental health trusts could not be achieved, which again resulted in missing mental health data.

Implications for research and practice

Our study suggests that despite national guidelines and policy initiatives, hospital service provision in England for self-harm patients remains highly variable. This is important because the management patients receive in hospital (particularly the provision of psychosocial assessments) may well have an impact on outcomes [23, 24]. Why have services not shown clear signs of improvement? It is possible of course that official guidance has simply not been implemented. Improvements to services may also have been made more difficult due to wider re-organization of NHS care - increasingly, NHS providers have merged organisations as a response to challenges in delivering care of an acceptable standard within budgetary constraints [25]. However, there are some indications that services may be getting better in other ways - the number of specialist teams managing self-harm have increased. Composite measures of service quality/provision also

seem to have improved: we found higher service scale scores than in the past and these were associated with higher rates of referral to mental health services. This improved quality is not necessarily reflected in all aspects of individual management – on average only 60% of individuals receive a psychosocial assessment when they attend hospital following an episode of self-harm and this proportion has remained static over the last decade. This may be partly a result of increasing demand on services. We should also bear in mind that it is not possible to determine how services would have developed in the absence of guidelines – it is conceivable that the situation would have been much worse than it is currently.

New NICE guidance on the longer-term management of self-harm was published in November 2011 [26]. The question of whether this and future policies will have a positive effect on the quality of services and patient outcomes will need careful evaluation. The effect of the new self-harm guideline on future practice may be greater because of the increased focus on implementation (http://guidance.nice.org.uk/CG133) and the development of Quality Standards (key aspects of the quality of care that will be used to commission and assess services in the new NHS). Self-harm Quality Standards are due to be published in June 2013. In terms of future research, developing consistent measures of service quality would be worthwhile. We also need to better understand the link between management and outcome. This is an important but methodologically challenging area and outcomes should include service user evaluation of their experiences. We also need to understand which aspects of treatment are beneficial in routine practice and why, and in which groups of individuals treatments might have the most impact. The role of psychosocial assessment warrants particular attention [24]. Randomised trials of national service-level interventions are sometimes possible [27] and when they are not, observational designs (e.g., pre-post studies [28]) may be worthwhile.

References

1. Bergen H, Hawton K, Waters K, Ness, J Cooper J, Steeg S, Kapur N. Premature death after self-harm: a multicentre cohort study. *Lancet* 2012; Published online September 18, http://dx.doi.org/10.1016/S0140-6736(12)61141-6
2. Sinclair, JMA, Gray, A, Hawton K. "Systematic review of resource utilization in the hospital management of deliberate self-harm." *Psychol Med* 2006; 36(12): 1681-1693.
3. Taylor TL, Hawton K, Fortune S, Kapur N. Attitudes towards clinical services among people who self-harm: systematic review. *B J Psych*, 2009; 194: 104-110.
4. Hunter C, Chantler K, Kapur N, Cooper J. Service user perspectives on psychosocial assessment following self-harm and its impact on further help-seeking: A qualitative study. *J Affect Disorders*, 2013; 145 (3), 315-323. DOI: http://dx.doi.org/10.1016/j.jad.2012.08.009
5. Blake DR and Mitchell JRA. Self-poisoning: management of patients in Nottingham, 1976. *BMJ*, 1978; 1: 1032-1035.
6. 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, *BMJ*, 1998; 316: 831-832.
7. 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. *BMJ* 2004; 328:1108-1109.
8. National Institute for Health and Clinical Excellence. The short-term physical and psychological management and secondary prevention of self-harm in primary and secondary care. Clinical Guideline 16. NICE, 2004.
9. Royal College of Psychiatrists. Assessment following self-harm in adults. London: Royal College of Psychiatrists; 2004.
10. Royal College of Psychiatrists. Better services for people who self-harm project. London: Royal College of Psychiatrists, 2005.
11. Dickson S, Steeg S, Gordon M, Donaldson I, Matthews V, Kapur N & Cooper J. *Self-Harm in Manchester 2008-2009*. Published 2011; The Centre for Suicide Prevention: The University of Manchester.
12. Hawton K, Bergen H, Casey D, Simkin S, Palmer B, Cooper J, Kapur N, Horrocks J, House A, Lilley R, Noble R, Owens D. Self-harm in England: A tale of three cities. *Soc Psych Psych Epid* 2007; 42: 513-521.
13. Gunnell, D, Bennewith, O, Peters, TJ, House, A and Hawton, K. The epidemiology and management of self-harm amongst adults in England. J Public Health (2005) 27 (1): 67-73. doi: 10.1093/pubmed/fdh192
14. Statacorp. Stata Statistical Software: Release 11: 2009; Stata Corporation, College Station.
15. SPSS Inc. SPSS for Windows Release 19.0.0. 2010; SPSS Inc., Chicago.
16. Cooper, J, Kapur, N, Webb, R, Guthrie, E, Lawlor, M, Macway-Jones, K & Appleby. 'Suicide following deliberate self-harm: a 4 year cohort study' American Journal of Psychiatry 2005; 162:297-303
17. Coulter A. Shifting the balance from secondary to primary care. *BMJ* 1995; 311:1447-1448. Dec 2.
18. King C. Severe mental illness: Managing the boundary of a CMHT. *Journal of Mental Health* 2001, 10:75-86.
19. Mind for better mental health. Mental health crisis care: commissioning excellence. A briefing for Clinical Commissioning Groups November 2012. http://www.mind.org.uk/assets/0002/2011/CommissioningExcellence_WEB_VERSION_2.pdf
20. Department of Health: *Mental Health Policy Implementation Guide: CommunityMental Health Team,* The Stationery Office, London; 2002.

21. Department of Health. The NHS Plan. A Plan for Investment. A Plan for Reform London Stationery Office (2000) accessed April 2013. http://webarchive.nationalarchives.gov.uk/20130107105354/http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4002960
22. Bergen H. Hawton K. Waters K, Cooper, J & Kapur, N. Epidemiology and trends in non-fatal self-harm in three centres in England: 2000-2007. *Br J Psychiatry* 2010;**197**:493-98 doi:10.1192/bjp.bp.110.07765
23. Barr W, Leitner M, Thomas J . "Self-harm patients who take early discharge from the accident and emergency department: how do they differ from those who stay?" *Accid Emerg Nurs* 2004; 12(2): 108-113.
24. Kapur N, Murphy E, Cooper J, Bergen H, Hawton K, Simkin S, Casey D, Horrocks J, Lilley R, Noble R, Owens D. Psychosocial assessment following self-harm: Results from the Multi-Centre Monitoring of Self-Harm Project. *J Affect Disorders* 2008; 106; 285−293.
25. Ham, C & Dixon, A. Tackling the problems of seriously challenged NHS providers : *BMJ* 2012; 344:e4422.
26. National Institute for Health and Clinical Excellence. The long term care and treatment of self-harm. Clinical Guideline 133. NICE, 2011.
27. Burns T, Rugkåsa J, Molodynski A, Dawson J, Yeeles K, Vazquez-Montes M, Voysey M, Sinclair J, S. Community treatment orders for patients with psychosis (OCTET): a randomised controlled trial. *Lancet* 2013; doi:10.1016/S0140-6736(13)60107-5.
28. While D, Bickley H, Roscoe A, Windfuhr K, Rahman S, Shaw J, Appleby L & Kapur N. Implementation of mental health service recommendations in England and Wales and suicide rates, 1997-2006: a cross-sectional and before-and-after observational study. *Lancet* 2012; 379: 1005-1012.

Table 1: Hospital characteristics and variation in management of self harm patients across 32 English hospitals in 2010/11

Hospital	Service scale score (maximum 21)	Total individuals during audit	Total episodes during audit	No. (%) episodes receiving specialist psychosocial assessment [b]	No. (%) episodes admitted to a medical bed [b]	No. (%) episodes with referral for mental health follow-up care [b]	No. (%) episodes admitted to a psychiatric ward [b]
1	17.5	219	244	124(51)	207(85)	37(16)	8(3)
2	13.5	100	122	70(59)	55(45)	27(23)	13(11)
3	13.5	157	175	54(31)	94(54)	75(43)	7(4)
4	10.5	143	168	119(72)	98(58)	50(30)	13(8)
5	13.5	225	254	132(55)	131(52)	90(36)	14(6)
6	11	141	176	77(50)	109(62)	30(22)	5(4)
7	11	326	366	154(50)	277(76)	64(22)	17(6)
8*	15	189	238	58(24)	84(35)	44(22)	0(0)
9	11	194	233	132(58)	147(63)	41(19)	9(4)
10	14.5	199	225	92(42)	59(26)	62(28)	15(7)
11	12	300	369	255(75)	230(62)	103(32)	4(1)

12	11.5	142	157	78(50)	48(31)	37(24)	10(7)
13	17.5	129	158	94(60)	75(47)	42(30)	16(11)
14	16	296	395	158(42)	94(24)	120(32)	49(13)
15	18.5	450	518	343(69)	277(53)	185(38)	69(14)
16	17.5	275	318	185(59)	218(69)	72(23)	8(3)
17[a]	15	85	90	-	49(56)	-	-
18	16	153	179	74(43)	74(47)	24(24)	2(2)
19*	12	178	220	83(39)	90(41)	43(20)	14(7)
20	13	171	205	127(64)	111(54)	77(41)	24(13)
21	18.5	178	198	139(70)	44(22)	72(38)	27(14)
22	15.5	182	195	97(61)	93(48)	37(23)	34(21)
23	14	112	125	74(59)	65(52)	30(24)	24(20)
24	11	123	141	115(88)	99(70)	56(43)	7(5)
25	16	193	232	184(80)	147(63)	111(48)	28(12)
26	16	132	162	113(71)	64(40)	92(57)	20(12)
27	19	339	466	333(72)	367(79)	219(57)	50(11)
28*	13	243	299	107(36)	198(66)	33(11)	22(7)

29	16	272	312	141(45)	107(34)	72(23)	17(6)
30	14.5	271	326	252(77)	257(79)	205(64)	12(4)
31	14.5	99	111	55(50)	53(48)	38(34)	7(6)
32	10.5	226	312	166(54)	194(62)	64(21)	14(4)
Summary: median (range)	14.5 (10.5-19)	186 (85-450)	223 (90-518)	58 (24-88)	54 (22-85)	28 (11-64)	7 (0-21)

[a] Information on assessment and inpatient psychiatric admission was not widely available in hospital 17 because mental health records were not accessed

*These hospitals had no designated self-harm service

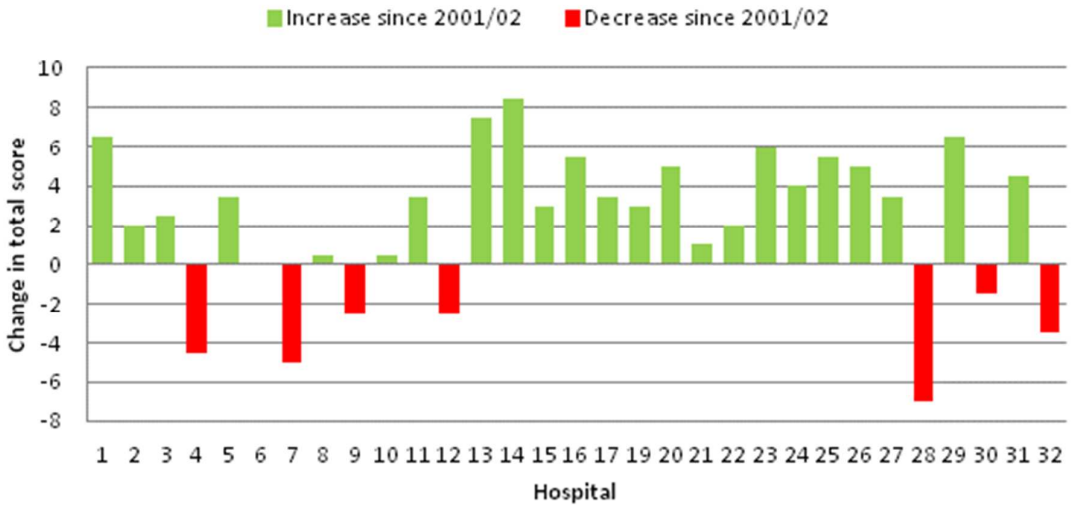
[b] Based on complete data

Table 2 Changes in service provision and hospital management: 2001-2002 v. 2010-2011 (*n* = 31)

	2001-2002	2010-2011	*P* value[#]
Total episodes	4150	7599	
Specialist mental health assessment			
Median, % (IQR, %)	55 (44-71)	58[a] (45-70)	0.85
Admission to medical ward			
Median, % (IQR, %)	39 (29-58)	54 (41- 63)	0.02
Specialist mental health follow-up (including admission)			
Median, % (IQR, %)	51 (46-63)	38[a] (26-48)	< 0.001
Referral to non-statutory mental health /voluntary/other services			
Median, % (IQR, %)	14 (7-20)	15[a] (8-23)	0.24
Referral to GP			
Median, % (IQR, %)	36 (22-45)	36 [a] (15-64)	0.30
Psychiatric admission			
Median, % (IQR, %)	9 (7-15)	7[a] (4-12)	0.05
Total service scale score			
Overall score (%)	375.5/651 (58)	442/651 (68)	
Median (IQR)	11.5 (10-14)	14.5 (11.5-16)	0.006

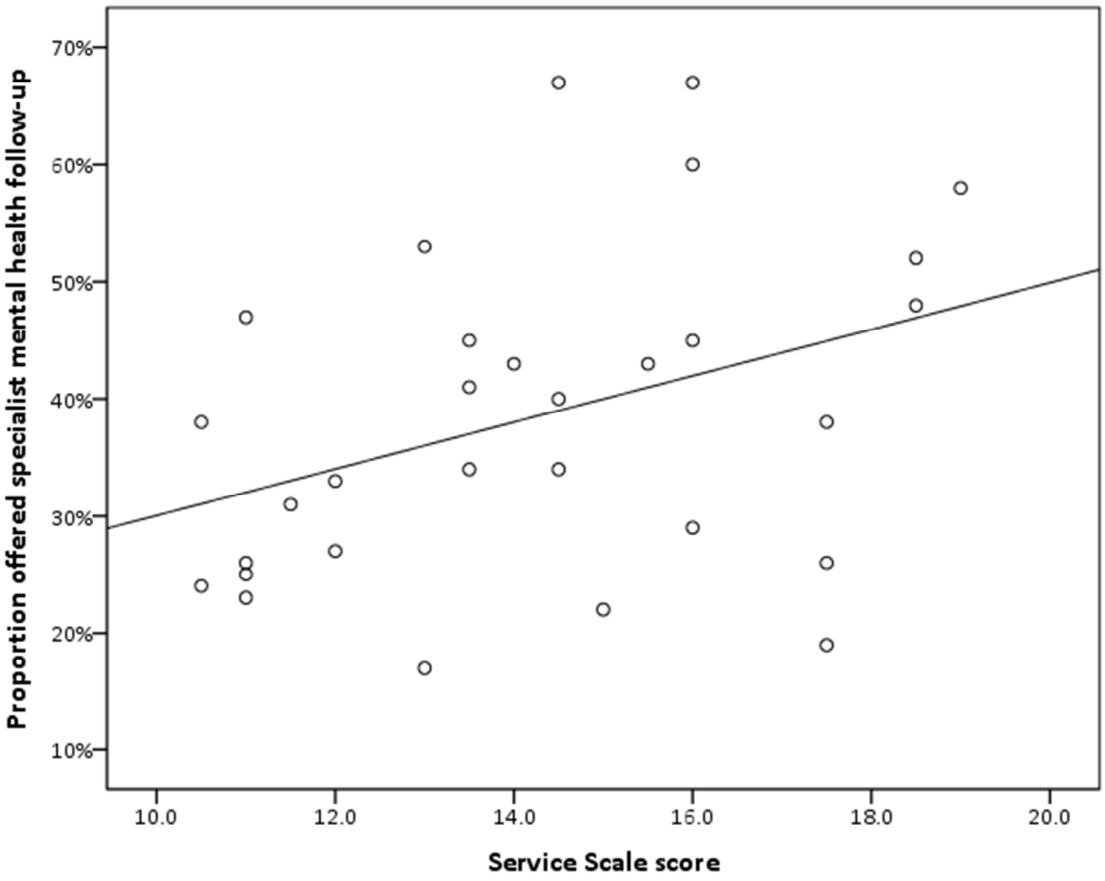
[#] P value for Wilcoxon matched-pairs signed ranks test
[a] calculated from 30 hospitals (we did not have access to mental health data for one of the sites)

Figure 1: Change in total Service Scale score: 2001-2002 v. 2010-2011 *(n = 31)* [a]



[a] Hospital 18 was not included in the earlier study so is excluded from these results
Differences in scores between time periods ranged from -7 to +8.5, with increased scores indicating improvement in services

Figure 2: Correlation between Service Score and proportion of episodes offered mental health follow-up in 2010-2011 *(n = 30)* [a]



[a] Hospital 18 was not included in the earlier study and we did not access mental health data in hospital 17 so both are excluded from these results.

Appendix 1- Audit form

APP 1:Please complete for self-harm patients aged 18 and over attending A&E from xx to xx inc

Patient Name: ……**DOB**……**NHS No**……

(for identification by hospital staff only)

A&E attendance number:…… «**HO1_ind**»……«**HO1ep_id**» ……

M[1] **F**[2] (24hr) [a]hour [b]mins.

1. Sex: ☐ **2.Age**……. **3. Date of arrival in A&E**…… **4.Time of arrival in A&E:** ……**:** …….

5. Ethnicity: White[1] ☐ Black[2] ☐ South Asian[3] ☐ Other[4] (specify)…… Not stated[5] ☐

6. a) Method of harm (tick all that apply):

self-poisoning (drugs)[1] ☐ self-poisoning (other)[2] ☐ …… (please specify) self-laceration[3] ☐

If self-poisoning by drug(s) state name of drug……

……

Other method) [4]…… **6 b)** Were recreational substances taken within 6hrs of the attempt? Yes[1]/No[2]……

(please specify) **6 c)** (If yes specify) alcohol Yes[1]/No[2]/N/K[3] ……rec drugs Yes[1]/No[2]/N/K[3]……

7. a) Was the patient admitted to a general hospital bed? Yes[1]/No[2]……

b) If yes, what type of ward was the patient admitted to?:-

A&E ward/bed[1] ☐ General medical/hospital bed[2] ☐ Other[3] ☐……

(short-stay medical assessment unit) (please specify)

8. Was there evidence of a risk assessment by A&E staff? Yes[1]/No[2]/N/K[3] ……

9. a) Was a specialist psychosocial assessment requested? Yes[1]/No[2] /N/K[3] ……

b) If not, please state the reason for this……

10. a) Did the patient have a specialist psychosocial assessment at any stage during the hospital episode? Yes[1]/No[2]/N/K[3]……

b) If not, please state the reason for this……

(**For the purposes of this audit**: A specialist *psychosocial assessment* is an interview carried out by a member of mental health staff).

11. If the patient had a specialist psychosocial assessment: (24hr) [a]hour [b]mins

a) When was the assessment carried out?: (i) Date: …… (ii) Tick time**:** ……/ …….

b) Who was the assessment carried out by? :-

Psychiatrist[1] ☐ CPN /MH Liaison Nurse[2] ☐ Other[3] ☐……

(please specify)

12. Had the patient previously self-harmed? Yes[1] /No[2]/ NK[3]……

13. Is the patient currently in receipt of specialist mental health services? Yes[1] /No[2]/ NK[3]……

14. a) Has the patient been a psychiatric in-patient in the last 12 months? Yes[1] /No[2]/ NK[3]……

b) If yes, how recently? (tick first that applies)

current ☐ <1month ago ☐ 1m-<12 months ago ☐ N/K ☐

15. Follow-up arrangements:-

a) Was the episode communicated to the GP? Yes[1] /No[2]/ NK[3]……

b) Select all follow-up arrangements that apply:

GP[1] ☐ Social Worker[2] ☐ Inpatient psychiatric care[3] ☐ Outpatient psychiatric care[4] ☐

CMHT[5] ☐ Other[6] …… (please specify) None[7] ☐ Not Known (NK) ☐

HO1_ind……«**HO1ep_id**»……

Appendix 2 – 21 Items of Service Quality

Appendix 2: Service scale items

Item number	Service scale items
1	Is there a protocol/guideline/aide memoire for staff in the A&E department for the immediate medical management of self-harm?
2	Is there a protocol/guideline/aide memoire for staff in the A&E department for the immediate assessment of risk and severe mental disorder for self-harm patients?
3	Is there a designated self-harm specialist clinical service? (+A&E Liaison)*
4	Is there a local specific planning/working group (of the team who undertake the psychosocial assessments) which meets at least once a year to plan/oversee the service for self-harm patients?
5	Are there psychosocial assessment training sessions for new staff who are involved in the psychosocial assessment of patients?
6	Are there supervision arrangements in place for staff members (new and existing) who undertake psychosocial assessments?
7	Are there written guidelines/a checklist, to assist psychiatric clinicians in the psychosocial assessment of self-harm patients?
8	Does the A&E department have 24-hour access to a psychiatrist, psychiatric nurse or social worker who is able to undertake psychosocial assessments?
9	If yes to 8, is immediate (within 15 minutes) advice available over the telephone?
10	If yes to 8, is emergency attendance, when requested, available within 1 hour?
11	Do regular (at least once a year) service planning/strategy meetings take place between the self-harm team/psychiatric service and the general medical service involved in the care of self-harm patients?
12	Are rooms which allow for privacy and confidentiality available for conducting interviews with self-harm patients either in or close to the A&E department?
13	Are rooms which allow for privacy and confidentiality available for conducting interviews with self-harm patients either in or close to the inpatient unit where most of the patients are assessed?
14	Does a formal arrangement exist with Social Services to visit and offer advice to self-harm patients who have significant social difficulties?
15	Can those admitted as inpatients remain in hospital until they have received a psychosocial assessment?
16	Is there a policy stating that a patient's GP should be contacted within 24 hours of patient discharge from an A&E department?
17	Is there a policy stating that a patient's GP should be contacted within 24 hours of patient discharge from a medical inpatient unit?
18	Are self-harm patients routinely given printed material about local services, voluntary groups and how to obtain access

	to them?
19	Are there any formal links with non-statutory services (e.g. self-help groups, the Samaritans)?
20	Has a system been set up for the monitoring of hospital attendance/discharge and referral of self-harm patients?
21	Has there been any audit of the service for self-harm patients in the last 2 years?

* = 'any liaison psychiatric service with at least one member of staff located within the ED'

Version 4 dated 5th March 2010

Study Protocol
Short title: Hospital Management of Self-harm in England (HoMaS 2)

Full title: Variations in Self-Harm service delivery: an observational study examining outcomes and temporal trends

Background

Every year in England there are around 4,500 suicides and hospitals manage over 140,000 episodes of self-harm ("attempted suicide"). Our previous studies have demonstrated wide variations in self-harm service delivery, but such variations have not been related to the outcomes of self-harm care in trusts with different approaches to management. Such outcomes research[1] is essential to guide service provision for self-harm, especially since randomised trials in this area tend to be underpowered, recruit highly selected samples, and be hampered by the poor engagement of participants with treatment.[2]

In 2004 two sets of clinical guidelines on the management of self-harm were published [3] [4]. In addition the Royal College of Psychiatrists has recently initiated the 'Better Services for People who Self-harm Project'[5] an audit-based quality improvement project involving surveys of service users' experiences, staff attitudes and training, and care pathways.

The two sets of guidelines and the Better Services Project might be expected to reduce the variability of services and improve the quality of care. In the current study we plan to investigate whether the variations in hospital management of self-harm have any impact on patient outcomes, specifically self-harm repetition. Comparison with the results of our previous study in 2001[6] will also enable us to investigate whether the service variability has decreased and service quality has improved in response to recent initiatives. In 2002 the Department of Health launched a National Suicide Prevention Strategy. Our proposed research aims to improve the evidence base to underpin the implementation and evaluation of the strategy. Findings from the study will lead to improved management of self-harm, and better evaluation of adherence to national guidelines.

We will compare the management (e.g. levels of assessment and admission) and outcome of self-harm in 32 hospitals to determine which aspects of care affect the risk of repeat self-harm. We will also assess whether improvements in services have followed recent guidance by comparing our findings on quality of service provision with the earlier 200-2 survey which took place in the same hospitals.

Research questions:
(i) Main research question:
Does the variability in service provision for self-harm have any impact on patient outcomes?
(ii) Additional research questions:
Has the variability in service provision decreased over recent years?
Has the quality of self-harm services improved over recent years?

Research Methods

The study will be carried out in a stratified random sample of 32 hospitals in England included in our earlier study.[6] We will approach medical directors/or local collaborators identified through the Research and Development approval procedure at each hospital Trust in order to identify the key mental health and emergency department staff involved in the provision of self-harm services. These personnel will be interviewed on the telephone or in person about current service structures and any routine letters / cards given to patients following self-harm. Their responses will then be rated on the measure of service quality developed as part of the previous study.[6] We will also rate services on measures of self-harm service quality developed as part of recent initiatives.[5].

With our local collaborators we will set up audits of self-harm in each hospital. As in the previous study, self-harm will be defined as 'a deliberate non-fatal act whether physical, drug over dosage or poisoning, done in the knowledge that it was potentially harmful and in the case of drug overdose or poisoning, done in the knowledge that it was potentially harmful and in the case of drug overdose that the amount taken was excessive'. [7]

Psychosocial assessments will be defined as in the previous study:
'an interview carried out by a member of mental health staff who has been trained in the process, is usually of about 30min 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'.

The audits will record every episode of self-harm in those aged 18 and over presenting to the study centres in a three month period. Service configurations for young people are likely to be markedly different from adult services and therefore those under 18 years old are excluded from this study. Individual level data will be collected using a simple one page audit form completed by emergency department or specialist mental health staff. The audit form will contain items relating to basic demographic, clinical data, details of the drugs taken in overdose and their recent contact with specialist mental health services (to inform other aspects of this programme). Details of in-hospital management will also be recorded, specifically whether the individual received a psychosocial assessment, whether they were admitted to a psychiatric or medical bed, whether they were referred for psychiatric follow up. At the end of each audit, to ensure complete case ascertainment has been achieved, a systematic search of the hospital's emergency department databases and registers will be carried out. Where individuals are identified as having been missed, audit forms will be completed by trust staff using the subject's emergency department, medical and mental health records. Similarly these sources will be used to obtain information where the audit forms have not been fully completed.

The index episode for each individual will be their first self-harm attendance during the study period. The main outcome will be hospital attendance with a repeat episode within six months. Repeat episodes will be identified through hospital databases by matching on name, date of birth, and NHS number if available. Patient identifiers will not be used on the audit forms. All data will be anonymised at source (at the participating hospital) before being sent to the research team. A named person within the trust will hold the key to enable subsequent patient attendances/episodes to be identified.

Sample size and analysis
The primary analysis will be hospital based. We will use meta-regression to assess the impact of key elements of service provision on repetition. A logistic regression analysis for repetition rate incorporating a random effect for hospital trust will be carried out. We will assess separately the effects of the following factors on repetition: proportion of individuals receiving a psychosocial assessment; proportion admitted to a medical bed; proportion admitted to a psychiatric bed; proportion referred for specialist mental health follow up.

In an individual based analysis we will examine the relationship between the key service factors and outcome using survival analyses (Cox Proportional Hazards regression). We will adjust as far as possible for differences in the case-mix of patients receiving different types of management. We will also take account of clustering by hospital.

Hospital level data: In order to measure the effect of hospital management on the proportion of patients repeating within six months, a sample size of 32 hospitals will enable us to detect correlations of 0.31 between continuous predictor variables and self-harm repetition (using Spearman's rank correlation coefficients and 2-sided significance levels of 5%). This will enable factors accounting for 9% or more of the variability in repetition rates between hospitals to be identified.

Individual level data: We estimate that approximately 4000 individuals will attend the study centres with a self-harm episode during the first three months of the study. If we consider the least common key service factor (admission to a psychiatric bed - occurring in 10% of index episodes), then this sample size will give us over 90% power to detect a clinically significant 5% difference in six -month repetition rates between those who are admitted and not admitted (7% vs. 12%).

Dissemination

We will disseminate the work through peer-reviewed publications and conference presentations. The Principal Investigators on this project are regularly asked to provide input to NICE Mental Health guidelines and other relevant policy documents and we will ensure our research findings are reflected in policy advice. We will also seek the views of users prior to dissemination, in particular whether the findings warrant specific dissemination strategies distinct from conventional academic dissemination.

References:

1. Gilbody SM, House AO, Sheldon TA. Outcomes research in mental health. Systematic review. *Br J Psychiatry* 2002;181:8-16.
2. Hawton K, Arensman E, Townsend E, Bremner S, Feldman E, Goldney R, et al. Deliberate self harm: systematic review of efficacy of psychosocial and pharmacological treatments in preventing repetition. *BMJ* 1998;317:441-447.
3. National Institute for Clinical Excellence Self-harm: The short-term physical and psychological management and secondary prevention of self-harm in primary and secondary care. National Institute for Clinical Excellence, 2004.
4. Royal College of Psychiatrists Assessment following self-harm in adults. London: Royal College of Psychiatrists, 2004.
5. Royal College of Psychiatrists. Better services for people who self-harm project. London: Royal College of Psychiatrists, 2005.
6. 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. *BMJ* 2004;328:1108-1109.
7. Morgan HG, Pocock H, Pottle S. the urban distribution of non-fatal deliberate self-harm *Br J Psychiatry* 1975; 126; 319-328

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation	Location in manuscript
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	*This is an observational study as specified in the 'Title' and 'Abstract' (under 'Design')*
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	*'Abstract' (under 'Setting', 'Outcome' and 'Results')*
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	*'Introduction' 1st and 2nd paragraph (p5)*
Objectives	3	State specific objectives, including any prespecified hypotheses	*Objectives are set out in the 'Introduction' section in the last paragraph (p5-6)*
Methods			
Study design	4	Present key elements of study design early in the paper	*'Abstract' and 'Methods' in subsections 'Setting and sample' (p6) and 'Analysis' (p8)*
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	*'Abstract' and 'Setting and sample' (p6) and 'Data collection' – 'Descriptive study' (p6) in the 'Methods' section.*
Participants	6	(*a*) *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	*Sources of data are described under 'Methods', subsection 'Setting and sample' (p6). Eligibility criteria and selection of participants for the descriptive study is described under 'Methods', subsection: 'Data collection' – 'Descriptive study' (p6-7) and under 'Service Interviews' (p7)*

		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case	*N/A*
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	*A description of variables is in 'Methods', subsection - 'Data collection': 'Descriptive study' 2nd paragraph (p7) and listed in 'Appendix 1'; 'Service interviews' (p7-8) and listed in 'Appendix 2'*
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	*'Methods', subsection - 'Setting and sample' (p6); 'Data collection': 'Descriptive study' 3rd paragraph (p7); 'Service interviews' 1st paragraph (p7)*
Bias	9	Describe any efforts to address potential sources of bias	*Case ascertainment was tested in a pilot study at each hospital 'Methods', subsection - 'Data collection': 'Descriptive study' 2nd paragraph (p7)*
Study size	10	Explain how the study size was arrived at	*As a comparative study the sample was based on the earlier study of 32 hospitals (which would enable us to detect correlations of 0.31 between total service scale scores and key aspects of management). See 'Methods', subsection – ' Setting and sample' (p6)*
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	*Total service score was treated as a continuous variable for aggregate level correlations and for comparisons over time we calculated overall*

			proportion, median and IQR. For groupings of clinical management variables see 'Results' sub section 'Comparison between 2001-2002 and 2010-2011' (p 11). The management variables were treated as binary (received vs. not received) and we calculated proportions by hospital see 'Table 1'. For comparisons of hospital management over time we calculated median and IQR see 'Table 2'
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	*'Analysis' (p8)*
		(*b*) Describe any methods used to examine subgroups and interactions	*N/A*
		(*c*) Explain how missing data were addressed	*Information was extracted from routinely collected data; if no information about a variable of interest was available then this was coded as absent – we acknowledge in the 'Discussion' section under 'Strengths and Limitations' 2nd paragraph (p15) that this may underestimate true prevalence. Analyses of comparisons were made on the 31 hospitals that were included in both studies see 'Analysis' 1st paragraph (p8) and 'Table 2'. Where we compared mental health data, only 30 hospitals were included in the analysis due to missing mental health data in one hospital (see footnote 'Table 2) and again acknowledged in 'Discussion' section under 'Strengths*

			and Limitations' 2nd paragraph (p15)
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy	*'Analysis' (p8)*
		(*e*) Describe any sensitivity analyses	*N/A*
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	*Study included all episodes of self-harm according to our study definition (see 'Methods' sub-section 'Data collection' – 'Descriptive study' (p7) and as reported in 'Results' section 'Characteristics of individuals' (p9))*
		(b) Give reasons for non-participation at each stage	*N/A: all study data were derived directly from hospital records*
		(c) Consider use of a flow diagram	*Not included*
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	*'Results' section, 1st paragraph (p9)*
		(b) Indicate number of participants with missing data for each variable of interest	*Data completeness was at least 90 % for all variables of interest and is described in more detail in 'Results' section, 1st paragraph (p9)*
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)	*N/A*
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time	*N/A*
		Case-control study—Report numbers in each exposure category, or summary measures of exposure	*N/A*
		Cross-sectional study—Report numbers of outcome events or summary measures	*Outcome events were self-harm episodes as reported in 'Tables 1 and 2'. Summary measures: Median, IQR, rates of management and total service*

			score (see 'Table2), proportions of key aspects of management (see 'Table' 1 and 'Figure 2')
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	*N/A – we did not calculate estimates*
		(*b*) Report category boundaries when continuous variables were categorized	*We categorized age as under 35 years and 35 years and older– see 'Results' 1st paragraph (p9). We did not categorize any other continuous variables*
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	*Not relevant*
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	*No other analyses were reported*
Discussion			
Key results	18	Summarise key results with reference to study objectives	*'Discussion' sub-section 'Main Findings' (p13-14)*
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	*Discussion' sub-section 'Strengths and Limitations' (p15)*
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	*Discussion' sub-section 'Strengths and Limitations' (p15)*
Generalisability	21	Discuss the generalisability (external validity) of the study results	*The generalisability of our study findings is inferred as we describe the robustness of our data in this large multi-site, national study in the Discussion' sub-section 'Strengths and Limitations' 1st paragraph (p15)*
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	'Acknowledgements' section (p3)

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

Are hospital services for self-harm getting better? An observational study examining management, service provision and temporal trends in England

Journal:	*BMJ Open*
Manuscript ID:	bmjopen-2013-003444.R1
Article Type:	Research
Date Submitted by the Author:	04-Sep-2013
Complete List of Authors:	Cooper, Jayne; University of Manchester Steeg, Sarah; University of Manchester, Psychiatry Bennewith, Olive; University of Bristol, Lowe, Matthew; University of Central Lancaster, School of Psychology Gunnell, DJ; University of Bristol, Social Medicine House, AO; Academic Unit of Psychiatry Hawton, Keith; Centre for Suicide Research Oxford University, Psychiatry Kapur, Navneet; University of Manchester, Centre for suicide prevention
Primary Subject Heading:	Mental health
Secondary Subject Heading:	Emergency medicine, Health services research
Keywords:	Suicide & self-harm < PSYCHIATRY, Adult psychiatry < PSYCHIATRY, ACCIDENT & EMERGENCY MEDICINE

Title page:

Are hospital services for self-harm getting better? An observational study examining management, service provision and temporal trends in England

Cooper, J.[1], Steeg, S.[1], Bennewith, O.[2], Lowe, M.[1], Gunnell, D.[2], House, A., Hawton, K.[3], Kapur, N[1]

1. Centre for Suicide Prevention, University of Manchester, UK
2. School of Social and Community Medicine, University of Bristol, UK
3. Centre for Suicide Research, University Department of Psychiatry, Warneford Hospital, Oxford, UK

Corresponding author: Dr Jayne Cooper

Address: Jean McFarlane Building, University of Manchester, Oxford Road, Manchester M13 9PL

Telephone: +44 (0)161 275 0718

Email: jayne.cooper@manchester.ac.uk

Abstract

Objectives: To describe the characteristics and management of individuals attending hospital with self-harm and assess changes in management and service quality since an earlier study in 2001, a period in which national guidance has been available.

Design: Observational study.

Setting: A stratified random sample of 32 hospitals in England, UK. Participants: 6442 individuals presenting with 7689 episodes of self-harm during a three-month audit period between 2010-2011.

Outcome: Self-harm episodes, key aspects of individual management relating to psychosocial assessment and follow up, and a 21-item measure of service quality.

Results: Overall, 56% (3583/6442) of individuals were female and 51% (3274/6442) were aged under 35 years. Hospitals varied markedly in their management. The proportion of episodes that received a psychosocial assessment by a mental health professional ranged from 22%-88% (median 58%, IQR,48-70%); the proportion of episodes resulting in admission to general hospitals varied from 22-85% (median 54%, IQR, 41-63%); a referral for specialist mental health follow up was made in 11-64% of episodes (median 28%, IQR 22-38%); a referral to non-statutory services was made in 4-62% of episodes (median 15%, IQR, 8-23%); 0-21% of episodes resulted in psychiatric admission (median 7%, QR, 4-12%). Specialist assessment rate varied by method of harm; the median rate for self-cutting was 45% (IQR 28-63%) v. 58% (IQR 48-73%) for self-poisoning. Compared to 2001, there was little difference in the proportion of episodes receiving specialist assessment, there was a significant increase in general hospital admission, but a decrease in referrals for specialist mental health follow up. However, scores on the service quality scale had increased from a median of 11.5-14.5 (a 26% increase).

Conclusions: Services for the hospital management of self-harm remain variable despite national guidelines and policy initiatives. We found no evidence for increasing levels of assessment over time but markers of service quality may have improved.

This paper forms part of the study 'Variations in self-harm service delivery: an observational study examining outcomes and temporal trends'. The National Institute for Health Research Clinical Research Network (NIHR CRN) Portfolio database registration number: HOMASH 2 (7333). The NIHR Coordinated System for gaining NHS Permission (CSP) registration number: 23226

Article Summary

1. Article Focus

We aimed to:

- describe the characteristics and hospital management of self-harm across the same sample of 32 hospitals that took part in our earlier study carried out in 2001-2
- compare our findings with the results from the earlier study to explore whether variability between services had decreased and service quality had improved over a 10-year period.

2. Key Messages

- Despite national clinical and government guidelines, there was marked variability in service provision for patients presenting to Emergency Departments with self-harm between the 32 study hospitals in England
- Overall, four out of ten individuals left hospital without having had an assessment with a mental health specialist; this is important because the management patients receive in hospital (particularly the provision of psychosocial assessments) may well have an impact on outcomes
- Compared to 2001, there was little difference in the proportion of episodes receiving specialist assessment, a significant increase in general hospital admission, and a decrease in referrals for specialist mental health follow up but limited evidence for progress in markers of overall service quality

3. Strengths and Limitations

This was a large study of hospital attendances to emergency departments following self-harm using recent data at individual and episode level from multiple sites randomly selected from across England. We were able to include 31 of the original 32 sites. However, we only collected data on self-harm attendances at hospitals and did not record episodes that did not come to medical attention. As a country-wide descriptive study, the data sources were based on clinical records rather than in-depth interviews. If there was no information in the notes of an item of interest then this was coded as absent. As a consequence, some of our findings may underestimate the true prevalence of particular characteristics or associated factors.

Introduction

Self-harm is a major cause of presentation to hospitals and is linked to an elevated risk of early death[1]. Hospital services for self-harm in the UK over the past four decades have been characterised by variability of service provision [2] and contrasting patient experiences of care[3, 4]. During the 1970's, wide variation in the management of patients with self-harm was found in ten psychiatric teams in one English city[5]. Twenty years later a two-fold difference was seen in the proportion of patients receiving a psychosocial assessment following self-harm in four hospitals in the north west of England[6]. The most comprehensive study of the management of self-harm to date, conducted in 2001/02 in 32 hospitals in England, found a two fold variation across hospitals in the levels of psychosocial assessment, a four-fold variation in general hospital admission, a ten-fold variation in psychiatric hospital admission and striking differences in the organisation and provision of services for patients with self-harm[7]. Subsequent to this there have been several policy documents giving guidance on appropriate service structures and the hospital management of self harm.

In 2004 two sets of clinical guidelines on the management of self-harm were published which included the recommendation that every patient presenting to hospital with self-harm should receive a psychosocial assessment before discharge from hospital[8,9]. In addition, the Royal College of Psychiatrists initiated the *Better Services for People who Self-harm Project*[10], an audit-based quality improvement project involving surveys of service users' experiences, staff attitudes and training, and care pathways. The two sets of guidelines and the *Better Services Project* might be expected to reduce the variability of services and improve the quality of care for self-harm patients.

In the current study we aimed to (i) describe the characteristics and hospital management of self-harm across the same sample of 32 hospitals that took part in our earlier study (ii) compare our

findings with the results from the earlier study in order to explore whether the service variability had decreased and service quality had improved over a 10-year period.

Methods

Setting and sample

A random sample of 32 hospitals was identified in our earlier investigation [7]. The original sample was stratified so that four hospitals were selected within each of the eight former Health Regions in England. Hospitals with no emergency department on site were not included. Thirty-one of the original 32 hospitals agreed to take part in the current study. The one hospital that declined to participate was replaced by an alternative randomly selected hospital from within the same stratum, as identified in the earlier study. Hospitals provided data on episodes of self-harm presenting to the Emergency Department (ED) (for the service audits) and on the structure of self-harm services (the service interviews).

Data collection

Descriptive study

Descriptive data were collected and recorded locally on site by clinical staff or Clinical Studies Officers (employed by the Trusts or national research networks), with the central research team overseeing the set up and administration of the data collection process. Guidelines for inclusion/exclusion criteria of individual items of data were provided to ensure data consistency between centres, with the research team answering specific queries. For each audit, data were collected on all episodes of self-harm in those aged 18 and over occuring during a three-month period. Service configurations for young people were likely to be markedly different from adult services and therefore those under 18 were excluded from this study. The exact time period varied between centres but all audits took place between May 2010 and June 2011.

Episodes of self-harm were identified from ED records using relevant search terms from our previous study [7] and from current self-harm monitoring systems in England [11,12]. The individual medical records of possible cases were examined to confirm case inclusion. As in the previous study, self-harm was defined as 'a deliberate non-fatal act whether physical, drug over-dosage or poisoning, done in the knowledge that it was potentially harmful and in the case of drug overdose that the amount taken was excessive' [13]. The robustness of this methodology was tested in each hospital in a pilot data collection exercise against all presentations for a brief period (one to two weeks) and/or against lists of presentations compiled by mental health teams, to identify missed cases. Search terms were adjusted accordingly to maximise case ascertainment. All data were anonymised at source (at the participating hospital) before being sent to the research team. A named person within the trust held the key to enable subsequent patient attendances/episodes to be identified.

Individual-level data were collected using a one page data collection sheet (see *Appendix 1*), which included demographic and clinical data, method of harm and the patient's recent contact with specialist mental health services. Details of in-hospital management were also recorded, specifically whether the individual received a psychosocial assessment (defined as 'an interview carried out by a member of mental health staff who has been trained in the process, is usually of about 30 minutes 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'[13]), whether they were admitted to a psychiatric or medical bed and whether they were referred for psychiatric follow up. Data were collected from both acute hospital and mental health medical records systems.

Service interviews

A key mental health and ED clinician involved in the provision of self-harm services, identified by the Local Collaborator at each Trust, were interviewed on the telephone or in person about

current service structures. Using the staff responses, hospitals were then rated on a measure of service quality developed as part of our previous study[7] (see *Appendix 2*: 21 Items of Service Quality) and based on the Royal College of Psychiatrists Guidelines for the general hospital management of self-harm [9]. These included the presence of a psychiatric liaison team within the ED, with appropriate support, training and supervision available for both ED clinicians and psychiatric staff, regular multi-disciplinary management meetings, contact arrangements with primary care and the existence of formal links with non-statutory services. Twenty-one items were scored '1' or '0' depending on the presence or absence of a particular aspect of the service. Consistency of coding was achieved by meetings and regular correspondence between key researchers from the earlier and current study. For two items (supervision arrangements for mental health staff who undertake psychosocial assessments and emergency attendance by a mental health worker available to the hospital ED within one hour) where such a strict categorisation was not possible, scores of '0', '0.5' or '1' were given in consultation with the research team. Therefore, hospitals could be potentially scored up to 21 on the Service Scale.

A summary of the methodology used in the present study and differences and similarities with our previous study is shown in Appendix 3.

Analysis

Analysis of the descriptive data was carried out at both individual patient level and at episode level. The characteristics of the cohort were examined based on each individual's first hospital presentation within the study period, the 'index' episode. Key aspects of clinical management were then measured using *all episodes* of self-harm (including any repeat presentations by the same individual during the data collection period) in the 31 hospitals that were included in the both studies. This approach allowed us to make direct comparisons with the earlier study, where individuals were not identified.

Aggregated hospital level data were used to compare the Service Scale scores of the hospitals and to examine changes in total Service Scale score and levels of hospital management over time. Spearman's rank correlation coefficient was used to measure associations between levels of hospital key management (using categories as set out in Table 2) and total service score. Differences in scores between the two time periods were tested using the matched-pairs signed-rank test. Analyses were conducted using Stata Version 11 [14] and SPSS Version 19 [15].

Local and ethical approval

This study received ethical approval from Tameside and Glossop NHS Research Ethics Committee in August 2009. The data collection process at each site was classified as a local audit and therefore patient consent was not required. Local approval was sought to carry out the study through the Research and Development departments at each participating NHS Trust. As part of this process, we approached potential local collaborators at each Trust commonly through the assistance of national research networks (for example Mental Health Research Network [MHRN]).

Results

Characteristics of individuals

A total of 6442 individuals presented with 7689 episodes of self-harm at the 32 hospitals during the three-month data collection period. Overall, 56% (3583) of individuals were female and 51% (3274) were aged under 35 years (age range, 18-94; median age, 34; interquartile range [IQR], 24 to 45). Information on ethnicity was not widely available for seven of the hospitals. Data were 85% complete in the remaining hospitals (4333); 93% (4017) of individuals were white, 3% (124) South Asian, 2% (78) black and 3% (114) were from other ethnic groups.

The main method of self-harm was known in 99.7% (6424/6442) of index episodes: self-poisoning with drugs in 79% (5073) of individuals, self-poisoning (other, for example bleach, anti-freeze,

batteries) in 2% (102), self-cutting in 14% (890) and other methods of harm (including burning, attempted hanging and jumping) in 6% (359). More detailed consideration of the methods used is beyond the scope of this paper and will be reported later. Data completeness was at least 90% for all other variables. Alcohol was taken within six hours of the self-harm act in 53% (3111/5828) of cases and recreational drugs in 7% (385/5828); previous self-harm had occurred in 51% (3173/6237) of individuals; patients were receiving psychiatric treatment at the time of their index self-harm episode in 32% (1982/6181) of cases; and 10% (636/6269) had been an inpatient in a psychiatric ward in the twelve months prior to the self-harm presentation.

Specialist assessment (all episodes)

A psychosocial assessment by a mental health specialist took place in 57% of all presentations. Seventy-six percent (3109/4075) of assessments were carried out by a mental health nurse (including mental health liaison nurses and those from specialist self-harm teams and crisis teams), 20% (799) by a psychiatrist (any grade) and 4% (167) by another mental health professional (such as a social worker). The median number of hours between time of hospital presentation and time of assessment was 11 (IQR, 5 to 21). For those not admitted to a medical bed, the median time to assessment was five hours (IQR, 3 to 9) compared to 14 hours (IQR 8 to 25) for those admitted. Episodes where alcohol had been taken within 6 hours of the self-harm act were assessed after a median wait of 12 hours (IQR, 6 to 20) compared to nine hours (IQR, 5 to 19) where no alcohol was involved. Episodes receiving specialist mental health assessment were more likely to result in follow-up care arrangements to specialist mental health outpatient services (45% vs. 13% for non-assessed episodes, $p = <0.001$) or to non-statutory services (21% vs. 12%, $p = <0.001$). A Wilcoxon signed-rank test showed that assessment rate was lower amongst those who self-cut as a method of harm ($z = -3.745$, $p = <0.001$) than those who self-poisoned, with a median hospital rate of 45% (IQR 28 to 63%) v. 58% (IQR 48 to 73%) respectively. In 15% of

episodes the individuals did not wait or refused assessment, 14% amongst episodes involving self-poisoning and 18% for self-cutting episodes (p = 0.005).

An assessment was conducted in only 68% (38/56) of episodes resulting in admission to an Intensive Care Unit (in one episode the patient self-discharged prior to assessment) compared to 57% overall (chi- square = 2.66, p=0.10). An assessment was conducted in 74% (60/81) of episodes involving strangulation, a higher proportion than overall (chi- square = 9.63, p=0.002) and in 7% (6/81) of episodes patients did not wait for assessment.

Variation in management of episodes between hospitals

There was wide variation between the 32 study hospitals in the proportion of episodes in which patients received key aspects of clinical management (Table 1 and Appendix 4). The proportion in which a psychosocial assessment was conducted varied from 24% to 88%. The proportion admitted to a medical ward varied between 22% to 85%. Each of the 32 hospitals had some form of short-stay ward or observation/assessment unit and medical admission here included referrals to these beds. There was no significant correlation between the proportion of episodes involving poisoning with drugs and the proportion admitted to a medical bed (Spearman's r = 0.249, P = 0.17). Admission to a psychiatric ward ranged from one hospital where there were no admissions to another where 21% of episodes resulted in in-patient care. The proportion of episodes resulting in a referral for specialist mental health follow up (excluding admission to a psychiatric ward) ranged from 11% to 64% (median 28%; IQR, 22 to 38%).

Comparison between 2001-2002 and 2010-2011

Whilst we could identify repeat episodes by the same individuals in the present study, the 2001/02 study was solely episode based. To enable like-for like comparisons with the earlier

study the following analyses are based on all episodes presenting to the 31 hospitals (of the original 32) that were recruited for the current study.

As the duration of data collection for the earlier study and the present study varied, we compared the average number of self-harm attendances per four-week period in 2001/02 and 2010/11. We found an overall 24% increase in episodes (2075 v. 2563) and a 15% increase in the median number of episodes per hospital (65 (IQR 42 to 80) v. 75 (IQR 54 to 104)). Twenty-five out of 31 hospitals had a higher number of episodes in 2010/11 than in 2001/2. We compared the overall median proportions of episodes receiving key aspects of clinical management in the two time periods (Table 2). The proportion of episodes in which psychosocial assessment occurred was similar, with wide variation in assessment rates between hospitals in both study periods. A higher proportion of episodes in the present study resulted in admission to a medical ward compared to the previous study (an increase of 15%). The type of general hospital medical ward admitted to differed in the two time periods (2010/11 v. 2001/02): 32% v. 56% were to a general medical bed; 63% v. 28% to a short stay Medical Assessment Unit/Clinical Decision Unit attached to the ED; and 5% v. 16% other bed (not specified). The median proportion of episodes receiving specialist mental health follow up (including inpatient admission, referral to outpatient psychiatric care, Crisis Teams, Community Mental Health Teams and statutory drug and alcohol services) decreased by 13%. The median proportion of episodes in which an assessment was conducted with no evidence of subsequent follow-up arrangements (including no GP follow-up) was three percent compared to ten percent in 2001/02 (p=0.19 using a matched-pairs signed-rank test).

Table 2 about here

Comparison of service provision between 2001-2002 and 2010-2011 (service interviews)

There was statistical evidence (p=0.006) that service quality, as indexed by our service quality scale was better in 2010-11 vs. 2001-02 and the range in scores in the earlier study (three-fold)

was greater than in the current study (two-fold difference). The total Service Scale score had increased in 74% (23/31) of hospitals, in 7/31 hospitals it had decreased and in one hospital the score had not changed since 2001. The median score had increased from 11.5 to 14.5 in the present study, an increase of 26%.

The individual items which had shown improvement in the greatest number of hospitals were presence of a formal arrangement with Social Services to visit and offer advice to self-harm patients, regular (at least once a year) service planning/ strategy meetings taking place between the specialist mental health and general medical services, and supervision arrangements in place for staff members who undertook psychosocial assessments. Most hospitals (28/31) now had a designated self-harm service (defined as 'any liaison psychiatric service with at least one member of staff located within the ED'), compared with the earlier time period, where this service was available in 23/31 hospitals. Amongst the 22 hospitals where the Service Scale score had increased (and where the assessment status of patients was known), 59% (13/22) had a rate of assessment greater than the median, compared to 25% (2/8) amongst those with no increase in Service Scale score (chi- square = 2.72, P=0.099). Amongst the seven hospitals whose score had decreased since 2001 (one had remained the same), six no longer had private rooms available in which to carry out assessment, four no longer allowed all patients admitted to a medical bed to remain in hospital until a psychosocial assessment could be carried out, four no longer routinely provided printed material about local services and four had not audited self-harm services in the past two years.

Service Score and management

We found no association between measures of service quality (the total Service Scale score) and the proportion of episodes receiving a specialist psychosocial assessment at each hospital (Spearman's $r = 0.141$, $P = 0.46$). There was a positive correlation between total score and rate of specialist mental health follow up (Spearman's $r = 0.381$, $P = 0.038$). There was no significant

association between a change in score since the previous study and a *change* in the rate of specialist mental health follow up (Spearman's $r = 0.171$, $P = 0.37$).

Discussion

Main findings

We collected data on over 6400 individuals who had presented with self-harm to 32 general hospitals across England in a three-month period. The characteristics of our sample were broadly consistent with other hospital-based studies in the UK [12], with the majority of episodes related to self-poisoning, and self-harm being more common in younger age groups and women. Alcohol was involved in just over half of cases and half of individuals had a previous history of self-harm. There was marked variability in service provision with an approximate 3.5-fold difference between hospitals in the proportion of episodes receiving a specialist assessment, a four-fold difference in medical admission, and an almost six-fold difference in the proportion of episodes referred for specialist follow up care. Frequency of admission to a psychiatric ward ranged from one hospital where there were no admissions to another where one in five episodes resulted in in-patient psychiatric care. Overall, four out of ten individuals left hospital without having had an assessment with a mental health specialist.

Disappointingly, given the introduction of clinical guidelines and policy emphasis, variations in service provision were as wide as ten years previously with no apparent improvement in key aspects of clinical management. Since the earlier study, the proportion of individuals receiving assessment from specialist services had remained static despite the NICE recommendation that *all* patients should receive an assessment of risk and needs. Those with more serious methods of harm, such as strangulation [16] and those who had been admitted to Intensive Care Unit had higher rates of assessment than overall (although the difference was not significant in the latter group). This possibly indicated recognition of high suicidal intent by clinicians in these groups although despite their high risk, [16] assessment was not universal. People who self-cut were less

likely than others to be assessed and yet this group have been shown to be of greater risk of repetition [17] and future suicide in the UK[18]. Consistent with other large scale surveys [19] levels of assessment in those who had cut themselves were reduced - they were less likely to complete treatment and more likely to specifically refuse assessment. Levels of referral for specialist follow up had decreased, perhaps due to pressures on specialist mental health services with a higher throughput of patients [20], problems with accessing specialist services [21], or constraints in referral due to Department of Health recommendation for Community Mental Health Teams to focus care on the severely mentally ill [22]. The proportion of assessors who were mental health nurses had increased since the earlier study from 46% to 75%[13] but was similar to current nurse led self-harm service provision in the UK. [23] Evidence suggests that psychiatrists and nurses use similar factors to inform their risk assessments, although nurses may be less likely to admit to a psychiatric ward. [23] This may explain the overall decrease in the proportion of psychiatric admissions since 2001 although he the decrease may also reflect trends in the number of psychiatric beds and an increased emphasis on community provision. It should also be noted that nearly one-fifth of individuals were referred for follow up from non-statutory services in this study.

The increased proportion of episodes resulting in medical admission may well have reflected the greater use of ED observation and assessment wards rather than an increase in acute admissions to general medical beds. Seventeen hospitals reported that the use of such beds had been introduced or had increased since the earlier study. This increase may partly have been driven by the policy emphasis on reduced waiting times in EDs [24] where the target of a maximum of a four hour stay in the ED before discharge or transfer is recommended. As all hospitals in the current study had short-stay wards or medical observation/assessment units, the variation in proportion of medical admissions between hospitals cannot be attributed to availability of short stay wards. Differences between time of presentation and assessment may be explained by medical fitness and/or intoxication of the patient

A measure of service quality developed as part of the previous study did show an improvement in 23 of the 31 hospitals with an overall 26% improvement in the median service quality score. The individual service items that showed an improvement in the greatest number of hospitals related to the availability of supervision, social services input, and joint service planning meetings between mental health and acute care services. Considering changes over time, we found the overall number of episodes of self-harm in the study centres increased by around one quarter. However, other studies have found no such increase[25] and, as we did not correct for changes in population size, our findings might have partly reflected service consolidation rather than a true increase in incidence. We found that 24 of the 25 hospitals with an increased number of self-harm episodes also had an increased number of beds, perhaps suggesting higher levels of activity overall or reflecting hospital mergers.

Strengths and Limitations

This was a large study of hospital attendances to emergency departments following self-harm using recent data at individual and episode level from multiple sites randomly selected from across England. Different electronic systems in the study hospitals required individual methodologies to identify and capture data. However, the robustness of data was affirmed at each study site by the individual data collectors, and pilot data collection was carried out in each centre.

Nevertheless, our findings should be interpreted in the context of a number of methodological limitations. We only collected data on self-harm attendances at hospitals and did not record episodes that did not come to medical attention. As a country-wide descriptive study, the data sources were based on clinical records rather than in-depth interviews. If there was no information in the notes of an item of interest then this was coded as absent. As a consequence, some of our findings may underestimate the true prevalence of particular characteristics or associated factors. Another potential weakness was that our data on follow up were based on

referral to services rather than actual receipt of interventions following discharge from hospital. Although data completeness was high overall and we were able to include 31 of the original 32 sites, there were some difficulties relating to individual hospitals. For example, in one acute Trust, patients received mental health care from a variety of mental health providers, so mental health data were unavailable for a small proportion of presentations. Within another site, data sharing agreements between acute and mental health trusts could not be achieved, which again resulted in missing mental health data. The Service Scale measure was developed as part of our previous study and was based on key elements of national guidance. Its use in the current study was principally to allow comparison with data from 2001 rather than as a standalone measure of service quality. Nonetheless, it should be borne in mind that properties of the scale, such as its underlying factor structure, have not been investigated.

Implications for research and practice

Our study suggests that despite national guidelines and policy initiatives, hospital service provision in England for self-harm patients remains highly variable. This is important because the management patients receive in hospital (particularly the provision of psychosocial assessments) is associated with follow up care and may well have an impact on outcomes [19, 26]. Why have services not shown clear signs of improvement? It is possible of course that official guidance has simply not been implemented. Improvements to services may also have been made more difficult due to wider re-organization of NHS care - increasingly, NHS providers have merged organisations as a response to challenges in delivering care of an acceptable standard within budgetary constraints [27]. However, there are some indications that services may be getting better in other ways - the number of specialist teams managing self-harm have increased. Composite measures of service quality/provision also seem to have improved: we found higher service scale scores than in the past and these were associated with higher rates of referral to mental health services. This improved quality is not necessarily reflected in all aspects of

individual management – on average only 60% of individuals receive a psychosocial assessment when they attend hospital following an episode of self-harm and this proportion has remained static over the last decade. This may be partly a result of increasing demand on services. We should also bear in mind that it is not possible to determine how services would have developed in the absence of guidelines – it is conceivable that the situation would have been much worse than it is currently.

New NICE guidance on the longer-term management of self-harm was published in November 2011 [28]. The question of whether this and future policies will have a positive effect on the quality of services and patient outcomes will need careful evaluation. The effect of the new self-harm guideline on future practice may be greater because of the increased focus on implementation (http://guidance.nice.org.uk/CG133) and the development of Quality Standards (key aspects of the quality of care that will be used to commission and assess services in the new NHS). Self-harm Quality Standards were published in June 2013. In terms of future research, developing consistent measures of service quality would be worthwhile. We also need to better understand the link between management and outcome. This is an important but methodologically challenging area and outcomes should include service user evaluation of their experiences. We also need to understand which aspects of treatment are beneficial in routine practice and why, and in which groups of individuals treatments might have the most impact. The role of psychosocial assessment warrants particular attention [19]. Randomised trials of national service-level interventions are sometimes possible [29] and when they are not, observational designs (e.g., pre-post studies [30]) may be worthwhile. Of course linking findings on variability of services to outcomes is of interest but this would require substantial further analysis that goes beyond the scope of the current report . However we hope to address these issues in future publications.

Conclusion

National guidelines and policy initiatives appear to have had little impact on the variability of self-harm service provision. Around 60 percent of individuals can expect a psychosocial assessment when they attend hospital following an episode of self-harm, and this proportion has remained static over the last decade or so. There is some evidence to suggest that the overall quality score of self-harm services may have improved, although this is not borne out by individual process measures of hospital management.

Table 1: Summary hospital characteristics and variation in management of self harm patients across 32 English hospitals in 2010/11

	Service scale score (maximum 21)	Total individuals during audit	Total episodes during audit	Episodes receiving specialist psychosocial assessment [a]	Episodes admitted to a medical bed	Episodes with referral for mental health follow-up care [a]	Episodes admitted to a psychiatric ward [a]
Median (range)	14.5 (10.5-19)	186 (85-450)	223 (90-518)	58% (24-88)	54% (22-85)	28% (11-64)	7% (0-21)

[a] Information was based on 31 hospitals because mental health records were not accessed in one hospital

Table 2 Changes in service provision and hospital management: 2001-2002 v. 2010-2011 (*n* = 31)

	2001-2002	2010-2011	*P* value[#]
Total episodes	4150	7599	
Specialist mental health assessment [a]			
Median, % (IQR, %)	55 (44-71)	58 (45-70)	0.85
Admission to medical ward			
Median, % (IQR, %)	39 (29-58)	54 (41- 63)	0.02
Specialist mental health follow-up [a] (including admission)			
Median, % (IQR, %)	51 (46-63)	38 (26-48)	< 0.001
Referral to non-statutory mental health /voluntary/other services [a]			
Median, % (IQR, %)	14 (7-20)	15 (8-23)	0.24
Referral to GP [a]			
Median, % (IQR, %)	36 (22-45)	36 (15-64)	0.30
Psychiatric admission [a]			
Median, % (IQR, %)	9 (7-15)	7 (4-12)	0.05
Total service scale score			
Overall score (%)	375.5/651 (58)	442/651 (68)	
Median (IQR)	11.5 (10-14)	14.5 (11.5-16)	0.006

[#] P value for Wilcoxon matched-pairs signed ranks test

[a] calculated from 30 hospitals (we did not have access to mental health data for one of the sites)

Acknowledgements

This paper presents independent research funded by the National Institute for Health Research (NIHR) under its Programme Grants for Applied Research Programme (Grant Reference Number RP-PG-0606-1247). The views expressed are those of the author(s) and not necessarily those of the NHS, the NIHR or the Department of Health.

Avon and Wiltshire Mental Health Partnership NHS Trust host the research programme. KH and DG are NIHR Senior Investigators. KH is also supported by Oxford Health NHS Foundation Trust and NK by the Manchester Mental Health and Social Care Trust. We would also like to thank the Local Collaborators at each of the 62 NHS Trusts, NHS staff and Clinical Science Officers attached to Mental Health Research Network who assisted locally in the setting up and data collection for this study.

Conflicts of Interest

DG, KH and NK are members of the Department of Health's (England) National Suicide Prevention Advisory Group. NK was chair of the NICE guideline development group for the longer term management of self –harm, chaired the NICE Topic Expert Group (which developed quality standards for self-harm services) and chaired the NICE evidence update for self-harm.

Contributorship

NK and JC designed the study with input from DG, OB, AH and KH. DG, KH and NK obtained funding to conduct the study. JC was responsible for data collection with assistance from OB and ML. JC and SS extracted and processed the data. SS analysed the data with assistance from NK and JC who also interpreted the results. JC wrote the first draft of the paper. All authors contributed to subsequent drafts and have approved the final version of the manuscript.

References

1. Bergen H, Hawton K, Waters K, Ness, J Cooper J, Steeg S, Kapur N. Premature death after self-harm: a multicentre cohort study. *Lancet* 2012; Published online September 18, http://dx.doi.org/10.1016/S0140-6736(12)61141-6
2. Sinclair, JMA, Gray, A, Hawton K. "Systematic review of resource utilization in the hospital management of deliberate self-harm." *Psychol Med* 2006; 36(12): 1681-1693.
3. Taylor TL, Hawton K, Fortune S, Kapur N. Attitudes towards clinical services among people who self-harm: systematic review. *B J Psych*, 2009; 194: 104-110.
4. Hunter C, Chantler K, Kapur N, Cooper J. Service user perspectives on psychosocial assessment following self-harm and its impact on further help-seeking: A qualitative study. *J Affect Disorders*, 2013; 145 (3), 315-323. DOI: http://dx.doi.org/10.1016/j.jad.2012.08.009
5. Blake DR and Mitchell JRA. Self-poisoning: management of patients in Nottingham, 1976. *BMJ*, 1978; 1: 1032-1035.
6. 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, *BMJ*, 1998; 316: 831-832.
7. 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. *BMJ* 2004; 328:1108-1109.
8. National Institute for Health and Clinical Excellence. The short-term physical and psychological management and secondary prevention of self-harm in primary and secondary care. Clinical Guideline 16. NICE, 2004.
9. Royal College of Psychiatrists. Assessment following self-harm in adults. London: Royal College of Psychiatrists; 2004.
10. Royal College of Psychiatrists. Better services for people who self-harm project. London: Royal College of Psychiatrists, 2005.
11. Dickson S, Steeg S, Gordon M, Donaldson I, Matthews V, Kapur N & Cooper J. *Self-Harm in Manchester 2008-2009*. Published 2011; The Centre for Suicide Prevention: The University of Manchester.
12. Hawton K, Bergen H, Casey D, Simkin S, Palmer B, Cooper J, Kapur N, Horrocks J, House A, Lilley R, Noble R, Owens D. Self-harm in England: A tale of three cities. *Soc Psych Psych Epid* 2007; 42: 513-521.
13. Gunnell, D, Bennewith, O, Peters, TJ, House, A and Hawton, K. The epidemiology and management of self-harm amongst adults in England. J Public Health (2005) 27 (1): 67-73. doi: 10.1093/pubmed/fdh192
14. Statacorp. Stata Statistical Software: Release 11: 2009; Stata Corporation, College Station.
15. SPSS Inc. SPSS for Windows Release 19.0.0. 2010; SPSS Inc., Chicago.
16. Runeson B, Tidemalm D, Dahlin M, Lichtenstein P, Langstrom N. Method of attempted suicide as predictor of subsequent successful suicide: national long term cohort study. BMJ 2010; 340: c3222. doi:10.1136/bmj.c3222
17. Lilley R, Owens D, Horrocks J, House A, Noble R, Bergen H, Hawton K, Casey D, Simkin S, Murphy E, Cooper J, Kapur N. Hospital care and repetition following self-harm: a multicentre comparison of self-poisoning and self-injury. Br J Psychiat 2008; 192: 440-445
18. Cooper, J, Kapur, N, Webb, R, Guthrie, E, Lawlor, M, Macway-Jones, K & Appleby. 'Suicide following deliberate self-harm: a 4 year cohort study' American Journal of Psychiatry 2005; 162:297-303
19. Kapur N, Murphy E, Cooper J, Bergen H, Hawton K, Simkin S, Casey D, Horrocks J, Lilley R, Noble R, Owens D. Psychosocial assessment following self-harm: Results from the Multi-Centre Monitoring of Self-Harm Project. *J Affect Disorders* 2008; 106; 285–293.

20. King C. Severe mental illness: Managing the boundary of a CMHT. *Journal of Mental Health* 2001, 10:75-86.
21. Mind for better mental health. Mental health crisis care: commissioning excellence. A briefing for Clinical Commissioning Groups November 2012. http://www.mind.org.uk/assets/0002/2011/CommissioningExcellence_WEB_VERSION_2.pdf
22. Department of Health: *Mental Health Policy Implementation Guide: CommunityMental Health Team,* The Stationery Office, London; 2002.
23. Murphy E, Kapur N, Webb R, **Cooper J.** Risk assessment following self-harm: comparison of mental health nurses and psychiatrists. Journal of Advanced Nursing 2011; 67; .127-139
24. Department of Health. The NHS Plan. A Plan for Investment. A Plan for Reform London Stationery Office (2000) accessed April 2013. http://webarchive.nationalarchives.gov.uk/20130107105354/http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4002960
25. Bergen H. Hawton K. Waters K, Cooper, J & Kapur, N. Epidemiology and trends in non-fatal self-harm in three centres in England: 2000-2007. *Br J Psychiatry* 2010;**197**:493-98 doi:10.1192/bjp.bp.110.07765
26. Barr W, Leitner M, Thomas J . "Self-harm patients who take early discharge from the accident and emergency department: how do they differ from those who stay?" *Accid Emerg Nurs* 2004; 12(2): 108-113.
27. Ham, C & Dixon, A. Tackling the problems of seriously challenged NHS providers : *BMJ* 2012; 344:e4422.
28. National Institute for Health and Clinical Excellence. The long term care and treatment of self-harm. Clinical Guideline 133. NICE, 2011.
29. Burns T, Rugkåsa J, Molodynski A, Dawson J, Yeeles K, Vazquez-Montes M, Voysey M, Sinclair J, S. Community treatment orders for patients with psychosis (OCTET): a randomised controlled trial. *Lancet* 2013; doi:10.1016/S0140-6736(13)60107-5.
30. While D, Bickley H, Roscoe A, Windfuhr K, Rahman S, Shaw J, Appleby L & Kapur N. Implementation of mental health service recommendations in England and Wales and suicide rates, 1997-2006: a cross-sectional and before-and-after observational study. *Lancet* 2012; 379: 1005-1012.

APP 1:Please complete for self-harm patients aged 18 and over attending A&E from xx to xx inc

Patient Name: ……**DOB**……**NHS No**……
(for identification by hospital staff only)
A&E attendance number:…… «**HO1_ind**»……«**HO1ep_id**» ……..

M[1] **F**[2] (24hr) [a]hour [b]mins.

1. Sex: ☐ **2.Age**……. **3. Date of arrival in A&E**…… **4.Time of arrival in A&E:** ……**:** ……..

5. Ethnicity: White[1] ☐ Black[2] ☐ South Asian[3] ☐ Other[4] (specify)…… Not stated[5] ☐

6. a) Method of harm (tick all that apply):

self-poisoning (drugs)[1] ☐ self-poisoning (other)[2] ☐ …… (please specify) self-laceration[3] ☐

If self-poisoning by drug(s) state name of drug…… ……

……

Other method) [4]……**6 b)** Were recreational substances taken within 6hrs of the attempt? Yes[1]/No[2]……
(please specify) **6 c)** (If yes specify) alcohol Yes[1]/No[2]/N/K[3] ……..rec drugs Yes[1]/No[2]/N/K[3]……

7. a) Was the patient admitted to a general hospital bed? Yes[1]/No[2]……

b) If yes, what type of ward was the patient admitted to?:-

A&E ward/bed[1] ☐ General medical/hospital bed[2] ☐ Other[3] ☐……
(short-stay medical assessment unit) (please specify)

8. Was there evidence of a risk assessment by A&E staff? Yes[1]/No[2]/N/K[3] ……

9. a) Was a specialist psychosocial assessment requested? Yes[1]/No[2] /N/K[3] ……

b) If not, please state the reason for this……

10. a) Did the patient have a specialist psychosocial assessment at any stage during the hospital episode?
Yes[1]/No[2]/N/K[3]……

b) If not, please state the reason for this……

(**For the purposes of this audit**: A specialist *psychosocial assessment* is an interview carried out by a member of mental health staff).

11. If the patient had a specialist psychosocial assessment: (24hr) [a]hour [b]mins

a) When was the assessment carried out?: (i) Date: …… (ii) Tick time**:** ……./ ……..

b) Who was the assessment carried out by? :-

Psychiatrist[1] ☐ CPN /MH Liaison Nurse[2] ☐ Other[3] ☐……
(please specify)

12. Had the patient previously self-harmed? Yes[1] /No[2]/ NK[3]……

13. Is the patient currently in receipt of specialist mental health services? Yes[1] /No[2]/ NK[3]……

14. a) Has the patient been a psychiatric in-patient in the last 12 months? Yes[1] /No[2]/ NK[3]……

b) If yes, how recently? (tick first that applies)

current ☐ <1month ago ☐ 1m-<12 months ago ☐ N/K ☐

15. Follow-up arrangements:-
a) Was the episode communicated to the GP? Yes[1] /No[2]/ NK[3]……
b) Select all follow-up arrangements that apply:

GP[1] ☐ Social Worker[2] ☐ Inpatient psychiatric care[3] ☐ Outpatient psychiatric care[4] ☐
CMHT[5] ☐ Other[6] …… (please specify) None[7] ☐ Not Known (NK) ☐

HO1_ind……«**HO1ep_id**»……

Appendix 2 – 21 Items of Service Quality

Item number	Service scale items
1	Is there a protocol/guideline/aide memoire for staff in the A&E department for the immediate medical management of self-harm?
2	Is there a protocol/guideline/aide memoire for staff in the A&E department for the immediate assessment of risk and severe mental disorder for self-harm patients?
3	Is there a designated self-harm specialist clinical service? (+A&E Liaison)*
4	Is there a local specific planning/working group (of the team who undertake the psychosocial assessments) which meets at least once a year to plan/oversee the service for self-harm patients?
5	Are there psychosocial assessment training sessions for new staff who are involved in the psychosocial assessment of patients?
6	Are there supervision arrangements in place for staff members (new and existing) who undertake psychosocial assessments?
7	Are there written guidelines/a checklist, to assist psychiatric clinicians in the psychosocial assessment of self-harm patients?
8	Does the A&E department have 24-hour access to a psychiatrist, psychiatric nurse or social worker who is able to undertake psychosocial assessments?
9	If yes to 8, is immediate (within 15 minutes) advice available over the telephone?
10	If yes to 8, is emergency attendance, when requested, available within 1 hour?
11	Do regular (at least once a year) service planning/strategy meetings take place between the self-harm team/psychiatric service and the general medical service involved in the care of self-harm patients?
12	Are rooms which allow for privacy and confidentiality available for conducting interviews with self-harm patients either in or close to the A&E department?
13	Are rooms which allow for privacy and confidentiality available for conducting interviews with self-harm patients either in or close to the inpatient unit where most of the patients are assessed?
14	Does a formal arrangement exist with Social Services to visit and offer advice to self-harm patients who have significant social difficulties?
15	Can those admitted as inpatients remain in hospital until they have received a psychosocial assessment?
16	Is there a policy stating that a patient's GP should be contacted within 24 hours of patient discharge from an A&E department?
17	Is there a policy stating that a patient's GP should be contacted within 24 hours of patient discharge from a medical inpatient unit?
18	Are self-harm patients routinely given printed material about local services, voluntary groups and how to obtain access to them?

19	Are there any formal links with non-statutory services (e.g. self-help groups, the Samaritans)?
20	Has a system been set up for the monitoring of hospital attendance/discharge and referral of self-harm patients?
21	Has there been any audit of the service for self-harm patients in the last 2 years?

* = 'any liaison psychiatric service with at least one member of staff located within the ED'

Appendix 3

Table: Differences in methodology between the present study and our earlier study

Service audits	**2001-2002**	**2010-2011**
Inclusion criteria	All self-harm attendances to one of the 32 participating EDs by adults aged 18 and over Self-harm attendances for both studies were identified from hospital record systems using relevant search terms according to how patients' presenting complaints were coded at each hospital. The pilot phase was used to refine the methodology and was specific to each hospital but included cross-checking the generated list of cases against all ED attendances to ascertain if any cases had not been captured and search terms were adjusted. Lists were also cross-checked against mental health records. Examples of common search terms used are 'OD', 'overdose', 'DSH', 'self-harm', 'psychiatry', 'depression', 'poisoning', 'hanging', 'behaving strangely', 'drug abuse', 'laceration', 'burns', 'inhalation fumes/smoke', 'non trauma', 'jump/fall', 'neck injury'.	
Study period	Eight week audit	Thirteen week audit
Sample	Episodes of self-harm	Individuals and episodes of self-harm
Service Interviews		
Inclusion criteria	Hospitals in England with an emergency department	
Sample	32 hospitals: selected at random from a stratified sampling frame (four hospitals selected from each of the eight former Health Regions in England)	32 hospitals: 31 of the same 32 hospitals selected in 2001/02. One hospital declined to take part so an alternative hospital was selected at random from the same strata.

Appendix 4 - Table: Hospital characteristics and variation in management of self harm patients across 32 English hospitals in 2010/11

Hospital	Service scale score (maximum 21)	Total individuals during audit	Total episodes during audit	No. (%) episodes receiving specialist psychosocial assessment [b]	No. (%) episodes admitted to a medical bed [b]	No. (%) episodes with referral for mental health follow-up care [b]	No. (%) episodes admitted to a psychiatric ward [b]
1	17.5	219	244	124(51)	207(85)	37(16)	8(3)
2	13.5	100	122	70(59)	55(45)	27(23)	13(11)
3	13.5	157	175	54(31)	94(54)	75(43)	7(4)
4	10.5	143	168	119(72)	98(58)	50(30)	13(8)
5	13.5	225	254	132(55)	131(52)	90(36)	14(6)
6	11	141	176	77(50)	109(62)	30(22)	5(4)
7	11	326	366	154(50)	277(76)	64(22)	17(6)
8*	15	189	238	58(24)	84(35)	44(22)	0(0)
9	11	194	233	132(58)	147(63)	41(19)	9(4)
10	14.5	199	225	92(42)	59(26)	62(28)	15(7)
11	12	300	369	255(75)	230(62)	103(32)	4(1)
12	11.5	142	157	78(50)	48(31)	37(24)	10(7)
13	17.5	129	158	94(60)	75(47)	42(30)	16(11)
14	16	296	395	158(42)	94(24)	120(32)	49(13)

15	18.5	450	518	343(69)	277(53)	185(38)	69(14)
16	17.5	275	318	185(59)	218(69)	72(23)	8(3)
17[a]	15	85	90	-	49(56)	-	-
18	16	153	179	74(43)	74(47)	24(24)	2(2)
19*	12	178	220	83(39)	90(41)	43(20)	14(7)
20	13	171	205	127(64)	111(54)	77(41)	24(13)
21	18.5	178	198	139(70)	44(22)	72(38)	27(14)
22	15.5	182	195	97(61)	93(48)	37(23)	34(21)
23	14	112	125	74(59)	65(52)	30(24)	24(20)
24	11	123	141	115(88)	99(70)	56(43)	7(5)
25	16	193	232	184(80)	147(63)	111(48)	28(12)
26	16	132	162	113(71)	64(40)	92(57)	20(12)
27	19	339	466	333(72)	367(79)	219(57)	50(11)
28*	13	243	299	107(36)	198(66)	33(11)	22(7)
29	16	272	312	141(45)	107(34)	72(23)	17(6)
30	14.5	271	326	252(77)	257(79)	205(64)	12(4)
31	14.5	99	111	55(50)	53(48)	38(34)	7(6)
32	10.5	226	312	166(54)	194(62)	64(21)	14(4)
Summary: median	14.5	186 (85-450)	223 (90-518)	58% (24-88)	54% (22-85)	28% (11-64)	7% (0-21)

6

(range) (10.5-19)

[a] Information on assessment and psychiatric follow-up was not widely available in hospital 17 because mental health records were not accessed

*These hospitals had no designated self-harm service

[b] Based on complete data

Version 4 dated 5th March 2010

Study Protocol
Short title: Hospital Management of Self-harm in England (HoMaS 2)

Full title: Variations in Self-Harm service delivery: an observational study examining outcomes and temporal trends

Background

Every year in England there are around 4,500 suicides and hospitals manage over 140,000 episodes of self-harm ("attempted suicide"). Our previous studies have demonstrated wide variations in self-harm service delivery, but such variations have not been related to the outcomes of self-harm care in trusts with different approaches to management. Such outcomes research[1] is essential to guide service provision for self-harm, especially since randomised trials in this area tend to be underpowered, recruit highly selected samples, and be hampered by the poor engagement of participants with treatment.[2]

In 2004 two sets of clinical guidelines on the management of self-harm were published [3] [4]. In addition the Royal College of Psychiatrists has recently initiated the 'Better Services for People who Self-harm Project'[5] an audit-based quality improvement project involving surveys of service users' experiences, staff attitudes and training, and care pathways.

The two sets of guidelines and the Better Services Project might be expected to reduce the variability of services and improve the quality of care. In the current study we plan to investigate whether the variations in hospital management of self-harm have any impact on patient outcomes, specifically self-harm repetition. Comparison with the results of our previous study in 2001[6] will also enable us to investigate whether the service variability has decreased and service quality has improved in response to recent initiatives. In 2002 the Department of Health launched a National Suicide Prevention Strategy. Our proposed research aims to improve the evidence base to underpin the implementation and evaluation of the strategy. Findings from the study will lead to improved management of self-harm, and better evaluation of adherence to national guidelines.

We will compare the management (e.g. levels of assessment and admission) and outcome of self-harm in 32 hospitals to determine which aspects of care affect the risk of repeat self-harm. We will also assess whether improvements in services have followed recent guidance by comparing our findings on quality of service provision with the earlier 200-2 survey which took place in the same hospitals.

Research questions:
(i) Main research question:
Does the variability in service provision for self-harm have any impact on patient outcomes?
(ii) Additional research questions:
Has the variability in service provision decreased over recent years?
Has the quality of self-harm services improved over recent years?

Research Methods

The study will be carried out in a stratified random sample of 32 hospitals in England included in our earlier study.[6] We will approach medical directors/or local collaborators identified through the Research and Development approval procedure at each hospital Trust in order to identify the key mental health and emergency department staff involved in the provision of self-harm services. These personnel will be interviewed on the telephone or in person about current service structures and any routine letters / cards given to patients following self-harm. Their responses will then be rated on the measure of service quality developed as part of the previous study.[6] We will also rate services on measures of self-harm service quality developed as part of recent initiatives.[5].

With our local collaborators we will set up audits of self-harm in each hospital. As in the previous study, self-harm will be defined as 'a deliberate non-fatal act whether physical, drug over dosage or poisoning, done in the knowledge that it was potentially harmful and in the case of drug overdose or poisoning, done in the knowledge that it was potentially harmful and in the case of drug overdose that the amount taken was excessive'. [7]

Psychosocial assessments will be defined as in the previous study:
'an interview carried out by a member of mental health staff who has been trained in the process, is usually of about 30min 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'.

The audits will record every episode of self-harm in those aged 18 and over presenting to the study centres in a three month period. Service configurations for young people are likely to be markedly different from adult services and therefore those under 18 years old are excluded from this study. Individual level data will be collected using a simple one page audit form completed by emergency department or specialist mental health staff. The audit form will contain items relating to basic demographic, clinical data, details of the drugs taken in overdose and their recent contact with specialist mental health services (to inform other aspects of this programme). Details of in-hospital management will also be recorded, specifically whether the individual received a psychosocial assessment, whether they were admitted to a psychiatric or medical bed, whether they were referred for psychiatric follow up. At the end of each audit, to ensure complete case ascertainment has been achieved, a systematic search of the hospital's emergency department databases and registers will be carried out. Where individuals are identified as having been missed, audit forms will be completed by trust staff using the subject's emergency department, medical and mental health records. Similarly these sources will be used to obtain information where the audit forms have not been fully completed.

The index episode for each individual will be their first self-harm attendance during the study period. The main outcome will be hospital attendance with a repeat episode within six months. Repeat episodes will be identified through hospital databases by matching on name, date of birth, and NHS number if available. Patient identifiers will not be used on the audit forms. All data will be anonymised at source (at the participating hospital) before being sent to the research team. A named person within the trust will hold the key to enable subsequent patient attendances/episodes to be identified.

Sample size and analysis
The primary analysis will be hospital based. We will use meta-regression to assess the impact of key elements of service provision on repetition. A logistic regression analysis for repetition rate incorporating a random effect for hospital trust will be carried out. We will assess separately the effects of the following factors on repetition: proportion of individuals receiving a psychosocial assessment; proportion admitted to a medical bed; proportion admitted to a psychiatric bed; proportion referred for specialist mental health follow up.

In an individual based analysis we will examine the relationship between the key service factors and outcome using survival analyses (Cox Proportional Hazards regression). We will adjust as far as possible for differences in the case-mix of patients receiving different types of management. We will also take account of clustering by hospital.

Hospital level data: In order to measure the effect of hospital management on the proportion of patients repeating within six months, a sample size of 32 hospitals will enable us to detect correlations of 0.31 between continuous predictor variables and self-harm repetition (using Spearman's rank correlation coefficients and 2-sided significance levels of 5%). This will enable factors accounting for 9% or more of the variability in repetition rates between hospitals to be identified.

Individual level data: We estimate that approximately 4000 individuals will attend the study centres with a self-harm episode during the first three months of the study. If we consider the least common key service factor (admission to a psychiatric bed - occurring in 10% of index episodes), then this sample size will give us over 90% power to detect a clinically significant 5% difference in six -month repetition rates between those who are admitted and not admitted (7% vs. 12%).

Dissemination

We will disseminate the work through peer-reviewed publications and conference presentations. The Principal Investigators on this project are regularly asked to provide input to NICE Mental Health guidelines and other relevant policy documents and we will ensure our research findings are reflected in policy advice. We will also seek the views of users prior to dissemination, in particular whether the findings warrant specific dissemination strategies distinct from conventional academic dissemination.

References:

1. Gilbody SM, House AO, Sheldon TA. Outcomes research in mental health. Systematic review. *Br J Psychiatry* 2002;181:8-16.
2. Hawton K, Arensman E, Townsend E, Bremner S, Feldman E, Goldney R, et al. Deliberate self harm: systematic review of efficacy of psychosocial and pharmacological treatments in preventing repetition. *BMJ* 1998;317:441-447.
3. National Institute for Clinical Excellence Self-harm: The short-term physical and psychological management and secondary prevention of self-harm in primary and secondary care. National Institute for Clinical Excellence, 2004.
4. Royal College of Psychiatrists Assessment following self-harm in adults. London: Royal College of Psychiatrists, 2004.
5. Royal College of Psychiatrists. Better services for people who self-harm project. London: Royal College of Psychiatrists, 2005.
6. 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. *BMJ* 2004;328:1108-1109.
7. Morgan HG, Pocock H, Pottle S. the urban distribution of non-fatal deliberate self-harm *Br J Psychiatry* 1975; 126; 319-328

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation	Location in manuscript
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	*This is an observational study as specified in the 'Title' and 'Abstract' (under 'Design')*
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	*'Abstract' (under 'Setting', 'Outcome' and 'Results')*
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	*'Introduction' 1st and 2nd paragraph (p5)*
Objectives	3	State specific objectives, including any prespecified hypotheses	*Objectives are set out in the 'Introduction' section in the last paragraph (p5-6)*
Methods			
Study design	4	Present key elements of study design early in the paper	*'Abstract' and 'Methods' in subsections 'Setting and sample' (p6) and 'Analysis' (p8)*
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	*'Abstract' and 'Setting and sample' (p6) and 'Data collection' – 'Descriptive study' (p6) in the 'Methods' section.*
Participants	6	(*a*) *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	*Sources of data are described under 'Methods', subsection 'Setting and sample' (p6). Eligibility criteria and selection of participants for the descriptive study is described under 'Methods', subsection: 'Data collection' – 'Descriptive study' (p6-7) and under 'Service Interviews' (p7)*

		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case	*N/A*
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	*A description of variables is in 'Methods', subsection - 'Data collection': 'Descriptive study' 2nd paragraph (p7) and listed in 'Appendix 1'; 'Service interviews' (p7-8) and listed in 'Appendix 2'*
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	*'Methods', subsection - 'Setting and sample' (p6); 'Data collection': 'Descriptive study' 3rd paragraph (p7); 'Service interviews' 1st paragraph (p7)*
Bias	9	Describe any efforts to address potential sources of bias	*Case ascertainment was tested in a pilot study at each hospital 'Methods', subsection - 'Data collection': 'Descriptive study' 2nd paragraph (p7)*
Study size	10	Explain how the study size was arrived at	*As a comparative study the sample was based on the earlier study of 32 hospitals (which would enable us to detect correlations of 0.31 between total service scale scores and key aspects of management). See 'Methods', subsection – ' Setting and sample' (p6)*
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	*Total service score was treated as a continuous variable for aggregate level correlations and for comparisons over time we calculated overall*

			proportion, median and IQR. For groupings of clinical management variables see 'Results' sub section 'Comparison between 2001-2002 and 2010-2011' (p 11). The management variables were treated as binary (received vs. not received) and we calculated proportions by hospital see 'Table 1'. For comparisons of hospital management over time we calculated median and IQR see 'Table 2'
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	*'Analysis' (p8)*
		(*b*) Describe any methods used to examine subgroups and interactions	*N/A*
		(*c*) Explain how missing data were addressed	*Information was extracted from routinely collected data; if no information about a variable of interest was available then this was coded as absent – we acknowledge in the 'Discussion' section under 'Strengths and Limitations' 2nd paragraph (p15) that this may underestimate true prevalence. Analyses of comparisons were made on the 31 hospitals that were included in both studies see 'Analysis' 1st paragraph (p8) and 'Table 2'. Where we compared mental health data, only 30 hospitals were included in the analysis due to missing mental health data in one hospital (see footnote 'Table 2) and again acknowledged in 'Discussion' section under 'Strengths*

			and Limitations' 2nd paragraph (p15)
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy	*'Analysis' (p8)*
		(*e*) Describe any sensitivity analyses	*N/A*
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	*Study included all episodes of self-harm according to our study definition (see 'Methods' sub-section 'Data collection' – 'Descriptive study' (p7) and as reported in 'Results' section 'Characteristics of individuals' (p9))*
		(b) Give reasons for non-participation at each stage	*N/A: all study data were derived directly from hospital records*
		(c) Consider use of a flow diagram	*Not included*
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	*'Results' section, 1st paragraph (p9)*
		(b) Indicate number of participants with missing data for each variable of interest	*Data completeness was at least 90 % for all variables of interest and is described in more detail in 'Results' section, 1st paragraph (p9)*
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)	*N/A*
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time	*N/A*
		Case-control study—Report numbers in each exposure category, or summary measures of exposure	*N/A*
		Cross-sectional study—Report numbers of outcome events or summary measures	*Outcome events were self-harm episodes as reported in 'Tables 1 and 2'. Summary measures: Median, IQR, rates of management and total service*

			score (see 'Table2), proportions of key aspects of management (see 'Table' 1 and 'Figure 2')
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	*N/A – we did not calculate estimates*
		(*b*) Report category boundaries when continuous variables were categorized	*We categorized age as under 35 years and 35 years and older– see 'Results' 1st paragraph (p9). We did not categorize any other continuous variables*
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	*Not relevant*
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	*No other analyses were reported*
Discussion			
Key results	18	Summarise key results with reference to study objectives	*'Discussion' sub-section 'Main Findings' (p13-14)*
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	*Discussion' sub-section 'Strengths and Limitations' (p15)*
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	*Discussion' sub-section 'Strengths and Limitations' (p15)*
Generalisability	21	Discuss the generalisability (external validity) of the study results	*The generalisability of our study findings is inferred as we describe the robustness of our data in this large multi-site, national study in the Discussion' sub-section 'Strengths and Limitations' 1st paragraph (p15)*
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	'Acknowledgements' section (p3)

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

Title page:

Are hospital services for self-harm getting better? An observational study examining management, service provision and temporal trends in England

Cooper, J.[1], Steeg, S.[1], Bennewith, O.[2], Lowe, M.[1], Gunnell, D.[2], House, A., Hawton, K.[3], Kapur, N[1]

1. Centre for Suicide Prevention, University of Manchester, UK
2. School of Social and Community Medicine, University of Bristol, UK
3. Centre for Suicide Research, University Department of Psychiatry, Warneford Hospital, Oxford, UK

Corresponding author: Dr Jayne Cooper

Address: Jean McFarlane Building, University of Manchester, Oxford Road, Manchester M13 9PL

Telephone: +44 (0)161 275 0718

Email: jayne.cooper@manchester.ac.uk

Abstract

Objectives: To describe the characteristics and management of individuals attending hospital with self-harm and assess changes in management and service quality since an earlier study in 2001, a period in which national guidance has been available.

Design: Observational study.

Setting: A stratified random sample of 32 hospitals in England, UK. Participants: 6442 individuals presenting with 7689 episodes of self-harm during a three-month audit period between 2010-2011.

Outcome: Self-harm episodes, key aspects of individual management relating to psychosocial assessment and follow up, and a 21-item measure of service quality.

Results: Overall, 56% (3583/6442) of individuals were female and 51% (3274/6442) were aged under 35 years. Hospitals varied markedly in their management. The proportion of episodes that received a psychosocial assessment by a mental health professional ranged from 22%-88% (median 58%, IQR,48-70%); the proportion of episodes resulting in admission to general hospitals varied from 22-85% (median 54%, IQR, 41-63%); a referral for specialist mental health follow up was made in 11-64% of episodes (median 28%, IQR 22-38%); a referral to non-statutory services was made in 4-62% of episodes (median 15%, IQR, 8-23%); 0-21% of episodes resulted in psychiatric admission (median 7%, QR, 4-12%). Specialist assessment rate varied by method of harm; the median rate for self-cutting was 45% (IQR 28-63%) v. 58% (IQR 48-73%) for self-poisoning. Compared to 2001, there was little difference in the proportion of episodes receiving specialist assessment, there was a significant increase in general hospital admission, but a decrease in referrals for specialist mental health follow up. However, scores on the service quality scale had increased from a median of 11.5-14.5 (a 26% increase).

Conclusions: Services for the hospital management of self-harm remain variable despite national guidelines and policy initiatives. We found no evidence for increasing levels of assessment over time but markers of service quality may have improved.

This paper forms part of the study 'Variations in self-harm service delivery: an observational study examining outcomes and temporal trends'. The National Institute for Health Research Clinical Research Network (NIHR CRN) Portfolio database registration number: HOMASH 2 (7333). The NIHR Coordinated System for gaining NHS Permission (CSP) registration number: 23226

Article Summary

1. Article Focus

We aimed to:

- describe the characteristics and hospital management of self-harm across the same sample of 32 hospitals that took part in our earlier study carried out in 2001-2
- compare our findings with the results from the earlier study ~~conducted in 2001 in order~~ to explore whether ~~the service~~ variability between services had decreased and service quality had improved over a 10-year period.

2. Key Messages

- Despite national clinical and government guidelines, there was marked variability in service provision for patients presenting to Emergency Departments with self-harm between the 32 study hospitals in England
- Overall, four out of ten individuals left hospital without having had an assessment with a mental health specialist; this is important because the management patients receive in hospital (particularly the provision of psychosocial assessments) may well have an impact on outcomes
- Compared to 2001, there was little difference in the proportion of episodes receiving specialist assessment, a significant increase in general hospital admission, and a decrease in referrals for specialist mental health follow up but limited evidence for progress in markers of overall service quality

3. Strengths and Limitations

This was a large study of hospital attendances to emergency departments following self-harm using recent data at individual and episode level from multiple sites randomly selected from across England. We were able to include 31 of the original 32 sites. However, we only collected data on self-harm attendances at hospitals and did not record episodes that did not come to medical attention. As a country-wide descriptive study, the data sources were based on clinical records rather than in-depth interviews. If there was no information in the notes of an item of interest then this was coded as absent. As a consequence, some of our findings may underestimate the true prevalence of particular characteristics or associated factors.

Introduction

Self-harm is a major cause of presentation to hospitals and is linked to an elevated risk of early death[1]. Hospital services for self-harm in the UK over the past four decades have been characterised by variability of service provision [2] and contrasting patient experiences of care[3,4]. During the 1970's, wide variation in the management of patients with self-harm was found in ten psychiatric teams in one English city[5]. Twenty years later a two-fold difference was seen in the proportion of patients receiving a psychosocial assessment following self-harm in four hospitals in the north west of England[6]. The most comprehensive study of the management of self-harm to date, conducted in 2001/02 in 32 hospitals in England, found a two fold variation across hospitals in the levels of psychosocial assessment, a four-fold variation in general hospital admission, a ten-fold variation in psychiatric hospital admission and striking differences in the organisation and provision of services for patients with self-harm[7]. Subsequent to this there have been several policy documents giving guidance on appropriate service structures and the hospital management of self harm.

In 2004 two sets of clinical guidelines on the management of self-harm were published which included the recommendation that every patient presenting to hospital with self-harm should receive a psychosocial assessment before discharge from hospital[8,9]. In addition, the Royal College of Psychiatrists initiated the *Better Services for People who Self-harm Project*[10], an audit-based quality improvement project involving surveys of service users' experiences, staff attitudes and training, and care pathways. The two sets of guidelines and the *Better Services Project* might be expected to reduce the variability of services and improve the quality of care for self-harm patients.

In the current study we aimed to (i) describe the characteristics and hospital management of self-harm across the same sample of 32 hospitals that took part in our earlier study (ii) compare our

findings with the results from the earlier study in order to explore whether the service variability had decreased and service quality had improved over a 10-year period.

Methods

Setting and sample

A random sample of 32 hospitals was identified in our earlier investigation [7]. The original sample was stratified so that four hospitals were selected within each of the eight former Health Regions in England. Hospitals with no emergency department on site were not included. Thirty-one of the original 32 hospitals agreed to take part in the current study. The one hospital that declined to participate was replaced by an alternative randomly selected hospital from within the ~~appropriate~~ same stratum, as identified in the earlier study. Hospitals provided data on episodes of self-harm presenting to the Emergency Department (ED) (for the service audits) and on the structure of self-harm services (the service interviews).

Data collection

Descriptive study

Descriptive data were collected and recorded locally on site by clinical staff or Clinical Studies Officers (employed by the Trusts or national research networks), with the central research team overseeing the set up and administration of the data collection process. Guidelines for inclusion/exclusion criteria of individual items of data were provided to ensure data consistency between centres, with the research team answering specific queries. For each audit, data were collected on all episodes of self-harm in those aged 18 and over occuring during a three-month period. Service configurations for young people were likely to be markedly different from adult services and therefore those under 18 were excluded from this study. The exact time period varied between centres but all audits took place between May 2010 and June 2011.

Episodes of self-harm were identified from ED records using relevant search terms from our previous study [7] and from current self-harm monitoring systems in England [11,12]. The individual medical records of possible cases were examined to confirm case inclusion. As in the previous study, self-harm was defined as 'a deliberate non-fatal act whether physical, drug over-dosage or poisoning, done in the knowledge that it was potentially harmful and in the case of drug overdose that the amount taken was excessive' [13]. The robustness of this methodology was tested in each hospital in a pilot data collection exercise against all presentations for a brief period (one to two weeks) and/or against lists of presentations compiled by mental health teams, to identify missed cases. Search terms were adjusted accordingly to maximise case ascertainment. All data were anonymised at source (at the participating hospital) before being sent to the research team. A named person within the trust held the key to enable subsequent patient attendances/episodes to be identified.

Individual-level data were collected using a one page data collection sheet (see *Appendix 1*), which included demographic and clinical data, method of harm and the patient's recent contact with specialist mental health services. Details of in-hospital management were also recorded, specifically whether the individual received a psychosocial assessment (defined as 'an interview carried out by a member of mental health staff who has been trained in the process, is usually of about 30 minutes 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'[13]), whether they were admitted to a psychiatric or medical bed and whether they were referred for psychiatric follow up. Data were collected from both acute hospital and mental health medical records systems.

Service interviews

A key mental health and ED clinician involved in the provision of self-harm services, identified by the Local Collaborator at each Trust, were interviewed on the telephone or in person about

current service structures. Using the staff responses, hospitals were then rated on a measure of service quality developed as part of our previous study[7] (see *Appendix 2*: 21 Items of Service Quality) and based on the Royal College of Psychiatrists Guidelines for the general hospital management of self-harm [9]. These included the presence of a psychiatric liaison team within the ED, with appropriate support, training and supervision available for both ED clinicians and psychiatric staff, regular multi-disciplinary management meetings, contact arrangements with primary care and the existence of formal links with non-statutory services. Twenty-one items were scored '1' or '0' depending on the presence or absence of a particular aspect of the service. Consistency of coding was achieved by meetings and regular correspondence between key researchers from the earlier and current study. For two items (supervision arrangements for mental health staff who undertake psychosocial assessments and emergency attendance by a mental health worker available to the hospital ED within one hour) where such a strict categorisation was not possible, scores of '0', '0.5' or '1' were given in consultation with the research team. Therefore, hospitals could be potentially scored up to 21 on the Service Scale.

A summary of the methodology used in the present study and differences and similarities with our previous study is shown in Appendix 3.

Analysis

Analysis of the descriptive data was carried out at both individual patient level and at episode level. The characteristics of the cohort were examined based on each individual's first hospital presentation within the study period, the 'index' episode. Key aspects of clinical management were then measured using *all episodes* of self-harm (including any repeat presentations by the same individual during the data collection period) in the 31 hospitals that were included in the both studies. This approach allowed us to make direct comparisons with the earlier study, where individuals were not identified.

Aggregated hospital level data were used to compare the Service Scale scores of the hospitals and to examine changes in total Service Scale score and levels of hospital management over time. Spearman's rank correlation coefficient was used to measure associations between levels of hospital key management (using categories as set out in Table 2) and total service score. Differences in scores between the two time periods were tested using the matched-pairs signed-rank test. Analyses were conducted using Stata Version 11 [14] and SPSS Version 19 [15].

Local and ethical approval

This study received ethical approval from Tameside and Glossop NHS Research Ethics Committee in August 2009. The data collection process at each site was classified as a local audit and therefore patient consent was not required. Local approval was sought to carry out the study through the Research and Development departments at each participating NHS Trust. As part of this process, we approached potential local collaborators at each Trust commonly through the assistance of national research networks (for example Mental Health Research Network [MHRN]).

Results

Characteristics of individuals

A total of 6442 individuals presented with 7689 episodes of self-harm at the 32 hospitals during the three-month data collection period. Overall, 56% (3583) of individuals were female and 51% (3274) were aged under 35 years (age range, 18-94; median age, 34; interquartile range [IQR], 24 to 45). Information on ethnicity was not widely available for seven of the hospitals. Data were 85% complete in the remaining hospitals (4333); 93% (4017) of individuals were white, 3% (124) South Asian, 2% (78) black and 3% (114) were from other ethnic groups.

The main method of self-harm was known in 99.7% (6424/6442) of index episodes: self-poisoning with drugs in 79% (5073) of individuals, self-poisoning (other, for example bleach, anti-freeze,

batteries) in 2% (102), self-cutting in 14% (890) and other methods of harm (including burning, attempted hanging and jumping) in 6% (359). More detailed consideration of the methods used is beyond the scope of this paper and will be reported later. Data completeness was at least 90% for all other variables. Alcohol was taken within six hours of the self-harm act in 53% (3111/5828) of cases and recreational drugs in 7% (385/5828); previous self-harm had occurred in 51% (3173/6237) of individuals; patients were receiving psychiatric treatment at the time of their index self-harm episode in 32% (1982/6181) of cases; and 10% (636/6269) had been an inpatient in a psychiatric ward in the twelve months prior to the self-harm presentation.

Specialist assessment (all episodes)

A psychosocial assessment by a mental health specialist took place in 57% of all presentations. Seventy-six percent (3109/4075) of assessments were carried out by a mental health nurse (including mental health liaison nurses and those from specialist self-harm teams and crisis teams), 20% (799) by a psychiatrist (any grade) and 4% (167) by another mental health professional (such as a social worker). The median number of hours between time of hospital presentation and time of assessment was 11 (IQR, 5 to 21). For those not admitted to a medical bed, the median time to assessment was five hours (IQR, 3 to 9) compared to 14 hours (IQR 8 to 25) for those admitted. Episodes where alcohol had been taken within 6 hours of the self-harm act were assessed after a median wait of 12 hours (IQR, 6 to 20) compared to nine hours (IQR, 5 to 19) where no alcohol was involved. Episodes receiving specialist mental health assessment were more likely to result in follow-up care arrangements to specialist mental health outpatient services (45% vs. 13% for non-assessed episodes, p = <0.001) or to non-statutory services (21% vs. 12%, p = <0.001). A Wilcoxon signed-rank test showed that assessment rate was lower amongst those who self-cut as a method of harm (z = -3.745, p = <0.001) than those who self-poisoned, with a median hospital rate of 45% (IQR 28 to 63%) v. 58% (IQR 48 to 73%) respectively. In 15% of

episodes the individuals did not wait or refused assessment, 14% amongst episodes involving self-poisoning and 18% for self-cutting episodes (p = 0.005).

An assessment was conducted in only 68% (38/56) of episodes resulting in admission to an Intensive Care Unit (in one episode the patient self-discharged prior to assessment) compared to 57% overall (chi- square = 2.66, p=0.10). An assessment was conducted in 74% (60/81) of episodes involving strangulation, a higher proportion than overall (chi- square = 9.63, p=0.002) and in 7% (6/81) of episodes patients did not wait for assessment.

~~Table 1 about here~~

Variation in management of episodes between hospitals

There was wide variation between the 32 study hospitals in the proportion of episodes in which patients received key aspects of clinical management (Table 1 and Appendix 4). The proportion in which a psychosocial assessment was conducted varied from 24% to 88%.~~;~~ T~~t~~he proportion admitted to a medical ward varied between 22% to 85%. Each of the 32 hospitals had some form of short-stay ward or observation/assessment unit and medical admission here included referrals to these beds. There was no significant correlation between the proportion of episodes involving poisoning with drugs and the proportion admitted to a medical bed (Spearman's r = 0.249, P = 0.17). ~~; and~~ A~~a~~dmission to a psychiatric ward ranged from one hospital where there were no admissions to another where 21% of episodes resulted in in-patient care. The proportion of episodes resulting in a referral for specialist mental health follow up (excluding admission to a psychiatric ward) ranged from 11% to 64% (median 28%; IQR, 22 to 38%).

Comparison between 2001-2002 and 2010-2011

Whilst we could identify repeat episodes by the same individuals in the present study, the 2001/02 study was solely episode based. To enable like-for like comparisons with the earlier study the following analyses are based on all episodes presenting to the 31 hospitals (of the original 32) that were recruited for the current study.

As the duration of data collection for the earlier study and the present study varied, we compared the average number of self-harm attendances per four-week period in 2001/02 and 2010/11. We found an overall 24% increase in episodes (2075 v. 2563) and a 15% increase in the median number of episodes per hospital (65 (IQR 42 to 80) v. 75 (IQR 54 to 104)). Twenty-five out of 31 hospitals had a higher number of episodes in 2010/11 than in 2001/2. We compared the overall median proportions of episodes receiving key aspects of clinical management in the two time periods (Table 2). The proportion of episodes in which psychosocial assessment occurred was similar, with wide variation in assessment rates between hospitals in both study periods. A higher proportion of episodes in the present study resulted in admission to a medical ward compared to the previous study (an increase of 15%). The type of general hospital medical ward admitted to differed in the two time periods (2010/11 v. 2001/02): 32% v. 56% were to a general medical bed; 63% v. 28% to a short stay Medical Assessment Unit/Clinical Decision Unit attached to the ED; and 5% v. 16% other bed (not specified). The median proportion of episodes receiving specialist mental health follow up (including inpatient admission, referral to outpatient psychiatric care, Crisis Teams, Community Mental Health Teams and statutory drug and alcohol services) decreased by 13%. The median proportion of episodes in which an assessment was conducted with no evidence of subsequent follow-up arrangements (including no GP follow-up) was three percent compared to ten percent in 2001/02 (p=0.19 using a matched-pairs signed-rank test).

Table 2 about here

Comparison of service provision between 2001-2002 and 2010-2011 (service interviews)

There was statistical evidence (p=0.006) that service quality, as indexed by our service quality scale was better in 2010-11 vs. 2001-02 and the range in scores in the earlier study (three-fold) was greater than in the current study (two-fold difference). The total Service Scale score had increased in 74% (23/31) of hospitals, in 7/31 hospitals it had decreased and in one hospital the score had not changed since 2001. ~~(Figure 1).~~ The median score had increased from 11.5 to 14.5 in the present study, an increase of 26%. ~~The difference between the distribution of the scores in the two time periods was statistically significant (*P* = 0.006) using a matched pairs test and the range in scores in the earlier study (three-fold) was greater than in the current study (two-fold difference).~~

~~Figure 1 about here~~

The individual items which had shown improvement in the greatest number of hospitals were presence of a formal arrangement with Social Services to visit and offer advice to self-harm patients, regular (at least once a year) service planning/ strategy meetings taking place between the specialist mental health and general medical services, and supervision arrangements in place for staff members who undertook psychosocial assessments. Most hospitals (28/31) now had a designated self-harm service (defined as 'any liaison psychiatric service with at least one member of staff located within the ED'), compared with the earlier time period, where this service was available in 23/31 hospitals. Amongst the 22 hospitals where the Service Scale score had increased (and where the assessment status of patients was known), 59% (13/22) had a rate of assessment greater than the median, compared to 25% (2/8) amongst those with no increase in Service Scale score (chi- square = 2.72, P=0.099). Amongst the seven hospitals whose score had decreased since 2001 (one had remained the same), six no longer had private rooms available in which to carry out assessment, four no longer allowed all patients admitted to a medical bed to remain in hospital until a psychosocial assessment could be carried out, four no longer routinely

provided printed material about local services and four had not audited self-harm services in the past two years.

~~Figure 2 about here~~

Service Score and management

We found no association between measures of service quality (the total Service Scale score) and the proportion of episodes receiving a specialist psychosocial assessment at each hospital (Spearman's $r = 0.141$, $P = 0.46$)~~.~~ ; T~~t~~here was a positive correlation between total score and rate of specialist mental health follow up (Spearman's $r = 0.381$, $P = 0.038$) ~~[see Figure 2]~~. There was no significant association between a change in score since the previous study and a *change* in the rate of specialist mental health follow up (Spearman's $r = 0.171$, $P = 0.37$).

Discussion

Main findings

We collected data on over 6400 individuals who had presented with self-harm to 32 general hospitals across England in a three-month period. The characteristics of our sample were broadly consistent with other hospital-based studies in the UK [12], with the majority of episodes related to self-poisoning, and self-harm being more common in younger age groups and women. Alcohol was involved in just over half of cases and half of individuals had a previous history of self-harm. There was marked variability in service provision with an approximate 3.5-fold difference between hospitals in the proportion of episodes receiving a specialist assessment, a four-fold difference in medical admission, and an almost six-fold difference in the proportion of episodes referred for specialist follow up care. Frequency of admission to a psychiatric ward ranged from one hospital where there were no admissions to another where one in five episodes resulted in in-patient psychiatric care. Overall, four out of ten individuals left hospital without having had an assessment with a mental health specialist.

Disappointingly, given the introduction of clinical guidelines and policy emphasis, variations in service provision were as wide as ten years previously with no apparent improvement in key aspects of clinical management. Since the earlier study, the proportion of individuals receiving assessment from specialist services had remained static despite the NICE recommendation that *all* patients should receive an assessment of risk and needs. ~~People who self-cut were even less likely than others to be assessed and yet this group have been shown to be of greater risk of future suicide[16].~~ Those with more serious methods of harm, such as strangulation [16] and those who had been admitted to Intensive Care Unit had higher rates of assessment than overall (although the difference was not significant in the latter group). This possibly indicated recognition of high suicidal intent by clinicians in these groups although despite their high risk, [16] assessment was not universal. People who self-cut were less likely than others to be assessed and yet this group have been shown to be of greater risk of repetition [17] and future suicide in the UK[18~~6~~]. Consistent with other large scale surveys [19~~23~~], levels of assessment in those who had cut themselves were reduced - they were less likely to complete treatment and more likely to specifically refuse assessment. Levels of referral for specialist follow up had decreased, perhaps due to ~~a greater involvement of primary care in follow up arrangements [17]~~, pressures on specialist mental health services with a higher throughput of patients [20~~18~~], problems with accessing specialist services [21~~19~~], or constraints in referral due to Department of Health recommendation for Community Mental Health Teams to focus care on the severely mentally ill [22~~9~~]. The proportion of assessors who were mental health nurses had increased since the earlier study from 46% to 75%[13] but was similar to current nurse led self-harm service provision in the UK. [23] Evidence suggests that psychiatrists and nurses use similar factors to inform their risk assessments, although nurses may be less likely to admit to a psychiatric ward. [23] This may explain the overall decrease in the proportion of psychiatric admissions since 2001 although ~~T~~the ~~overall decrease in the proportion of psychiatric admissions~~ the decrease may also reflect ~~just be a reflection of~~ trends in ~~reducing~~ the number of psychiatric beds ~~hospital beds~~ and an increased emphasis on

community provision. ~~strengthening community ties.~~ It should also be noted that nearly one-fifth of individuals were referred for follow up from non-statutory services in this study.

The increased proportion of episodes resulting in medical admission may well have reflected the greater use of ED observation and assessment wards rather than an increase in acute admissions to general medical beds. Seventeen hospitals reported that the use of such beds had been introduced or had increased since the earlier study. This increase may partly have been driven by the policy emphasis on reduced waiting times in EDs [24~~11~~] where the target of a maximum of a four hour stay in the ED before discharge or transfer is recommended. As all hospitals in the current study had short-stay wards or medical observation/assessment units, the variation in proportion of medical admissions between hospitals cannot be attributed to availability of short stay wards. Differences between time of presentation and assessment may be explained by medical fitness and/or intoxication of the patient ~~The overall decrease in the proportion of psychiatric admissions may be a reflection of trends in reducing the number of hospital beds and strengthening community ties.~~

A measure of service quality developed as part of the previous study did show an improvement in 23 of the 31 hospitals with an overall 26% improvement in the median service quality score. The individual service items that showed an improvement in the greatest number of hospitals related to the availability of supervision, social services input, and joint service planning meetings between mental health and acute care services. Considering changes over time, we found the overall number of episodes of self-harm in the study centres increased by around one quarter. However, other studies have found no such increase[25~~12~~] and, as we did not correct for changes in population size, our findings might have partly reflected service consolidation rather than a true increase in incidence. We found that 24 of the 25 hospitals with an increased number of self-harm episodes also had an increased number of beds, perhaps suggesting higher levels of activity overall or reflecting hospital mergers.

Strengths and Limitations

This was a large study of hospital attendances to emergency departments following self-harm using recent data at individual and episode level from multiple sites randomly selected from across England. Different electronic systems in the study hospitals required individual methodologies to identify and capture data. However, the robustness of data was affirmed at each study site by the individual data collectors, and pilot data collection was carried out in each centre.

Nevertheless, our findings should be interpreted in the context of a number of methodological limitations. We only collected data on self-harm attendances at hospitals and did not record episodes that did not come to medical attention. As a country-wide descriptive study, the data sources were based on clinical records rather than in-depth interviews. If there was no information in the notes of an item of interest then this was coded as absent. As a consequence, some of our findings may underestimate the true prevalence of particular characteristics or associated factors. Another potential weakness was that our data on follow up were based on referral to services rather than actual receipt of interventions following discharge from hospital. Although data completeness was high overall and we were able to include 31 of the original 32 sites, there were some difficulties relating to individual hospitals. For example, in one acute Trust, patients received mental health care from a variety of mental health providers, so mental health data were unavailable for a small proportion of presentations. Within another site, data sharing agreements between acute and mental health trusts could not be achieved, which again resulted in missing mental health data. The Service Scale measure was developed as part of our previous study and was based on key elements of national guidance. Its use in the current study was principally to allow comparison with data from 2001 rather than as a standalone measure of service quality. Nonetheless, it should be borne in mind that properties of the scale, such as its underlying factor structure, have not been investigated.

Implications for research and practice

Our study suggests that despite national guidelines and policy initiatives, hospital service provision in England for self-harm patients remains highly variable. This is important because the management patients receive in hospital (particularly the provision of psychosocial assessments) is associated with follow up care and may well have an impact on outcomes [19 23, 26 4]. Why have services not shown clear signs of improvement? It is possible of course that official guidance has simply not been implemented. Improvements to services may also have been made more difficult due to wider re-organization of NHS care - increasingly, NHS providers have merged organisations as a response to challenges in delivering care of an acceptable standard within budgetary constraints [27 5]. However, there are some indications that services may be getting better in other ways - the number of specialist teams managing self-harm have increased. Composite measures of service quality/provision also seem to have improved: we found higher service scale scores than in the past and these were associated with higher rates of referral to mental health services. This improved quality is not necessarily reflected in all aspects of individual management – on average only 60% of individuals receive a psychosocial assessment when they attend hospital following an episode of self-harm and this proportion has remained static over the last decade. This may be partly a result of increasing demand on services. We should also bear in mind that it is not possible to determine how services would have developed in the absence of guidelines – it is conceivable that the situation would have been much worse than it is currently.

New NICE guidance on the longer-term management of self-harm was published in November 2011 [28 6]. The question of whether this and future policies will have a positive effect on the quality of services and patient outcomes will need careful evaluation. The effect of the new self-harm guideline on future practice may be greater because of the increased focus on implementation (http://guidance.nice.org.uk/CG133) and the development of Quality Standards

(key aspects of the quality of care that will be used to commission and assess services in the new NHS). Self-harm Quality Standards ~~are due to be~~were published in June 2013. In terms of future research, developing consistent measures of service quality would be worthwhile. We also need to better understand the link between management and outcome. This is an important but methodologically challenging area and outcomes should include service user evaluation of their experiences. We also need to understand which aspects of treatment are beneficial in routine practice and why, and in which groups of individuals treatments might have the most impact. The role of psychosocial assessment warrants particular attention [19~~24~~]. Randomised trials of national service-level interventions are sometimes possible [29~~27~~] and when they are not, observational designs~~-~~ (e.g., pre-post studies [30~~28~~]) may be worthwhile. Of course linking findings on variability of services to outcomes is of interest but this would require substantial further analysis that goes beyond the scope of the current report . However we hope to address these issues in future publications.

Conclusion

National guidelines and policy initiatives appear to have had little impact on the variability of self-harm service provision. Around 60 percent of individuals can expect a psychosocial assessment when they attend hospital following an episode of self-harm, and this proportion has remained static over the last decade or so. There is some evidence to suggest that the overall quality score of self-harm services may have improved, although this is not borne out by individual process measures of hospital management.

Table 1: Summary hHospital characteristics and variation in management of self harm patients across 32 English hospitals in 2010/11

Hospital	Service scale score (maximum 21)	Total individuals during audit	Total episodes during audit	No. (%) Eepisodes receiving specialist psychosocial assessment [ba]	No. (%) eEpisodes admitted to a medical bed [b]	No. (%) eEpisodes with referral for mental health follow-up care [ba]	No. (%) eEpisodes admitted to a psychiatric ward [ba]
1	17.5	219	244	124(51)	207(85)	37(16)	8(3)
2	13.5	100	122	70(59)	55(45)	27(23)	13(11)
3	13.5	157	175	54(31)	94(54)	75(43)	7(4)
4	10.5	143	168	119(72)	98(58)	50(30)	13(8)
5	13.5	225	254	132(55)	131(52)	90(36)	14(6)
6	11	141	176	77(50)	109(62)	30(22)	5(4)
7	11	326	366	154(50)	277(76)	64(22)	17(6)
8*	15	189	238	58(24)	84(35)	44(22)	0(0)
9	11	194	233	132(58)	147(63)	41(19)	9(4)
10	14.5	199	225	92(42)	59(26)	62(28)	15(7)
11	12	300	369	255(75)	230(62)	103(32)	4(1)

12	11.5	142	157	78(50)	48(31)	37(24)	10(7)
13	17.5	129	158	94(60)	75(47)	42(30)	16(11)
14	16	296	395	158(42)	94(24)	120(32)	49(13)
15	18.5	450	518	343(69)	277(53)	185(38)	69(14)
16	17.5	275	318	185(59)	218(69)	72(23)	8(3)
17[a]	15	85	90	-	49(56)	-	-
18	16	153	179	74(43)	74(47)	24(24)	2(2)
19*	12	178	220	83(39)	90(41)	43(20)	14(7)
20	13	171	205	127(64)	111(54)	77(41)	24(13)
21	18.5	178	198	139(70)	44(22)	72(38)	27(14)
22	15.5	182	195	97(61)	93(48)	37(23)	34(21)
23	14	112	125	74(59)	65(52)	30(24)	24(20)
24	11	123	141	115(88)	99(70)	56(43)	7(5)
25	16	193	232	184(80)	147(63)	111(48)	28(12)
26	16	132	162	113(71)	64(40)	92(57)	20(12)
27	19	339	466	333(72)	367(79)	219(57)	50(11)
28*	13	243	299	107(36)	198(66)	33(11)	22(7)

~~29~~	~~16~~	~~272~~	~~312~~	~~141(45)~~	~~107(34)~~	~~72(23)~~	~~17(6)~~
~~30~~	~~14.5~~	~~271~~	~~326~~	~~252(77)~~	~~257(79)~~	~~205(64)~~	~~12(4)~~
~~31~~	~~14.5~~	~~99~~	~~111~~	~~55(50)~~	~~53(48)~~	~~38(34)~~	~~7(6)~~
~~32~~	~~10.5~~	~~226~~	~~312~~	~~166(54)~~	~~194(62)~~	~~64(21)~~	~~14(4)~~
~~Summary:~~ M~~m~~edian (range)	14.5 (10.5-19)	186 (85-450)	223 (90-518)	58% (24-88)	54% (22-85)	28% (11-64)	7% (0-21)

~~*These hospitals had no designated self-harm service~~

~~[b] Based on complete data~~

[a] Information ~~on assessment and inpatient psychiatric admission was not widely available in hospital 17~~was based on 31 hospitals because mental health records were not accessed in one hospital

Table 2 Changes in service provision and hospital management: 2001-2002 v. 2010-2011 (*n* = 31)

	2001-2002	2010-2011	*P* value[#]
Total episodes	4150	7599	
Specialist mental health assessment [a]			
Median, % (IQR, %)	55 (44-71)	58[a] (45-70)	0.85
Admission to medical ward			
Median, % (IQR, %)	39 (29-58)	54 (41- 63)	0.02
Specialist mental health follow-up [a] (including admission)			
Median, % (IQR, %)	51 (46-63)	38[a] (26-48)	< 0.001
Referral to non-statutory mental health /voluntary/other services[a]			
Median, % (IQR, %)	14 (7-20)	15[a] (8-23)	0.24
Referral to GP[a]			
Median, % (IQR, %)	36 (22-45)	36[a] (15-64)	0.30
Psychiatric admission[a]			
Median, % (IQR, %)	9 (7-15)	7[a] (4-12)	0.05
Total service scale score			
Overall score (%)	375.5/651 (58)	442/651 (68)	
Median (IQR)	11.5 (10-14)	14.5 (11.5-16)	0.006

[#] P value for Wilcoxon matched-pairs signed ranks test

[a] calculated from 30 hospitals (we did not have access to mental health data for one of the sites)

Acknowledgements

This paper presents independent research funded by the National Institute for Health Research (NIHR) under its Programme Grants for Applied Research Programme (Grant Reference Number RP-PG-0606-1247). The views expressed are those of the author(s) and not necessarily those of the NHS, the NIHR or the Department of Health.

Avon and Wiltshire Mental Health Partnership NHS Trust host the research programme. KH and DG are NIHR Senior Investigators. KH is also supported by Oxford Health NHS Foundation Trust and NK by the Manchester Mental Health and Social Care Trust. We would also like to thank the Local Collaborators at each of the 62 NHS Trusts, NHS staff and Clinical Science Officers attached to Mental Health Research Network who assisted locally in the setting up and data collection for this study.

Conflicts of Interest

DG, KH and NK are members of the Department of Health's (England) National Suicide Prevention Advisory Group. NK was chair of the NICE guideline development group for the longer term management of self –harm, chaired the NICE Topic Expert Group (which developed quality standards for self-harm services) and chaired the NICE evidence update for self-harm.

Contributorship

NK and JC designed the study with input from DG, OB, AH and KH. DG, KH and NK obtained funding to conduct the study. JC was responsible for data collection with assistance from OB and ML. JC and SS extracted and processed the data. SS analysed the data with assistance from NK and JC who also interpreted the results. JC wrote the first draft of the paper. All authors contributed to subsequent drafts and have approved the final version of the manuscript.

References

1. Bergen H, Hawton K, Waters K, Ness, J Cooper J, Steeg S, Kapur N. Premature death after self-harm: a multicentre cohort study. *Lancet* 2012; Published online September 18, http://dx.doi.org/10.1016/S0140-6736(12)61141-6
2. Sinclair, JMA, Gray, A, Hawton K. "Systematic review of resource utilization in the hospital management of deliberate self-harm." *Psychol Med* 2006; 36(12): 1681-1693.
3. Taylor TL, Hawton K, Fortune S, Kapur N. Attitudes towards clinical services among people who self-harm: systematic review. *B J Psych*, 2009; 194: 104-110.
4. Hunter C, Chantler K, Kapur N, Cooper J. Service user perspectives on psychosocial assessment following self-harm and its impact on further help-seeking: A qualitative study. *J Affect Disorders*, 2013; 145 (3), 315-323. DOI: http://dx.doi.org/10.1016/j.jad.2012.08.009
5. Blake DR and Mitchell JRA. Self-poisoning: management of patients in Nottingham, 1976. *BMJ*, 1978; 1: 1032-1035.
6. 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, *BMJ*, 1998; 316: 831-832.
7. 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. *BMJ* 2004; 328:1108-1109.
8. National Institute for Health and Clinical Excellence. The short-term physical and psychological management and secondary prevention of self-harm in primary and secondary care. Clinical Guideline 16. NICE, 2004.
9. Royal College of Psychiatrists. Assessment following self-harm in adults. London: Royal College of Psychiatrists; 2004.
10. Royal College of Psychiatrists. Better services for people who self-harm project. London: Royal College of Psychiatrists, 2005.
11. Dickson S, Steeg S, Gordon M, Donaldson I, Matthews V, Kapur N & Cooper J. *Self-Harm in Manchester 2008-2009*. Published 2011; The Centre for Suicide Prevention: The University of Manchester.
12. Hawton K, Bergen H, Casey D, Simkin S, Palmer B, Cooper J, Kapur N, Horrocks J, House A, Lilley R, Noble R, Owens D. Self-harm in England: A tale of three cities. *Soc Psych Psych Epid* 2007; 42: 513-521.
13. Gunnell, D, Bennewith, O, Peters, TJ, House, A and Hawton, K. The epidemiology and management of self-harm amongst adults in England. J Public Health (2005) 27 (1): 67-73. doi: 10.1093/pubmed/fdh192
14. Statacorp. Stata Statistical Software: Release 11: 2009; Stata Corporation, College Station.
15. SPSS Inc. SPSS for Windows Release 19.0.0. 2010; SPSS Inc., Chicago.
16. Runeson B, Tidemalm D, Dahlin M, Lichtenstein P, Langstrom N. Method of attempted suicide as predictor of subsequent successful suicide: national long term cohort study. BMJ 2010; 340: c3222. doi:10.1136/bmj.c3222
17. Lilley R, Owens D, Horrocks J, House A, Noble R, Bergen H, Hawton K, Casey D, Simkin S, Murphy E, Cooper J, Kapur N. Hospital care and repetition following self-harm: a multicentre comparison of self-poisoning and self-injury. Br J Psychiat 2008; 192: 440-445
18. Cooper, J, Kapur, N, Webb, R, Guthrie, E, Lawlor, M, Macway-Jones, K & Appleby. 'Suicide following deliberate self-harm: a 4 year cohort study' American Journal of Psychiatry 2005; 162:297-303

~~18.~~19. Kapur N, Murphy E, Cooper J, Bergen H, Hawton K, Simkin S, Casey D, Horrocks J, Lilley R, Noble R, Owens D. Psychosocial assessment following self-harm: Results from the Multi-Centre Monitoring of Self-Harm Project. *J Affect Disorders* 2008; 106; 285–293.

~~19.~~20. King C. Severe mental illness: Managing the boundary of a CMHT. *Journal of Mental Health* 2001, 10:75-86.

~~20.~~21. Mind for better mental health. Mental health crisis care: commissioning excellence. A briefing for Clinical Commissioning Groups November 2012. http://www.mind.org.uk/assets/0002/2011/CommissioningExcellence_WEB_VERSION_2.pdf

22. Department of Health: *Mental Health Policy Implementation Guide: CommunityMental Health Team,* The Stationery Office, London; 2002.

~~21.~~23. Murphy E, Kapur N, Webb R, **Cooper J.** Risk assessment following self-harm: comparison of mental health nurses and psychiatrists. Journal of Advanced Nursing 2011; 67; .127-139

~~22.~~24. Department of Health. The NHS Plan. A Plan for Investment. A Plan for Reform London Stationery Office (2000) accessed April 2013. http://webarchive.nationalarchives.gov.uk/20130107105354/http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4002960

~~23.~~25. Bergen H. Hawton K. Waters K, Cooper, J & Kapur, N. Epidemiology and trends in non-fatal self-harm in three centres in England: 2000-2007. *Br J Psychiatry* 2010;**197**:493-98 doi:10.1192/bjp.bp.110.07765

~~24.~~26. Barr W, Leitner M, Thomas J . "Self-harm patients who take early discharge from the accident and emergency department: how do they differ from those who stay?" *Accid Emerg Nurs* 2004; 12(2): 108-113.

~~25.~~27. ~~Kapur N, Murphy E, Cooper J, Bergen H, Hawton K, Simkin S, Casey D, Horrocks J, Lilley R, Noble R, Owens D. Psychosocial assessment following self-harm: Results from the Multi-Centre Monitoring of Self-Harm Project. *J Affect Disorders* 2008; 106; 285–293.~~

~~26.~~28. Ham, C & Dixon, A. Tackling the problems of seriously challenged NHS providers : *BMJ* 2012; 344:e4422.

~~27.~~29. National Institute for Health and Clinical Excellence. The long term care and treatment of self-harm. Clinical Guideline 133. NICE, 2011.

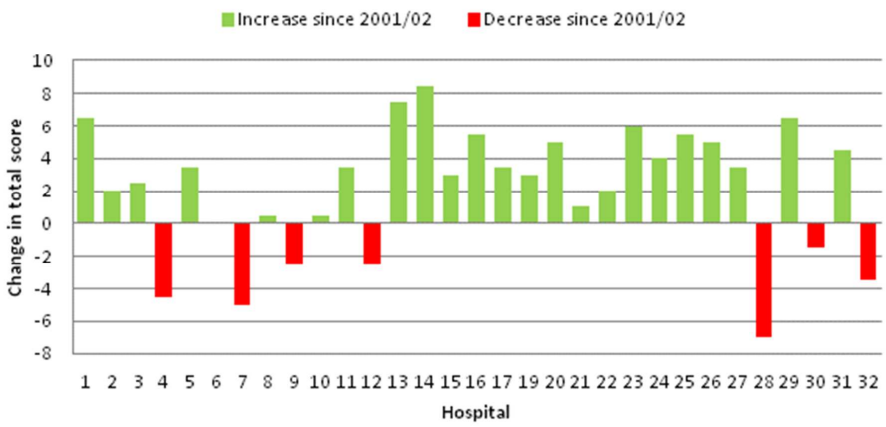
~~28.~~30. Burns T, Rugkåsa J, Molodynski A, Dawson J, Yeeles K, Vazquez-Montes M, Voysey M, Sinclair J, S. Community treatment orders for patients with psychosis (OCTET): a randomised controlled trial. *Lancet* 2013; doi:10.1016/S0140-6736(13)60107-5.

~~29.~~31. While D, Bickley H, Roscoe A, Windfuhr K, Rahman S, Shaw J, Appleby L & Kapur N. Implementation of mental health service recommendations in England and Wales and suicide rates, 1997-2006: a cross-sectional and before-and-after observational study. *Lancet* 2012; 379: 1005-1012.

Formatted: Normal, Add space between paragraphs of the same style

Formatted

Figure 1: Change in total Service Scale score: 2001-2002 v. 2010-2011 *(n = 31)*[a]

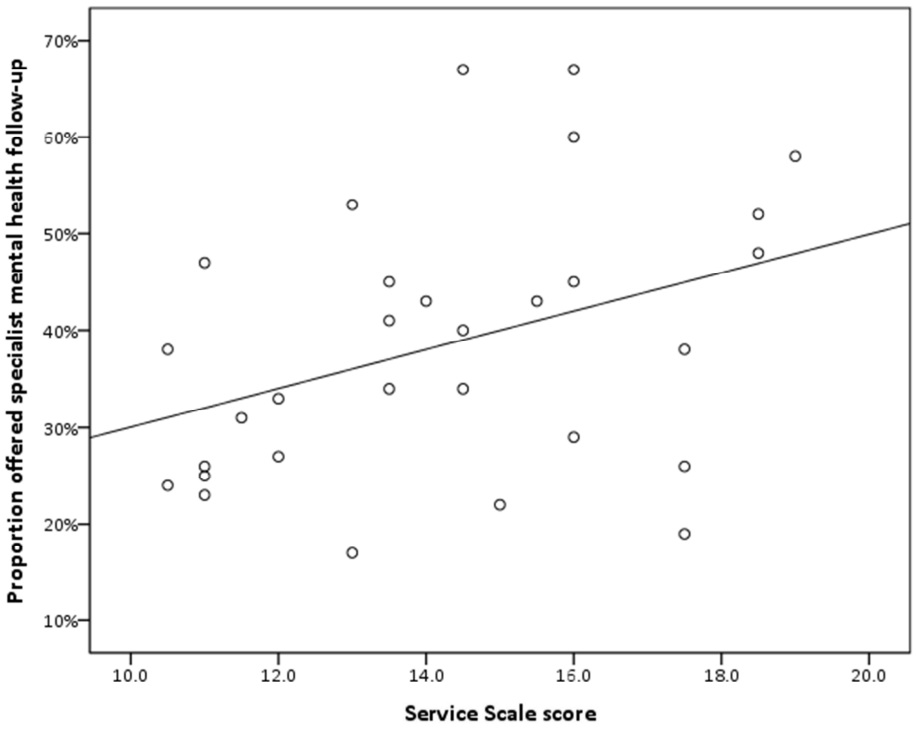


[a]Hospital 18 was not included in the earlier study so is excluded from these results

Differences in scores between time periods ranged from -7 to +8.5, with increased scores indicating improvement in services

Formatted: Font: (Default) Calibri, 11 pt

Figure 2: Correlation between Service Score and proportion of episodes offered mental health follow-up in 2010-2011 *(n = 30)*[a]



[a]Hospital 18 was not included in the earlier study and we did not access mental health data in hospital 17 so both are excluded from these result

Formatted: Font: