

Self-harm in university students: A comparative analysis of data from the Multicentre Study of Self-harm in England

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ABSTRACT

Background: Increases in poor mental health and suicide have been identified among university students in the UK. However, little is known about self-harm in this group.

Aims: To describe and identify care needs of university aged-students who self-harm via comparisons with an age-equivalent non-student group who self-harm.

Methods: Observational cohort data from The Multicentre Study of Self-harm in England were used to investigate students aged 18 to 24 years who presented to emergency departments for self-harm, 2003 to 2016. Data were collected via clinician reports and medical records from five hospitals in three English regions. Characteristics, rates, repetition, and mortality outcomes were investigated.

Results: The student sample included 3491 individuals (983, 28.2 % men; 2507, 71.8 % women; 1 unknown) compared to 7807 (3342, 42.8 % men; 4465, 57.2 % women) non-students. Self-harm increased over time in students (IRR 1.08, 95%CI 1.06–1.10, $p < 0.01$) but not in non-students (IRR 1.01, 95%CI 1.00–1.02, $p = 0.15$). There were differences in monthly distribution of self-harm with more presentations by students in October, November, and February. Characteristics were broadly similar, but students reported more problems with studying and mental health. Repetition (HR 0.78, 95%CI 0.71–0.86, $p < 0.01$) and mortality (HR 0.51, 95%CI 0.33–0.80, $p < 0.01$) were lower in students than non-students.

Conclusions: Self-harm in students may be directly related the student experience, such as academic pressure, relocation, and the transition to independent living. Wellbeing initiatives targeting these factors, alongside mental health awareness training for academic and non-academic staff may help to support students at risk.

1. Introduction

Self-harm and suicide in young people are key public health concerns (Department of Health, 2017). Previous self-harm is one of the strongest risk factors associated with suicide, and recent reports show high rates of self-harm among young people (Bould et al., 2019; McManus and Gunnell, 2020; Farooq et al., 2021). Increased self-reported mental health problems, suicide ideation, depression, suicide attempt and suicide have been reported among university students in the UK and internationally (Yang et al., 2015; Eskin et al., 2016; Peltzer et al., 2017; Mortier et al., 2018; Akram et al., 2020; Gunnell et al., 2020).

Some studies show lower rates of suicide, self-harm and mental health problems in the student population than in age-equivalent general populations, but a number of factors common among students may

still confer risk in this large segment of young people (Hawton et al., 2012; McManus and Gunnell, 2020). An increasing number of students in the UK are from relatively deprived socioeconomic backgrounds, which are associated with higher incidence of self-harm (Department for Education, 2019; McManus et al., 2019). Female gender, being lesbian, gay or bisexual, being single, living alone, and migration status all increase risk for suicidal thoughts and self-harm among UK and European students (McManus and Gunnell, 2020; Taylor et al., 2020).

Increases in self-harm and suicide during exam periods have been reported, possibly reflecting periods of increased stress during the academic year (Gunnell et al., 2020; Rodway et al., 2020). Life changes, such as the transition from school to higher education and living independently, may exacerbate mental health problems and self-harm (Cleary et al., 2011). Poor mental health outcomes in students are

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associated with loneliness, social isolation, poor study/social life balance, experimenting with drugs and alcohol, and challenging financial circumstances (Cleary et al., 2011; Bergin and Pakenham, 2015; Richardson et al., 2015). A study of Norwegian students found those experiencing financial difficulties were more likely to report mental health problems and self-harm (Bøe et al., 2021).

A rise in reported mental health problems among students has taken place alongside an increase in the undergraduate student population in the UK. A concomitant increase in help-seeking has increased pressure on institutional counselling services, especially for more high-intensity support (Ishii et al., 2018; Higher Education Statistics (HESA), 2021). While research suggests worsening mental health among students overall, there is a lack of information on hospital-presenting self-harm among this group, with the majority of work cross-sectional and focussed on younger school-aged adolescents where self-harm is known to be high (Geulayov et al., 2018; McManus et al., 2019). There has been little exploration of trends in self-harm in this group or the timing of self-harm throughout the academic year. The Multicentre Study of Self-harm in England, involving data collection in centres with varied levels of socioeconomic deprivation and several major universities, offers an opportunity to investigate self-harm in students of university age.

The aims of this study were to:

- Investigate trends in hospital-presenting self-harm among students aged 18 to 24 years, over time.
- Examine the frequency of self-harm in relation to calendar month.
- Compare demographic characteristics, methods of self-harm, problems preceding self-harm and referral following self-harm between students and an age-equivalent group of non-students who had self-harmed.
- Compare 12-month repetition of self-harm and mortality following self-harm in students and an age-equivalent group of non-students.

2. Method

2.1. The Multicentre Study dataset

The core Multicentre Study data included information on hospital emergency department presentations for self-harm to general hospitals in Oxford, Manchester, and Derby (one hospital in Oxford, three hospitals in Manchester, and one hospital in Derby; local audits have shown these hospitals cover most emergency department presentations made by people resident within the relevant local authority areas e.g., approximately 95 % coverage in Manchester, collected from 1st January 2000 to 31st December 2016).

Data is collected on all emergency department presentations for self-harm from two sources, 1) from review of emergency department patient records by experienced data collectors, or 2) from psychosocial assessments conducted by psychiatric liaison teams (or assessments by emergency department clinicians in Manchester). Information on sex, age, and method of self-harm are collected for all self-harm presentations. More detailed information on clinical characteristics (e.g., history of self-harm, previous contact with psychiatric services), the type of problems that may have precipitated the self-harm, and onward referrals from the emergency department, are only available where the person has received a specialist assessment following their emergency department presentation for self-harm.

A core aspect of the Multicentre Study dataset is that all cases are followed-up for mortality status via linkage with Office for National Statistics (ONS) records through NHS Digital. Individuals were followed up to 31st December 2019, enabling a minimum of 3 years and maximum of 17 years follow-up for the study cohort. Follow-up ends when a mortality event occurs, or when an individual leaves the healthcare system (e.g., leaves the country). Follow-up for all other individuals ends on 31st December 2019. Deaths were coded using the International Classification of Diseases version 10 (ICD-10) underlying

cause of death codes. Intentional self-harm (ICD-10 codes X60-X84) or undetermined intent (ICD-10 codes Y10-Y34) were defined as suicides, consistent with UK suicide research policies.

Self-harm is defined as any act of non-fatal intentional self-poisoning or self-injury, irrespective of motivation or degree of suicidal intent (Hawton et al., 2003).

2.2. Study sample

Cases were ascertained using the ‘employment status’ variable within the Multicentre Study dataset, which includes a category for ‘student’. In Manchester and Derby, employment status is collected on all cases. In Oxford this information is largely recorded during psychosocial assessment but is also collected by data collectors from patient records where possible. The employment categories are exclusive, therefore, a person can only be allocated to one category at the time of a presentation for self-harm. Over 75 % of self-harm presentations recorded on the study database have employment/student data recorded.

People were included in the ‘student’ group if they indicated being a student in the ‘employment status’ variable and were aged 18 to 24 years (inclusive) at the time of the self-harm presentation. People aged 18 to 24 years make up around 80 % of the undergraduate population in England and most of the sample would therefore have been university students. It was not possible to differentiate different types of students (e.g., those in further education rather than higher education). Part-time students may or may not be included in the ‘student’ category, depending on patient self-identification. Younger people in this age-group may still be attending school, therefore additional sensitivity analyses were conducted removing those aged 18 years from the analysis.

The comparison group of ‘non-students’ were people who presented to the emergency department for self-harm during the study period, who were of equivalent age to the student group, and were recorded in the ‘employment status’ variable as: employed (full or part-time), unemployed, registered sick/disabled, house-person, and ‘other’ employment status. Any person without a valid response in the employment status variable was excluded. To avoid the possibility of people appearing in both groups due to changes in student/employment status over time, anyone included in the student sample was excluded from the ‘non-student’ comparison sample.

The study period was restricted to 1st January 2003 to 31st December 2016, with a mortality follow-up to 31st December 2019. In Manchester, data was only available for people assessed by psychiatric services prior to 2003 (e.g., people who did not receive an assessment were not included), therefore only data from 2003 onward were included in the analyses to ensure consistency between sites.

2.3. Study setting

There were approximately 1.4 million people enrolled as full-time undergraduate students at higher education institutions in England in 2020/21 (data from HESA.ac.uk). The Multicentre Study collects information on self-harm from sites in Oxford, Manchester, and Derby. All sites have local higher education institutions, with Oxford and Manchester being particularly well known for having large student populations. There are three higher education institutions in the city of Manchester: The University of Manchester, The Manchester Metropolitan University, and the Royal Northern College of Music, with a combined 55,355 full-time undergraduates registered in 2020/21. Oxford has two main institutions: The University of Oxford and Oxford Brookes University, with a combined total of 24,635 full-time undergraduates in 2020/21. Derby has a more modest student presence with one institution, The University of Derby, with 12,315 undergraduate students. These sites represent just under 7 % of the total full-time undergraduate population of England. It may also be important to note that these

students enrolled in institutions close to the study sites may also be resident within the local area.

In England the academic year typically runs from 1st August to 31st July the following year and follows a two-semester structure. Institutions typically usually require undergraduate students to attend from mid-September to mid-December and mid-January to early-June, with a short break around Easter each year (these can be considered as three ‘terms’ or ‘term-time’ periods when students are on campus). Exam periods may vary by institution, but often take place in January and May/June. Results are reported in academic years where relevant.

2.4. Data analysis

2.4.1. Self-harm rates and trends over time

Rates of self-harm were calculated using the number of self-harm presentations by individuals recorded as students within each academic year ($n = 3517$). Denominator data was taken from the Higher Education Statistics Agency (HESA; hesa.ac.uk/data-and-analysis/students). HESA is a trusted source of higher education data and analysis working with higher education providers to produce open-source higher education data. Higher education institutions were identified via local knowledge of the authors, with additional checks made via internet searches in each study area. HESA data on total undergraduate student numbers by gender were obtained for each local institution and pooled.

Denominator data from HESA were only available for all local institutions for 2014/15 and 2015/16 (academic years). Therefore, to account for increases in student numbers over time, the denominator figure was estimated for all academic years before 2014/15. To create the estimate, the average year-on-year percentage change in total undergraduate student numbers was calculated (between 2003/04 to 2013/14). Using the accurate figures from 2014/15, the percent change was applied sequentially to previous years to reduce the number of students for the previous academic years (average annual local undergraduates from HESA $n = 91,998$).

For comparison, rates were also calculated for the non-student self-harm sample (non-students are described above under *Study sample*). For non-students the numerator was the number of people resident within the study areas who presented for self-harm ($n = 9627$), and the denominator was area and age matched ONS population data (annual average age-equivalent local population from ONS $n = 140,407$). To reduce potential bias from individuals who presented multiple times, only the first self-harm presentation recorded for each person, within each academic year, was included in the rates calculations (for both the student and non-student groups). Suicide rates per 100,000 of the student population are also presented for context and these data are taken from official ONS estimates of suicide in higher education students in England and Wales ([Office for National Statistics, 2018](https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/mentalhealth/articles/suicideinhighereducationstudentsinenglandandwales/2018-01-26)).

Poisson regression analysis (or negative binomial analysis, based on goodness-of-fit statistics) was used to examine trends over time and monthly distribution of presentations across the academic year. For trends analysis exposure was the study-area student/non-student populations for each year (e.g., denominator data as described above). For monthly distribution August was used as the reference category as the first month of the academic year to be consistent with HESA definitions.

2.4.2. Comparison of characteristics

Comparison of characteristics between student and non-students was conducted at the individual-level. For the student sample (total $n = 3491$, or $n = 2682$ for variables that require an assessment to be completed), the first episode on the study database where student status was indicated was used; for non-students (total $n = 7807$, or $n = 6543$ for variables that require an assessment to be completed), the first episode on the study database where ‘employment status’ details were recorded was used. A complete-case analysis approach was taken. Individuals with missing information on an item were therefore excluded from analyses of that item (the denominator therefore changed depending on

the number of cases excluded for each analysis). The total $n\%$ of missing data was included in the tables to add context. Chi Square tests were used to identify significant associations between student status and characteristics.

2.4.3. Twelve-month repetition and mortality follow-up

Separate cox proportional hazards models were used to examine 12-month risk of repetition, and mortality.

Twelve-month repetition identifies any person who presented for self-harm a second time within 12 months of an initial emergency department presentation for self-harm. There may be multiple repeat presentations by any individual across the 14-year study period, and each presentation is followed up for 12 months. There were 2350 student presentations and 7343 non-student presentations included in the analysis. To allow for a full 12-month follow-up the self-harm data was restricted to 2003 to 2015 (inclusive). The mortality follow-up period was from 2003 to 2019 (inclusive) and included all individuals where mortality information had been provided by ONS (for students $n = 2598$ and for non-students $n = 6616$).

Models were run on student status alone (unadjusted), and then with age and gender included (adjusted). A further explanatory model included additional factors known to be associated with self-harm and suicide from the existing literature (i.e., age, gender, alcohol within 6 h of the self-harm, previous self-harm, current contact with psychiatric services, and method of self-harm). This larger model was restricted to assessed cases only as completion of some variables was dependent on an assessment having been completed (see [Fig. 1](#) for details). Cases were censored to match the end of the follow-up period if no event occurred.

All analyses were conducted using STATA/IC 15.

2.5. Ethical approval

All three monitoring systems are fully compliant with the Data Protection Act (1998) and have approval under Section 251 of the National Health Services (NHS) Act (2006) to collect patient-identifiable information without patient consent. The monitoring systems in Oxford and Derby have approval from local NHS Research Ethics Committees to collect data on self-harm, and self-harm monitoring in Manchester is part of a local clinical audit system ratified by the Local Research Ethics Committee. The multicentre study also has ethical approval to release patient details to the Data Linkage and Extract Service of NHS Digital for mortality information on these individuals.

2.6. Role of the funding source

This study was funded by the Department of Health and Social Care, UK. The funder of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report.

3. Results

Information on employment/student status was available for 76,477 (75.5 %) presentations in the study database. A total of 18,481 (18.3 % of total presentations on the Multicentre database) self-harm presentations were recorded during the study period, made by people aged 18 to 24 years (inclusive), where there was also a valid response in the ‘employment status’ variable. These presentations were made by 11,298 individuals. People who were identified as students accounted for 4776 (25.8 %) of these presentations. The 4776 presentations were made by 3491 individuals; 983 (28.2 %) were men and 2507 (71.8 %) were women (gender was unknown for 1 person). A specialist psychosocial assessment was conducted for 63.5 % of presentations ($n = 3034$) made by students, compared to 67.7 % of presentations by age-equivalent non-students ($n = 9276$, $X^2 = 27.5$, 2 d.f., $p < 0.01$).

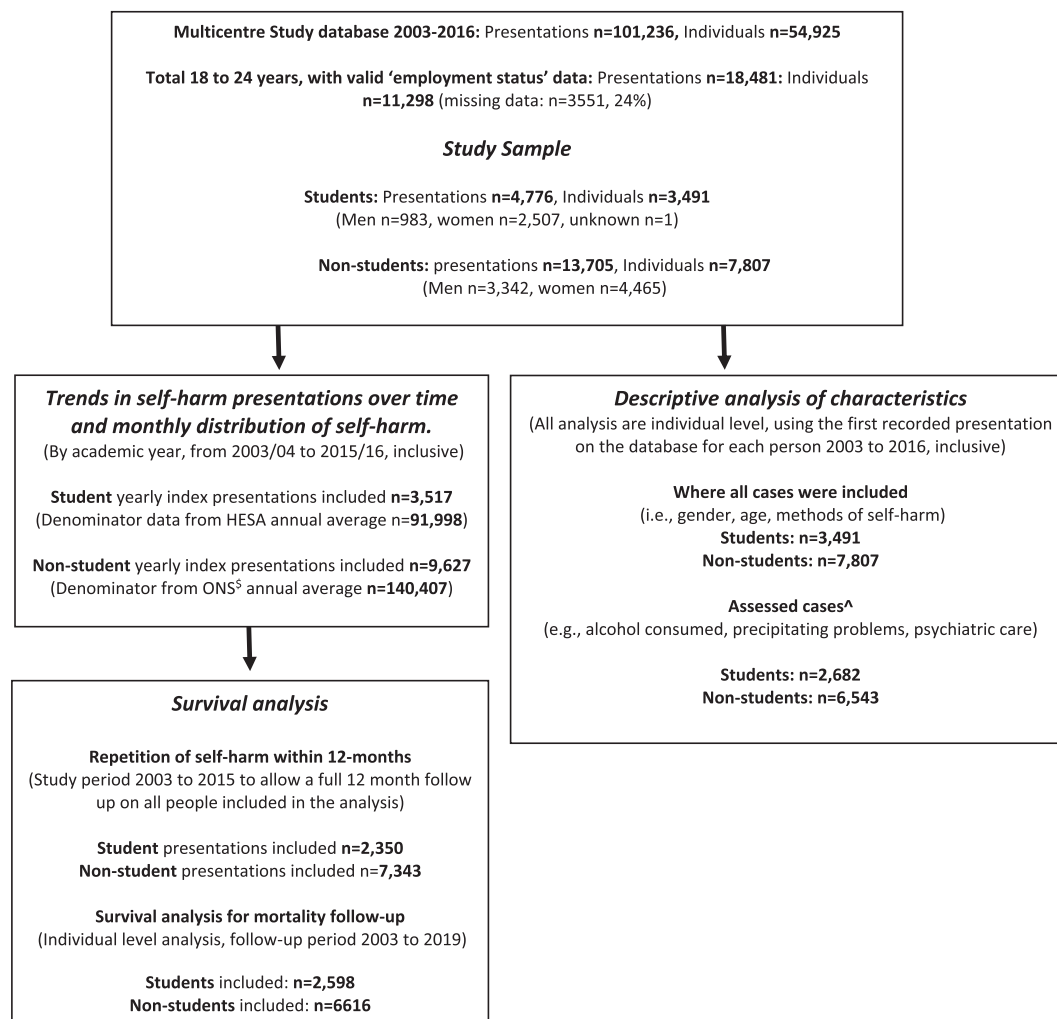


Fig. 1. Flow chart describing number of students and non-students included/excluded from each analysis

*HESA: Higher Education Statistics Agency, denominator data were the number of students registered for each higher education institution located within the local area of the study sites.

§ONS: Office for national statistics, denominator data were annual age-matched general population figures for the local area of the study sites.

[^]Assessed cases are episodes of self-harm where the patient received a psychosocial assessment during their emergency department presentation.

3.1. Rates and trends over time

Fig. 2 shows rates of self-harm per 100,000 of the student population, along with the age-equivalent rate of self-harm per 100,000 of the general population. There was an overall increase in self-harm in students over time (IRR 1.08, 95%CI 1.06–1.10, $p < 0.01$), but no significant increase in the age-equivalent non-student population (IRR 1.01, 95%CI 1.00–1.02, $p = 0.15$). The highest rate in students was in 2015/16 at 454 per 100,000 of the undergraduate student population. As shown in Fig. 2B, the increase seen in students followed a similar pattern to that found in the incidence of suicide in students.

3.2. Monthly distribution

Fig. 3 shows presentations by students across the academic year. Compared to August, numbers of presentations were particularly high in October (IRR 1.62, 95%CI 1.36–1.93, $p < 0.01$), November (IRR 1.50, 95%CI 1.26–1.79, $p < 0.01$), and February (IRR 1.63, 95%CI 1.37–1.94, $p < 0.01$), and lowest in July (IRR 0.72, 95%CI 0.59–0.89, $p > 0.01$). This was not seen in non-students, where all subsequent months were lower than in August and relatively consistent across the rest of the year.

3.3. Demographic characteristics and method of self-harm

The student sample included a higher proportion of women than the non-students. Students also included a higher proportion of people from Black, South Asian, and Other non-white ethnic backgrounds, but the majority of presentations were made by White people across both student and non-student groups (see Table 1 for details).

Self-poisoning was the most common method of self-harm. Self-injury alone was a more common method in the student sample than in non-students. Pure paracetamol was the most common drug taken in overdose and was used more often by students ($n = 1237$, 47.7 % vs. $n = 2651$, 43.9 %; $X^2 = 10.68$, 1 d.f., $p < 0.01$). In terms of socio-economic deprivation, students were less likely to be living in the most deprived local areas than non-students ($n = 1013$, 30.8 % vs. $n = 3217$, 44.0 %; $X^2 = 322.54$, 4 d.f., $p < 0.01$).

3.4. Problems preceding self-harm

Compared to non-students, the student sample more often reported relationships with others as a problem preceding self-harm (Table 2). Problems related to studying or employment were also more often reported as precipitating factors by the student sample along with

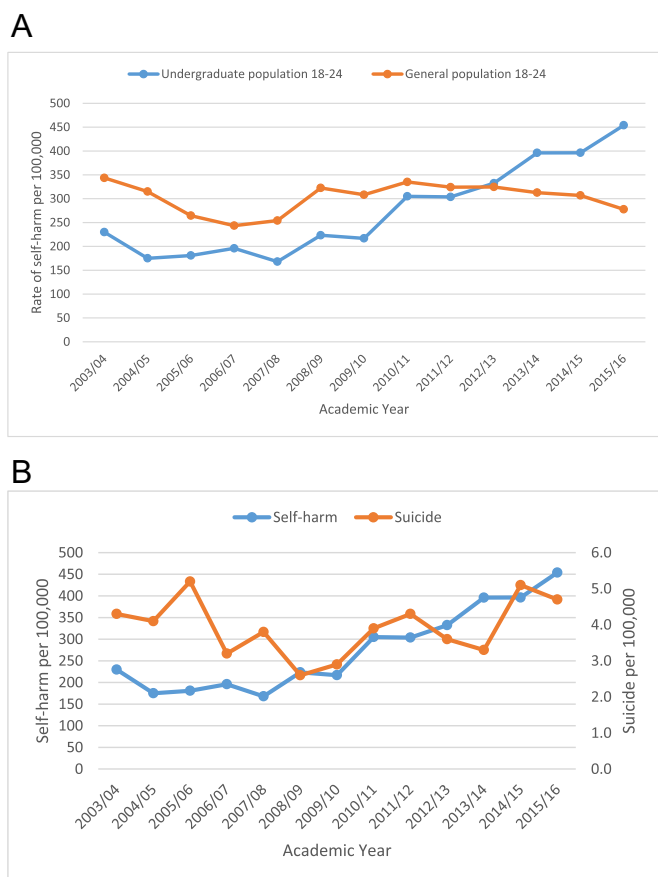


Fig. 2. A. Rates for self-harm presentations by students aged 18 to 24 years and general self-harm rates in 18 to 24 year-olds.

B. Rates of self-harm in students aged 18 to 24 years per 100,000 of the undergraduate student population, with rate of suicide in students on the secondary axis.

problems related to mental health. Financial problems, housing problems, legal problems and drug and alcohol problems, as well as problems related to relationships with partners, were all less common in students compared to non-students.

3.5. Follow-up care

A slightly smaller proportion of students than non-students received a specialist psychosocial assessment ($n = 2305$, 66.1 % vs. $n = 5632$, 72.1 %; $X^2 = 42.7$, 2 d.f., $p < 0.01$). Students were more often referred for outpatient care following hospital discharge ($n = 898$, 26.0 % vs. $n = 1845$, 23.9 %; $X^2 = 5.5$, 2 d.f., $p < 0.01$), but less often referred to drug and alcohol services ($n = 39$, 1.1 % vs. $n = 216$, 2.8 %; 2 d.f., $X^2 = 30.9$, $p < 0.01$) than non-students (however numbers referred to drug and alcohol services were low in both groups). Referrals to inpatient care, GP care, and proportion of people who self-discharged were similar for the two groups.

3.6. Repetition of self-harm

The rate of 12-month repetition of self-harm was lower in the students than the non-students 16.4 % ($n = 504$) compared to 20.6 % ($n = 1823$) respectively. Cox regression models were significant (Hazard Ratio [HR] 0.78, 95%CI 0.71–0.86, $p < 0.01$) and controlling for age and gender made little difference to the hazard ratio (HR 0.79, 95%CI 0.71–0.8287, $p < 0.01$). A multiple variable model run on assessed cases only, including age, gender, alcohol involved, history of previous self-

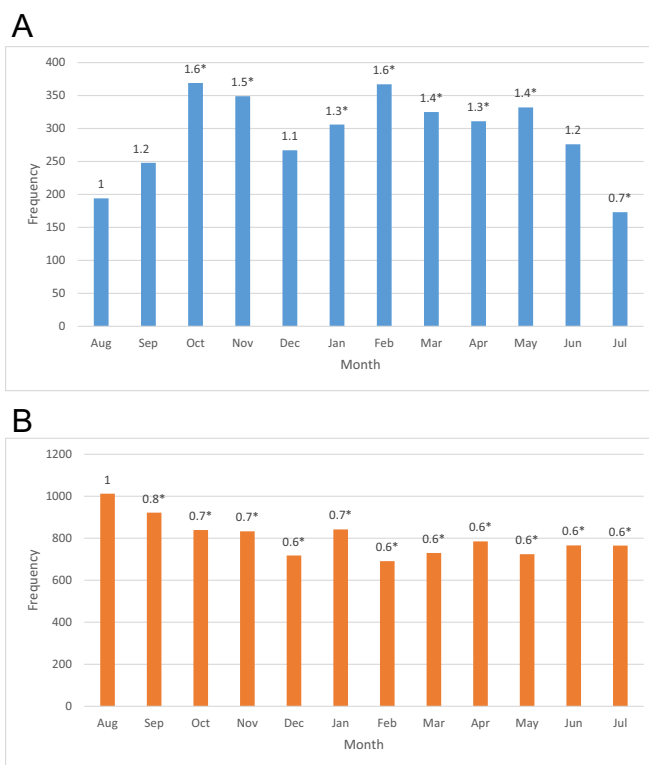


Fig. 3. A. Monthly distribution of self-harm presentations across the academic year by students aged 18 to 24 years, IRRs (August as reference month 1).

* Significant at $p < 0.05$

B. Monthly distribution of self-harm presentations across the academic year by people in the general population aged 18 to 24 years, IRRs (August as reference month 1).

* Significant at $p < 0.05$.

Table 1

Demographics and self-harm method in students and non-students aged 18 to 24 years.

Variable	Total student <i>N</i> = 3491 (valid %)	Total non-student <i>N</i> = 7807 (valid %)	X^2 , <i>p</i> -value
Male	983 (28.2)	3342 (42.8)	218.83, $p < 0.01$
Female	2507 (71.8)	4465 (57.2)	
Unknown	1 (<0.1 %)	2 (<0.1 %)	
Ethnicity			196.78, $p < 0.01$
White	2469 (77.2)	6299 (87.7)	
Black	134 (4.2)	209 (2.9)	
South Asian	275 (8.6)	320 (4.5)	
Other	321 (10.0)	351 (4.9)	
Unknown	292 (8.4)	630 (8.1)	
Method of self-harm			19.81, $p < 0.01$
Self-poisoning	2410 (69.0)	5709 (73.1)	
Self-injury	848 (24.3)	1643 (21.0)	
Both poisoning and injury	233 (6.7)	457 (5.9)	
Alcohol consumed within 6 h of self-harm	1306 (49.0)	3257 (51.0)	
Unknown	823 (23.6)	1422 (18.2)	46.68, $p < 0.01$

harm, current contact with psychiatric services, and method of self-harm, showed that student status was an independent predictor of less frequent repetition (HR 0.74, 95%CI 0.66–0.84, $p < 0.01$) (see Table 3 for full results). To ensure results were not due to bias in receipt of assessment, the same model was run including all cases and results were similar, with student status maintaining significance.

Table 2

Problems precipitating self-harm reported by students and non-students ($n = 9225$ of individuals who received psychosocial assessment).

Precipitating problems ^a	Total student N = 2682 (valid %)	Total non- student N = 6543 (valid %)	χ^2 , p-value
Relationship with partner	936 (34.9)	3106 (47.5)	122.59, $p < 0.01$
Relationship with family	815 (28.5)	2000 (29.5)	1.56, $p = 0.46$
Relationship with others	400 (14.0)	731 (10.8)	21.17, $p < 0.01$
Study/Employment	782 (29.2)	1590 (24.3)	26.92, $p < 0.01$
Financial	221 (8.2)	1004 (15.3)	83.60, $p < 0.01$
Housing	125 (4.7)	893 (13.7)	156.72, $p < 0.01$
Legal	39 (1.5)	303 (4.6)	54.70, $p < 0.01$
Alcohol	307 (13.6)	1010 (18.7)	29.37, $p < 0.01$
Drugs	125 (5.2)	636 (11.3)	73.79, $p < 0.01$
Physical health	131 (4.9)	349 (5.3)	2.33, $p = 0.31$
Mental Health	703 (26.2)	1486 (22.7)	15.85, $p < 0.01$
Bereavement	183 (7.0)	557 (8.7)	8.03, $p = 0.02$
Abuse	260 (9.7)	702 (10.7)	3.23, $p = 0.20$
Other	577 (21.5)	1207 (18.5)	13.52, $p < 0.01$
Unknown (range across categories)	73–112 (3.2–4.2)	155–241 (2.7–3.7)	

^a Problems categories are not exclusive and a person may report multiple problems.

Table 3

Multiple variable Cox regression model for 12-month repetition of self-harm and student status.

	Hazard ratio (95 % CI)	p value
Student status	0.74 (0.66–0.84)	<0.01
Age	0.98 (0.96–1.01)	0.21
Gender	1.00 (0.91–1.10)	0.97
Alcohol within 6 h of self-harm	1.01 (0.99–1.03)	0.19
Previous self-harm	1.02 (1.00–1.04)	0.07
Current psychiatric treatment	1.07 (1.05–1.09)	<0.01
Method: Self-poisoning	1	
Method: Self-injury	1.52 (1.36–1.70)	<0.01
Method: Both self-poisoning and self-injury	1.80 (1.54–2.11)	<0.01

3.7. Mortality follow-up

The mortality rate during follow-up was lower in students compared to the non-student group (HR 0.51, 95%CI 0.33–0.80, $p < 0.01$; adjusted HR 0.60, 0.38–0.94, $p = 0.03$), with 26 (1.0 %) deaths in students and 140 (2.1 %) deaths in non-students. While a greater proportion of deaths were due to suicide in the student group (57.7 %, $n = 15$ vs, 38.6 %, $n = 54$) numbers were small and rate of suicide was similar in both groups (unadjusted HR 0.73, 95%CI 0.40–1.32, $p = 0.30$; adjusted for age and gender HR 0.92 (0.50–1.69, $p = 0.78$).

4. Discussion

4.1. Key findings

Students who presented to hospital following self-harm were more often women, from ethnic minority backgrounds, and reported problems around education, relationships, and mental health, compared to age-equivalent non-students. Rates of self-harm in students appear to have increased over time, especially after 2008, similar to the increases seen

in UK student suicide at this time (Office for National Statistics, 2018). In terms of distribution across the academic year, self-harm in students was more common in October, November, and February, while self-harm in non-students was relatively stable across the year. Fewer students received a psychosocial assessment compared to non-students.

4.2. Comparison with existing research

Increases in self-harm over time among university students are consistent with reports of increased self-harm among young people and university students in some other European countries (Bould et al., 2019; McManus and Gunnell, 2020). While this study did not find a similar increase in non-students, other studies have shown a rise in self-harm in both students and non-students in England, although these included broader age-groups (McManus and Gunnell, 2020). There were no major differences between students and non-students in terms of characteristics, though the larger proportion of people from ethnic minority backgrounds in the student sample may warrant further investigation, especially with the increasing entry rates of ethnic minority students to higher education domestically, and with regard to increases in recruitment of international students. Research to date suggests that the mental health challenges faced by overseas students may be greater than those faced by domestic students, especially since the COVID-19 pandemic (Chen et al., 2020). Equally we cannot be certain to what extent our findings are generalisable to other countries. Although there are commonalities in the student experience internationally there are also important differences (Alharbi and Smith, 2018) and there needs to be further country specific research.

Previous reports of deteriorating mental health among students are consistent with the higher reports of mental health problems as a precipitating factor among the student group in this study (Akram et al., 2020). Financial problems, housing problems, legal problems and drug and alcohol problems were all less common in students than non-students of the same age and may reflect the different socioeconomic situation of students and non-students. (Department for Education, 2019) While numbers of students from lower socioeconomic groups are increasing, equity of access to education after the age of 18 remains a problem despite programmes designed to address this disparity (e.g. Widening Participation) (Department for Education, 2019).

Increases in student presentations at different points in the academic year may reflect times of increased stress—for example, exam periods early in the new year may explain the higher number of presentations in February (Gunnell et al., 2020; Rodway et al., 2020). Lower presentations in July and August align with the summer vacation period and may to some extent be an artefact of students leaving for the summer months, especially in Manchester and Oxford where student populations are particularly high. However, there is remaining variation during the months when students are typically attending in-person, such as between January and May, and there is no indication of these fluctuations being present among permanent residents of the study areas. Reasons for the increase in October and November need further investigation but may relate to loneliness or social isolation among new students adjusting to living away from home (Cleary et al., 2011).

4.3. Limitations

This study used data from three largely urban areas with multiple large higher education institutions and large student populations. Results may not be generalizable to all areas; however, they are likely to be relevant to other university towns and cities. It was not possible to identify specific types of students within the sample and systemic differences between students at different types of institutions, or in different years or levels of study could not be explored. Furthermore, there was no way to identify international students within the dataset, who may have different risk factors and characteristics compared to domestic students and more work needs to be done in this area in order

to assess self-harm risk in this student population.

Although completion of the ‘employment status’ variable was high across the Multicentre dataset at around 75 % bias may have been introduced if the remaining 25 % were missing systematically. It is also possible that part-time students may be missed due to the mutually exclusive nature of the categories under ‘employment status’. Age was used as a proxy to identify undergraduate students, but it is likely a proportion of mature students were missed, and those on postgraduate courses were included in the student sample. While no major systematic local (e.g., implementation of suicide prevention interventions by Universities) or broader socioeconomic changes (e.g., changes in the job market increasing the number of part-time students) were identified during the study period it is a possibility. Between group differences could in part be a result of these and other confounders, however the key results still have relevance for management and prevention of self-harm among students.

HESA data was used as the denominator in calculating self-harm rates in the student population. Unlike the non-students rates calculation that used reliable local area population figures from ONS, the HESA data may be more limited in capturing all student activity in any given area. Data are limited to higher education institutions, however there are an increasing number of further education institutions offering degree-level qualifications. In addition, the denominator had to be estimated for years earlier than 2014/15 as institution-level data was not available prior to this. To address this, efforts were made to create a reliable estimate based on the actual average increase in student numbers during the study period. Despite these limitations HESA data was the only viable and openly available source of data on the total and local student population. Ultimately the practical impact is that the denominator data is likely to be an underestimation of the total student population of the study areas, and so, the rates presented here must be interpreted with caution.

Reductions in missing data due to improved data collection by hospitals over time might account for some of the increase in self-harm seen in the student population. The proportion of cases with missing employment/student information was plotted over time to explore this, and while there was a steady decrease in missing data across the whole study period, this applied to both students and non-students and therefore does not account for the rapid increases seen in students after 2008, that was not seen in the age-equivalent non-students.

4.4. Conclusions/implications

Increases in self-harm in students may reflect recent increases in distress and mental health problems found in prior work in this population, and in younger people more generally (Ibrahim et al., 2013; Richardson et al., 2015). However, the distribution of presentations across the academic year suggests that self-harm may often be a response to student experience, such as being away from home and exam pressures. Problems around education or employment were also more often reported as a factor that precipitated self-harm by students than non-students. Well-resourced university counselling and mental health support services with input from the NHS are required to respond to the increase in mental ill health in the student population (Cleary et al., 2011; Broglia et al., 2018). Wellbeing initiatives targeting factors associated with self-harm (e.g. exam stress, alcohol and drugs), and mental health awareness training for academic and non-academic staff may help to support students at risk. Future studies looking at self-harm in students by year and/or level of study may help increase understanding of the specific triggers and needs of students at different stages of university programmes.

CRedit authorship contribution statement

CC and NK were responsible for the study conception and design. CC was the guarantor of the study and was responsible for data analysis and

writing of the initial draft with input from BF. CC had full access to the data and accepted responsibility to submit for publication. All authors had access to the data (BF and GG verified the data) and were involved in interpretation of the results, critical review of the manuscript, and approval of the final draft.

Declaration of competing interest

LA chairs the National Suicide Prevention Strategy Advisory Group of the UK Department of Health and Social Care, which NK and KH are members of. NK reports grants from Department of Health and Social Care, National Institute of Health Research, National Institute of Health and Care Excellence, and Healthcare Quality and Improvement Partnership, outside of the submitted work. NK has chaired the National Institute for Health and Care Excellence (NICE) guidelines for the longer-term management of self-harm, is the clinical topic adviser for the new NICE self-harm guidelines, chairs the guideline committee for the management of depression, and is part of the NICE Topic Expert Group, which developed the quality standards for self-harm services. KW is executive director for STORM UK suicide prevention training. All other authors declare no competing interests.

Data availability

Individual patient-level will not be available because of confidentiality and data-sharing agreements in place. The study protocol, statistical analysis plan, and analytic code is available on request from the corresponding author.

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