



Risk of repetition and subsequent self-harm following presentation to hospital with suicidal ideation: A longitudinal registry study

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ABSTRACT

Background: Few studies have focused on those who present to hospital with suicidal thoughts (suicidal ideation). The aim of this study was to establish the risk of repeat presentation to hospital following suicidal ideation and to identify factors which were associated with further ideation or subsequent self-harm.

Methods: Data were obtained from the Northern Ireland Registry of Self-harm. Risk of repeat presentation following hospital-presenting ideation was analysed using Kaplan Meier analyses, specifically cox proportional hazard models.

Findings: During the period April 2014 to March 2019, a total of 14,695 presentations to hospital due to suicidal ideation were made in Northern Ireland. The cumulative incidence of repeat presentation to hospital was 40.5% within five years, with an 18.3% risk of subsequent self-harm. Previous ideation had the strongest association with repeat presentation. There was evidence of recidivism considering further ideation, with an increased risk according to number of previous presentations. In contrast, risk of subsequent self-harm was highest after the first or second presentation. Male gender and alcohol were associated with further ideation, while females and young people were more likely to re-present with self-harm.

Interpretation: The findings indicate that individuals who present to hospital with suicidal ideation are at risk of repeat presentation and future self-harm, however clinical guidelines do not specifically address hospital-presenting ideation. The transition from ideation to suicidal behaviour is important to consider and research could inform effective screening and early intervention measures.

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1. Introduction

Each year, approximately 800,000 individuals die by suicide [1]. Data from the World Mental Health Survey indicate that the 12-month prevalence of suicidal ideation, plans and attempts are 2.0%, 0.6% and 0.3% respectively [2]. To date, research in the area of suicide prevention has primarily focused on determinants and impacts of mortality (suicide) and morbidity (self-harm). However suicidal ideation – suicidal thoughts – is one of the strongest predictors of psychiatric hospitalisation and death by suicide [3], and has been recently highlighted as an intervention target largely overlooked in suicide-related research and international policies [4].

Large-scale studies of hospital-presenting ideation are lacking [5], with the Northern Ireland Registry of Self-harm being the only of its

kind to systematically record ideation presentations to hospital emergency departments. A recent study based on data from this registry found that the rate of hospital-presenting ideation in Northern Ireland was 149 per 100,000, 50% lower than hospital-presenting self-harm. While the two populations were distinct in their demographics, the rate of repeat presentation to hospital was similar following self-harm and ideation, primarily as a subgroup of ideation presentations subsequently re-presented with self-harm [6]. Yet important knowledge gaps remain when considering what happens after an individual presents to hospital with ideation. The intensity, duration and frequency of ideation following presentation may confer risk of future self-harm, particularly in young people [7,8]. What is unclear is if the risk factors for repeat presentation to hospital following ideation and self-harm are similar, and what distinguishes those who subsequently self-harm.

The aims of the current study were to describe the patterns of repeat presentation to hospital following ideation, to identify the factors associated with repetition and to compare those who re-present

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Research in context

Evidence before this study

We searched PubMed with the following terms: “ideation” “self-harm” “suicidal” “hospital” “presenting” “repetition”. Few studies have reported on the incidence of hospital-presenting suicidal ideation, despite knowing that ideation is an important risk factor for future suicide. A recent study demonstrated that a subgroup of those who present to hospital with ideation will subsequently re-present with self-harm. However, we do not know who is at greatest risk of re-presenting to hospital, in particular those at greatest risk of self-harm.

Added value of this study

The number of previous ideation presentations made within the study period was the strongest independent risk factor for repeat presentation. There was strong evidence for recidivism with regards to repeat ideation, whereas the risk of self-harm was greatest after the first or second presentation with ideation. Stratified analyses showed that males and presentations involving alcohol were more likely to result in further ideation, while women and young people were at greatest risk for subsequent self-harm.

Implications of all the available evidence

The observed patterns indicate that early intervention for those presenting with ideation is critical, given the subsequent risk of self-harm. Our findings indicate that there is a significant need to formally recognise those presenting to hospital with ideation as an important group and that clinical guidelines for self-harm should be expanded to include guidance for ideation presentations. Mental health services should also consider if this group receive optimal care in acute settings, or if they should be re-directed to community mental health settings and primary care.

expected physical consequences’ [11]. This is an internationally-recognised definition of self-harm, which is consistent with that used by similar systems in Ireland [12] and England [13].

2.2. Data items

The Registry records information on both demographic and clinical variables relating to the presentation, including gender, age, date and hour of presentation to hospital, mode of arrival to hospital and recommended next care. The involvement of alcohol is ascertained through hospital case notes—if it was recorded on registration or by the attending clinician, or if present on toxicology reports. The Registry records if a mental health assessment was conducted in the emergency department at the time of attendance to hospital. It is also recorded if a patient was referred for an assessment at a later time in the general hospital/ offsite if an assessment at the time of attendance was not possible or not immediately required.

2.3. Ethical approval

Ethical approval for the Northern Ireland Registry of Self-harm has been granted by the Office for Research Ethics in Northern Ireland (ORECNI).

2.4. Data sharing

Data collected by the Northern Ireland Registry of Self-harm are sensitive in nature and in accordance with data protection legislation cannot be made available publically. Access to data is available via an Honest Broker service once approval from all Health and Social Care trusts in Northern Ireland has been received. To access data from the Northern Ireland Registry of Self-harm, please contact the Public Health Agency (reception.pha@hscni.net).

2.5. Statistical analyses

Data covering the period 1 April 2012 until 31 March 2019 ($n=90,769$) were included in the current study. As it is difficult to ensure that an individual's first presentation to hospital in the study time period was their first ever presentation, the dataset was restricted to individuals whose first observed presentation was made after 1 April 2014 (i.e. no presentations in the period 1 April 2012 to 31 March 2014), in order to maximize the number of true first presentations.

The risk of repeat presentation to hospital following ideation was estimated using Kaplan-Meier analyses. Specifically, Cox proportional hazard models were fitted to estimate time to repeat presentation following ideation. Repeat presentation was defined as re-attendance to a hospital emergency department with further ideation or with subsequent self-harm. The repeat event analysis used was the conditional risk set analysis [14], using the time between successive events as the outcome measure. All subsequent presentations by an individual during the study period were also analysed according to the time between events. The follow-up time after a presentation to hospital varied depending on when the presentation occurred, as a fixed final data (31 March 2019) was used. Follow-up time ranged from 1 to 1825 days. Variables selected for inclusion in the Cox proportional hazard models were those that are routinely recorded by the Registry and which have previously been shown to have an association with repetition of self-harm [15], including demographic and temporal variables as well as factors relating to the management of ideation in the hospital setting. The increasing number of repeat presentations during the study period was also examined as a risk factor for further repetition. Univariable models assessed each variable individually, with variables demonstrating an association ($p < 0.2$) included in the final adjusted model. Adjusted Hazard Ratios (AHR) with 95% confidence intervals (95% CI) were calculated. The lack of independence of association due to multiple presentations by individuals was accounted for by

to hospital with further ideation and those who subsequently present with self-harm.

2. Methods

2.1. Data source

Data from the Northern Ireland Registry of Self-harm was used for this study. The Registry records information on presentations to hospital emergency departments following self-harm and following suicidal ideation. Since 2012, the Registry has had coverage of the emergency departments at all twelve general hospitals in the region, representing a population of 1.9 million [9]. Presentations are identified and recorded by independently-trained data registration officers.

Presentations involving suicidal ideation (hereafter referred to as ideation) are recorded according to the definition: ‘passive thoughts about wanting to be dead or active thoughts about killing oneself, not accompanied by preparatory behaviour’ [10]. This relates to presentations by persons who have experienced thoughts of self-harm and/or suicide, where no physical act has taken place.

The definition of self-harm used by the Registry is ‘an act with non-fatal outcome in which an individual deliberately initiates a non-habitual behaviour, that without intervention from others will cause self-harm, or deliberately ingests a substance in excess of the prescribed or generally recognised therapeutic dosage, and which is aimed at realising changes that the person desires via the actual or

Table 1
Cumulative incidence of repeat presentation to hospital following ideation, 2014–2019.

	Ideation followed by repeat presentation (either reason)		Ideation followed by ideation		Ideation followed by self-harm		
	n	Number repeating	Risk of repeat presentation (95% CI)	Number repeating	Risk of repeat presentation (95% CI)	Number repeating	Risk of repeat presentation (95% CI)
12 months	9792	1218	24.0% (23.0–25.0)	519	14.8% (14.0–15.7)	699	9.8% (9.2–10.6)
Five years	9792	2513	40.5% (38.8–42.3)	1512	28.9% (26.3–31.7)	1001	18.3% (17.1–19.6)

using robust standard errors, using the cluster option in Stata. For analyses examining risk of self-harm following ideation presentations, if an individual subsequently re-presented with self-harm following an index ideation presentation, their data were censored from that point on.

The association between the cumulative number of ideation presentations made to hospital during the study period and specific demographic characteristics was examined using chi-square tests for trend. Analyses were completed using SPSS 24 and Stata version 12.0.

2.6. Reporting guidelines

This study is reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for observational studies [16].

3. Results

3.1. Sample demographics

Between 1 April 2014 and 31 March 2019, 14,695 presentations due to ideation were recorded by the Registry, involving 9792 individuals. The majority of these presentations were made by men (9448; 64.3%), and the median age was 35 (IQR: 25) years. Alcohol was involved in 6413 (43.6%) of these presentations.

During the study period, 2513 individuals made at least one repeat presentation to hospital for either reason. Of these, 1512 represented with further ideation while 1001 presented with self-harm. Within five years, the person-based cumulative risk of repeat presentation to hospital following ideation (for either reason) was 40.5% (95% CI= 38.8–42.3). Risk of further ideation was 28.9% (26.3–31.7), while the risk of subsequent self-harm was 18.3% (17.1–19.6) (Table 1). Risk of repeat presentation for either reason was greatest in the first 12 months (24.0%; 23.0–25.0). The risk of subsequent self-harm was 9.8% (9.2–10.6) after 12 months (Table 1).

Table 2
Unadjusted and adjusted cox proportional hazard survival analyses for repeat ideation, 2014–2019.

	n	Number of repeat presentations	Unadjusted HR (95% CI)	p-value	Adjusted HR (95% CI)	p-value
Gender						
Male	9448	3350	1.26 (1.10–1.44)	0.001	1.16 (1.07–1.25)	<0.001
Female	5247	1553	[Reference]		[Reference]	
Age						
<30yrs	5867	1675	0.76 (0.63–0.93)	0.007	0.97 (0.87–1.09)	0.622
30–54yrs	6959	2574	1.06 (0.86–1.30)	0.586	1.08 (0.95–1.22)	0.244
55+yrs	1869	654	[Reference]		[Reference]	
Alcohol involvement						
No	8282	2355	[Reference]		[Reference]	
Yes	6413	2548	1.50 (1.34–1.68)	<0.001	1.13 (1.05–1.23)	<0.001
Time of presentation						
9am until 5pm	4754	1362	[Reference]		[Reference]	
5pm until 9am	9941	3541	1.31 (1.21–1.41)	<0.001	1.14 (1.07–1.22)	<0.001
Weekend presentation						
Yes	10 450	3522	1.04 (0.98–1.12)	0.213		
No	4245	1381	[Reference]			
Mode of arrival						
Ambulance	5355	2108	1.49 (1.32–1.67)	<0.001	1.08 (1.00–1.18)	0.049
Other emergency services	2644	941	1.39 (1.24–1.55)	<0.001	1.04 (0.95–1.15)	0.362
Self-presenting	6696	1854	[Reference]		[Reference]	
Mental health assessment						
Yes/ referred	12 873	4175	0.82 (0.74–0.91)	<0.001	1.02 (0.93–1.12)	0.627
No	1818	727	[Reference]		[Reference]	
Recommended next care						
Medical admission	3695	1384	1.31 (1.21–1.42)	<0.001	1.09 (1.01–1.16)	0.023
Psychiatric admission	1233	416	1.12 (0.99–1.27)	0.075	1.09 (0.97–1.22)	0.132
Refused admission/ left before recommendation	1261	562	1.65 (1.48–1.86)	<0.001	1.23 (1.10–1.37)	<0.001
Discharged from ED	8506	2541	[Reference]		[Reference]	
Number of previous ideation presentations within study period						
None	9792	2146	[Reference]			
One previous	2146	901	2.41 (2.23–2.60)	<0.001	2.34 (2.16–2.53)	<0.001
Two previous	901	467	3.49 (3.16–3.86)	<0.001	3.30 (2.98–3.66)	<0.001
Three previous	467	297	4.91 (4.35–5.54)	<0.001	4.68 (4.14–5.29)	<0.001
Four or more previous	1389	1092	9.14 (7.85–10.63)	<0.001	8.24 (7.19–9.45)	<0.001

Results from the unadjusted and adjusted cox regression models identified the factors associated with risk of repeat presentation to hospital with further ideation (Table 2) or subsequent self-harm (Table 3), based on all presentations to hospital during the study period. Considering further ideation, unadjusted analyses identified that male gender (HR=1.26, 95% CI=1.10–1.44), alcohol involvement (1.50, 1.34–1.68) out-of-hours attendance (1.31, 1.21–1.41), involvement of ambulance (1.49, 1.32–1.67) or emergency services (1.39, 1.24–1.55), medical admission (1.31, 1.21–1.42), and an individual refusing admission or leaving before a recommendation could be made (1.65, 1.48–1.86) were all associated with increased risk of further ideation. The risk was lower for those under 30 years of age (0.76, 0.63–0.93) and following a mental health assessment (0.82, 0.74–0.91). The risk of further ideation was greatest amongst those with four or more previous ideation presentations within the study period (9.14, 7.85–10.63). In the adjusted models, the following associations held, although with a weaker association for most: male gender (1.16, 1.07–1.25), alcohol involvement (1.14, 1.07–1.22), out-of-hours attendance, (1.14, 1.07–1.22), medical admission (1.08, 1.01–1.16), refusing admission/ leaving before recommendation (1.23, 1.10–1.37). The association between number of previous ideation presentations and risk of further ideation also held, highest after four or more previous presentations (8.24, 7.18–9.45) (Table 2 and Fig. 1). The unadjusted associations with younger age and provision of a mental health assessment were attenuated in the adjusted model. When these analyses were stratified by gender (Supplementary Table 1), the associated risk of alcohol held for males only (1.16, 1.05–1.28).

Considering subsequent self-harm, male gender (0.80, 0.71–0.91), younger age [<30 years: (2.13, 1.69–2.70); 30–54 years: (1.44, 1.14–1.83)], involvement of ambulance services (0.86,

0.75–0.99) and number of previous ideation presentations within the study period [four or more: (0.16, 0.57–0.44)] were the factors associated with risk of self-harm in the unadjusted models. The adjusted model found that risk of subsequent self-harm remained lower for males (0.80, 0.71–0.91) and highest for those aged less than 30 years (2.04, 1.61–2.58). The association with number of previous ideation presentations remained, with risk of subsequent self-harm lowest after four or more previous presentations (0.19, 0.07–0.53) (Table 3 and Fig. 1), implying that risk of self-harm was greatest for those presenting for the first time or with one previous presentation. In the gender-specific models (Supplementary Table 2), the risk of self-harm was highest amongst females aged less than 30 years (2.34, 1.59–3.45). In addition, risk of self-harm was significantly associated with medical and psychiatric admission for females only.

3.2. Risk of repeat presentation according to number of previous ideation presentations

Fig. 2 illustrates the risk of repeat presentation to hospital following ideation over the course of the study period, according to number of previous presentations within the study period. Within 12 months, the cumulative risk of repeat presentation to hospital with ideation was 17%, 39%, 49%, 62% and 83% for those with none, one, two, three and four or more previous presentations. Within 12 months, the cumulative risk of subsequent self-harm was 10%, 14%, 12%, 10% and 7% for those with none, one, two, three and four or more previous presentations.

Table 3
Unadjusted and adjusted cox proportional hazard survival analyses for subsequent self-harm, 2014–2019.

	n	Number of repeat presentations ^a	Unadjusted HR (95% CI)	p-value	Adjusted HR (95% CI)	p-value
Gender						
Male	6391	599	0.80 (0.71–0.91)	0.001	0.80 (0.71–0.91)	0.001
Female	3484	402	[Reference]		[Reference]	
Age						
<30yrs	3890	496	2.13 (1.69–2.70)	<0.001	2.04 (1.61–2.58)	<0.001
30–54yrs	4641	421	1.44 (1.14–1.83)	0.003	1.44 (1.14–1.83)	0.002
55+yrs	1344	84	[Reference]		[Reference]	
Alcohol involved						
No	5823	604	[Reference]		–	
Yes	4052	397	0.90 (0.79–1.02)	0.109	–	
Time of presentation						
9am until 5pm	3439	350	[Reference]		–	
5pm until 9am	6436	651	0.98 (0.86–1.12)	0.775	–	
Weekend presentation						
Yes	6978	706	1.00 (0.88–1.15)	0.951	–	
No	2897	295	[Reference]		–	
Mode of arrival						
Ambulance	3425	327	0.86 (0.75–0.99)	0.042	0.96 (0.83–1.11)	0.567
Other emergency services	1537	169	1.05 (0.88–1.25)	0.581	1.10 (0.93–1.32)	0.269
Self-presenting	4913	505	[Reference]		–	
Mental health assessment						
Yes/ referred	8706	881	1.11 (0.91–1.34)	0.301	–	
No	1168	120	[Reference]		–	
Recommended next care						
Medical admission	2457	233	0.91 (0.78–1.06)	0.248		
Psychiatric admission	807	85	1.02 (0.81–1.28)	0.860		
Refused admission/ left before recommendation	734	85	1.11 (0.88–1.39)	0.389		
Discharged from ED	5877	598	[Reference]			
Number of previous ideation presentations within study period						
None	7838	835	[Reference]		[Reference]	
One previous	1209	125	1.05 (0.87–1.27)	0.630	1.08 (0.89–1.30)	0.438
Two previous	393	28	0.75 (0.52–1.10)	0.139	0.82 (0.56–1.19)	0.299
Three previous	165	9	0.58 (0.30–1.11)	0.101	0.66 (0.34–1.26)	0.209
Four or more previous	270	4	0.16 (0.57–0.44)	<0.001	0.19 (0.07–0.53)	0.002

^a Data censored once subsequent self-harm presentation made.

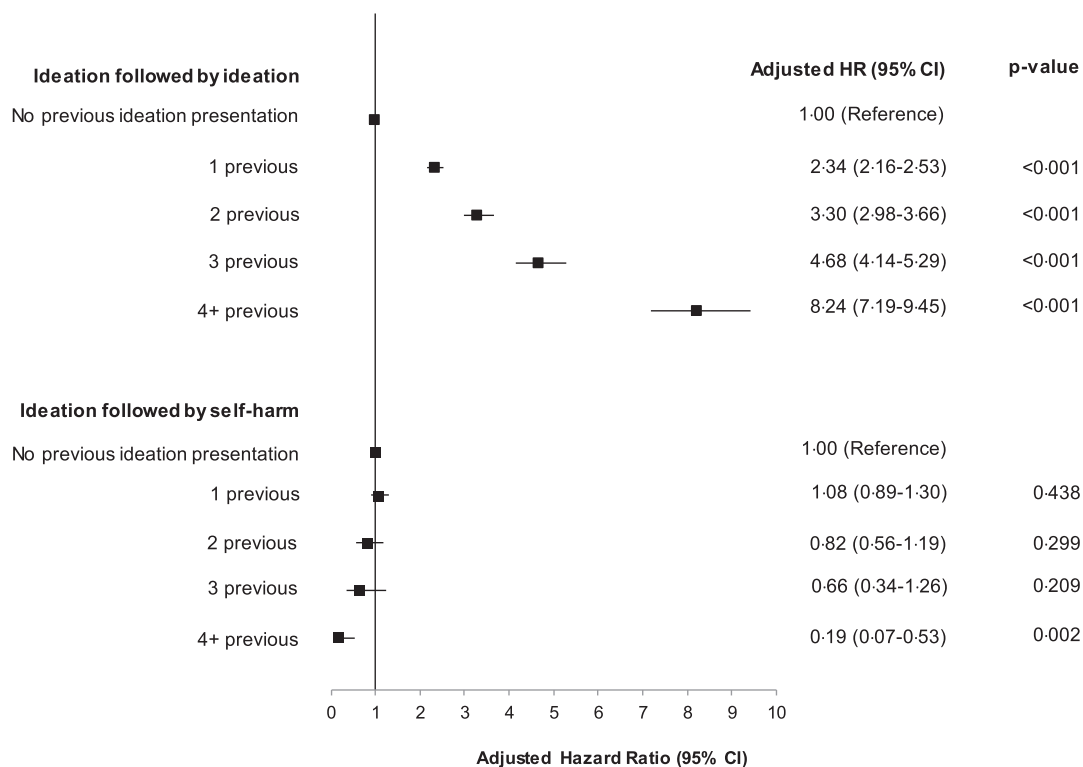


Fig. 1. Adjusted cox proportional hazard survival analyses for repeat presentation to hospital following ideation, according number of previous ideation presentations within study period. Note: Adjusted for other variables listed in Tables 2 and 3. For risk of self-harm following ideation, data censored once subsequent self-harm presentation made.

3.3. Factors associated with number of presentations to hospital

Of the 9792 individuals who presented with ideation, 7646 did not make a subsequent ideation presentation during the study period, but 1245 (12.7%), 434 (4.4%), 170 (1.7%) and 297 (3.0%) individuals made one, two, three and at least four further presentations, respectively. The cumulative number of presentations was not associated with age, but higher for males (although the proportional difference was small) and for persons with alcohol involved in their index presentation ($p < 0.05$; Supplementary Table 3).

4. Discussion

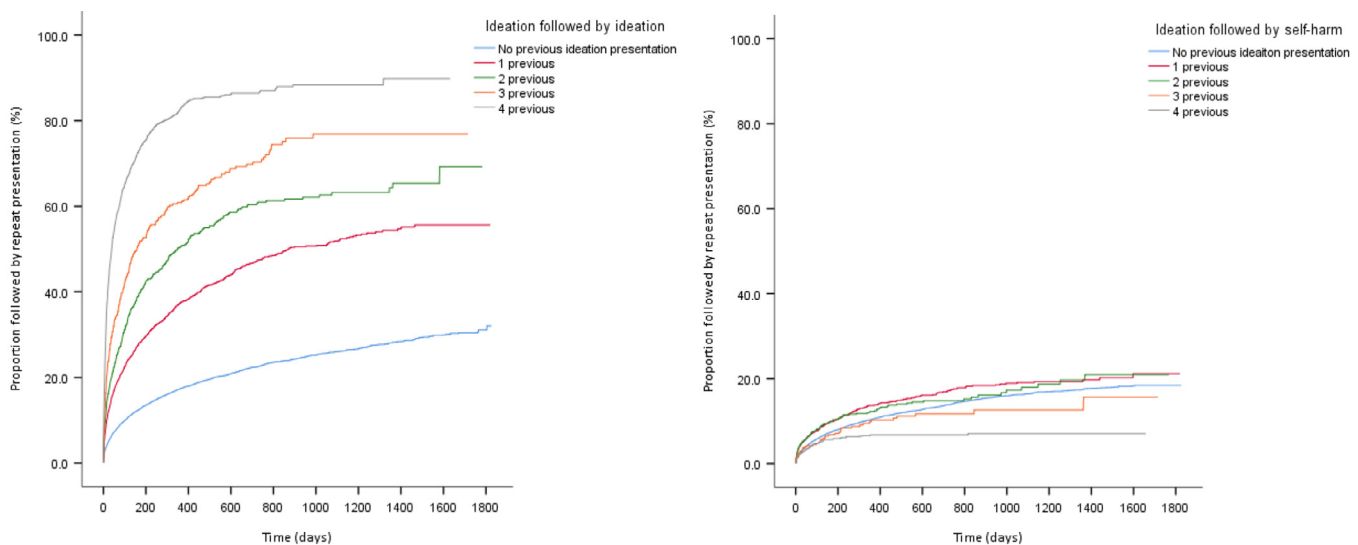
We used data from a registry covering a region of the United Kingdom to examine the risk of repeat presentation to hospital following ideation. We found that the risk of repeat presentation to hospital following suicidal ideation was 41% within five years and that the risk of subsequent self-harm was 10% within 12 months and 18% within five years. The number of previous presentations to hospital within the study period had the strongest independent association with repeat presentation: positively associated with risk of further ideation, but negatively associated with risk of subsequent self-harm. Male gender and alcohol were also strongly associated with risk of further ideation. In contrast, risk of subsequent self-harm was highest amongst females and those under 30 years of age. The cumulative number of presentations made to hospital was associated with male gender and alcohol involvement.

To our knowledge, this is the first study to explore the factors associated with of repeat presentation following hospital-presenting ideation, with most studies examining self-harm only, or suicidal behaviour as a composite group. While the cumulative risk of repeat presentation following ideation is higher than reported for self-harm [6], the risk factors we identified were, for the most part, comparable with previous research on self-harm [12,15–18].

The observed gender difference in risk of subsequent self-harm may be partly explained by a lower rate of help-seeking behaviour combined with a higher risk of suicide amongst men. However findings from research incorporating the same population as the current study suggest that while presentation to hospital with ideation was associated with a four-fold risk of suicide compared with the general population, there are no differences in risk of suicide according to age or gender [19]. Further work is needed to fully establish the risk of suicide and other causes of death following ideation. Having alcohol on board at the time of presentation to hospital was uniquely associated with further risk of ideation amongst men. This may reflect the presence of underlying co-morbidities in this group, including substance-related and other psychiatric disorders. The use of alcohol in self-harm has previously been shown to be highest amongst men in Northern Ireland aged 45–54 years [20], a generation who have lived through the period of ‘The Troubles’ and report a high prevalence of conflict-related post-traumatic stress disorder [21].

Risk of subsequent self-harm following ideation was highest amongst young people, in particular females aged under 30, with 15% of ideation presentations followed by self-harm in this group. This finding reinforces the expression of suicidal ideation as an important marker of psychological distress amongst young people [7]. For most, onset of self-harm occurs in adolescence and international findings have shown an increasing trend in self-harm in young people in recent years [22,23], and there are particular concerns about transgenerational trauma amongst young people in Northern Ireland [24]. Opportunities for early intervention for young people expressing ideation could be an effective suicide prevention target.

Existing research has demonstrated the cumulative effect of multiple self-harm presentations and subsequent repetition [12,15]. A similar pattern of recidivism was observed in this study for repetition with further ideation, with a six-fold risk of repeat presentation following four or more previous ideation presentations. This is in line with results from a recent meta-analysis, which found that the



Number at risk	12m	24m	36m	48m
No previous	6030	4028	2485	1168
1 previous	922	503	269	95
2 previous	277	127	62	17
3 previous	127	54	22	6
4 previous	139	48	20	3

Number at risk	12m	24m	36m	48m
No previous	5232	3616	2304	1156
1 previous	736	460	281	107
2 previous	229	132	73	26
3 previous	99	51	26	8
4 previous	169	90	36	10

Fig. 2. Kaplan-Meier failure curves showing, for ideation presentations, the cumulative probability of a repeat presentation with ideation (left) or self-harm (right), according to the number of previous ideation presentations within study period. Numbers at risk at 12-month intervals are tabulated underneath. For risk of subsequent self-harm, data censored once subsequent self-harm presentation made.

strongest risk factor for suicidal ideation was prior ideation [18]. However an inverse pattern was observed when considering subsequent self-harm, with the risk highest following a first or second ideation presentation, and decreasing thereafter. This implies that the risk of transition from ideation to self-harm is greatest when an individual attends hospital for the first or second time with suicidal thoughts, a finding which has important implications for clinical practice and intervention. We have previously reported that the risk of repeat presentation following ideation is greatest in the first 12 months [6], a finding supported by general population research which found that the majority of suicide attempts (planned and unplanned) occurred within one year of onset of ideation [25]. There is relatively little robust, large-scale research explaining the temporal course of suicidal behaviour, particularly those mapping the trajectory from thoughts to action. However, the patterns found in this study align with psychological models such as the integrated motivational-volitional model of suicidal behaviour [26], which posits that the relationship between suicidal ideation and behaviour may be more cyclical in nature than linear, particularly for repeated engagement in self-harm, with the transition between ideation and behaviour becoming increasingly rapid.

The risk of repeat presentation following ideation for those who refused care or who left the emergency department before a recommendation could be made emphasizes the need to provide interventions and comprehensive follow-up for all individuals who present to hospital expressing ideation. It also emphasizes the need for emergency departments to have processes in place to minimize the risk of vulnerable individuals leaving prior to a recommendation being made. More

generally, there is a need to consider how to minimize unnecessary presentations to hospital emergency departments for ideation. Community-based initiatives such as multi-agency and street triage teams have been shown to be effective in providing appropriate interventions and reducing unnecessary emergency department visits [27].

Our study did not show that receiving or being referred for a mental health assessment at the time of presentation to hospital impacted on the overall risk of repeat presentation to hospital. At a univariable level, provision of mental health assessment was associated with a decreased risk of further ideation, but this association became non-significant when adjusting for recommended next care and number of presentations made during the study period. This may suggest some confounding by indication, but would need to be considered in greater detail in future studies. Evidence for the effect of psychosocial assessments in the emergency department in reducing repeat self-harm is mixed, with most studies showing some benefit [28–30]. While there is some evidence for the effectiveness of general psychological interventions on reducing suicidal ideation [31], there is a lack of research on interventions for those who present to hospital, in particular those which aim to reduce the risk of future self-harm. A recent large scale US study found that a multifaceted intervention following hospital presentation with self-harm or ideation was associated with a 20% relative risk reduction in suicide attempts [32]. There is no consensus on whether interventions aimed at reducing self-harm are also appropriate for those expressing ideation [4]. However, given the broad similarities in factors associated with repetition of self-harm and ideation that we have shown, future studies should consider how such interventions may work differently for self-harm and ideation, and if they should be population-specific.

A strength of this study is the use of consecutive presentations to hospital in a large region of the United Kingdom, over a period of eight years. We used an inception cohort method to maximise the number of true first presentations to hospital, to ensure that the patterns of repeat presentation were accurate. Nevertheless, our study had some limitations. We did not have information on referrals made to out-patient or community mental health services following discharge from hospital, which may have also contributed to the risk of repetition. Similarly, we didn't have information on active mental health care or psychiatric treatments received, particularly during the period following presentation to hospital. We were also only able to examine hospital-presenting episodes and so presentations to primary care or other mental health settings have not been captured. Such treatments or health care contacts may have contributed to the patterns of repetition presented in this study, and future research should examine the impact of longer-term management of suicidal ideation in primary and secondary care. The definition of ideation used by the Registry is broad, and we were not able to sub-classify the ideation presentations with regards to degree of suicidal intent or according to active or passive ideation. Finally, we were only able to look at hospital-presenting ideation and self-harm, and so further ideation or self-harm where the individual did not present to hospital has not been captured.

This study has built on recent work describing the profile of hospital-presenting ideation [6], which concluded that although those who present to hospital with ideation were a distinct population from those presenting with self-harm, a proportion will engage in self-harm. This research has highlighted important patterns in the trajectory of suicidal behaviour, particularly in relation to the transition from ideation to self-harm in young people. The findings underline the need for those who present to hospital with ideation to be recognized as an important clinical group at risk of self-harm, and clinical guidance and policy should reflect this.

Contributors

The study was designed by EG, PC and BB. EG and PC analysed the data. EG, PC, BB, DOH and KK interpreted the results. EG and KK drafted the manuscript. All authors critically reviewed the manuscript and approved the final version.

Declaration of Competing Interest

BB and DOH are employed by the Public Health Agency, Northern Ireland. This statutory body commissions both research and health and social care services. In this context they are involved in both self-harm research and commissioning of services for people who self-harm. PC, EG and KK declare no conflicts of interest.

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Supplementary materials

Supplementary material associated with this article can be found in the online version at doi: [10.1016/j.eclinm.2020.100378](https://doi.org/10.1016/j.eclinm.2020.100378).

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