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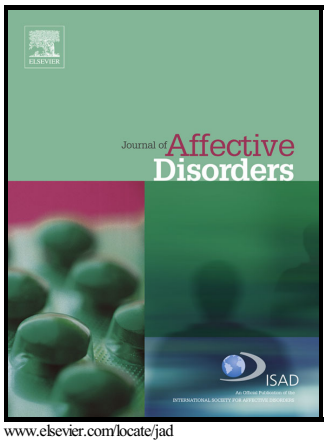

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The exacerbating influence of hopelessness on other known risk factors for repeat self-harm and suicide

Sarah Steeg[1]

Matthew Haigh[2]

Roger T. Webb[1]

Nav Kapur[1]

Yvonne Awenat[3]

Patricia Gooding[3]

Daniel Pratt[3]

Jayne Cooper[1]

[1]Centre for Suicide Prevention, University of Manchester

[2] Department of Psychology, Northumbria University Newcastle

[3]School of Psychological Sciences, University of Manchester

Address for correspondence:

Sarah Steeg

Centre for Suicide Prevention

Jean McFarlane Building

University of Manchester

M13 9PL

Tel: +44 161 275 0718

sarah.steeg@manchester.ac.uk

Abstract

Background: Hopelessness is frequently observed in people who harm themselves and is an established risk factor for nonfatal self-harm repetition and suicide. Little is known about how the presence of hopelessness in addition to other risk factors affects subsequent risk.

Method: Prospective cohort of 19,479 individuals presenting with self-harm to one of three English Emergency Departments between 1st January 2000 and 31st December 2010. Repeat self-harm and suicide deaths within twelve months of the first assessed episode were identified. Cox Proportional Hazards models were used to estimate Hazard Ratios (HRs) for risk factors with and without hopelessness.

Results: A clinical impression of hopelessness was associated with increased risk of further self-harm (HR 1.35, 95% CI 1.16-1.58) and suicide (HR 2.56, CI 1.10-5.96) in the year following an index episode. For individuals who were living alone or homeless, unemployed, reported problems with housing, had received psychiatric treatment in the past, were currently receiving treatment or used alcohol during the self-harm episode, an exacerbation of an already elevated risk of repetition was observed amongst those who were assessed as hopeless. Where individuals presented with forensic problems, physical health problems or bereavement, an increase in risk was only observed for those who were also assessed as hopeless.

Limitations: A clinical impression of hopelessness was assigned using a binary 'yes'/'no' classification rather than a validated scale.

Conclusions: Hopelessness intensifies the impact of several known risk factors for adverse outcomes following self-harm. These findings highlight the importance of identifying and therapeutically addressing this dynamic but potentially modifiable clinical risk factor during the psychosocial assessment and in subsequent care.

Key words: Hopelessness; self-harm; suicide; epidemiology; psychosocial assessment

Introduction

Large-scale epidemiological studies have provided information about factors associated with the repetition of suicidal behaviour, largely identifying fixed and non-modifiable characteristics. Clinical guidance for the United Kingdom produced by the National Institute for Health and Care Excellence (NICE, 2011) reviewed evidence from prospective cohort studies to bring together population-level risk factors for repeat self-harm and suicide. Nine key risk factors were identified: a history of self-harm, depressive symptoms, a history of psychiatric treatment, alcohol misuse, physical health problems, gender (male gender for suicide risk and female gender for risk of repeat self-harm), marital status and level of suicide intent. A report by the World Health Organization (World Health Organization, 2014) summarised key risk factors for suicide including isolation, relationship conflict or loss, previous suicide attempt, mental disorder, harmful use of alcohol, loss of employment, financial problems, hopelessness, chronic pain, family history of suicide and genetic and biological factors, as well as influences from a wider systemic level such as access to means and the availability of appropriate health care. The report emphasised that vulnerability to suicide is likely to result from the cumulative effect of a number of risk factors.

Hopelessness has featured strongly in psychological theories of suicide. Initially the term was used broadly, to describe generalised negative expectancies about the future and feelings of depression (Menninger, 1938). Later, in an attempt to quantify 'hopelessness', a scale was derived and validated. Beck's 'Hopelessness Scale' (Beck et al., 1974) is made up of 20 specific measures and incorporates themes including 'Feelings About the Future', 'Loss of Motivation' and 'Future Expectations'. Theories about the relationship between hopelessness and suicide have also been refined. Menninger, in 1938, identified hopelessness, in its broad sense, as a fundamental dimension of suicide (Menninger, 1938). Beck went on to find that suicidal intent was more correlated with hopelessness than with depression (Beck et al., 1974). More recent models of suicidal behaviour, for example the 'Cry of Pain' model (Williams and Pollock, 2000) and the Schematic Appraisal Model of Suicide (Johnson et al., 2008) emphasise the role of hopelessness in the development of suicidal behaviour. For example, the 'Cry of Pain' model includes a specific prediction that feelings of defeat can lead to feelings of entrapment, which, when projected into the future, can lead to hopelessness. Another recent model of suicidal behaviour focusses on the development of suicidal act from suicidal ideation, taking into account components increasing risk at each stage, including those relating to positive future thinking (O'Connor, 2011). A recent review highlighted hopelessness as one of the key psychological risk factors for suicidal ideation and behaviour (O'Connor and Nock, 2014). Feelings of hopelessness have been found to be associated with initiation of self-harm

(Milnes et al., 2002), risk of repeat self-harm (McMillan et al., 2007) and suicide (Beck et al., 1990). In a recent international review of case-control and cohort studies, hopelessness was found to be associated with a greater than twofold increase in risk of suicide amongst people with depression (Hawton et al., 2013). However, prospective, hospital-based studies of self-harm have tended to examine risk factors in isolation, overlooking their cumulative effect (Larkin et al., 2014). Their inclusion could enhance understanding of some existing known risk factors (Kessler et al., 1999; Larkin et al., 2014).

The goal of the current study was to address this gap with a focus on the psychological variable hopelessness. We aimed to examine how a clinical impression of hopelessness, identified in individuals attending the Emergency Department (ED) following self-harm, augments risks of repeat self-harm and suicide in individuals with other known epidemiological risk factors. Our specific objective was to examine the additive effect of hopelessness on twelve-month risk of repeat self-harm and suicide in the presence of known risk factors for repetition, using data available from a prospective cohort of self-harm patients described below.

Method

Study design and setting

A prospective cohort study identified all cases of self-harm by individuals aged 16 years and over attending three Emergency Departments (EDs) in the City of Manchester, England. We defined acts of self-harm as those that involve 'intentional self-injury or self-poisoning, irrespective of motivation' (Hawton et al., 2003), in line with definitions commonly used in clinical record-based (Bergen et al., 2010; Kwok et al., 2014) and Medicaid claims-based (Olfson et al., 2013) studies of self-harm. Hospital records and medical notes were systematically searched to identify all ED presentations involving self-harm, providing information on age, gender, method of self-harm and date of presentation for all individuals presenting to any of the three study hospitals, regardless of the treatment they received upon presentation to hospital. Other identifying information such as NHS number and date of birth was also recorded, allowing individuals to be monitored for future attendances. In addition, most patients received a psychosocial assessment, either by an ED clinician or a mental health specialist (or both), upon presentation to hospital allowing the collection of more detailed contextual data and patients' mental state and social circumstances.

Measures

We focused on individuals who received at least one psychosocial assessment during the study period. Assessments were conducted by ED clinicians upon presentation to hospital or by mental health specialists, the majority of whom were a mental health nurse or psychiatrist, following referral from the ED. Assessments carried out by ED clinicians comprised a brief proforma assessment, which can be found, along with a more detailed description of the methodology and study population characteristics, in a previous report (Bickley et al., 2013). A psychosocial assessment carried out by a mental health specialist refers to 'a comprehensive assessment including an evaluation of needs and risk.'… 'designed to identify those personal psychological and environmental (social) factors that might explain an act of self-harm' (NICE, 2011). Where a patient received both assessments, information about hopelessness was obtained from the assessment conducted by a mental health specialist, as it was likely that this was the more in-depth assessment. Patients' first assessed episode during the study period was used as the index episode, regardless of assessor type. As part of both assessments, a clinical impression of hopelessness was assigned by the ED/mental health clinician, using a binary 'yes' or 'no' classification on a standardised pro-forma. The clinicians were asked to give a clinical impression of hopelessness based on the patient's current mental state. No standard prompt or definition was provided. Other established risk factors were selected for analysis if they were routinely recorded as part of the psychosocial assessment or were contained within the hospital records. Thus, the following variables were identified as relevant to this study: self-harm within the past year, living alone or homelessness, cutting as a method of self-harm (for the episode being assessed), current or previous treatment for a psychiatric disorder, unemployment, use of alcohol at the time of the self-harm, gender and problems with relationships, work, money, housing, forensic problems (such as an impending court case), poor physical health or bereavement.

Repetition was identified if an individual returned to a study hospital with self-harm within twelve months of the index episode. The cohort was linked with national records (DLS; Health and Social Care Information Centre, 2013) to identify any subsequent suicides up until 31st December 2012. We included deaths assigned verdicts of suicide (ICD codes X60-X84) and undetermined cause (Y10-Y34, excluding Y33.9) (World Health Organization, 2010).

Approval from the National Information Governance Board for Health and Social Care (NIGB) under Section 251 of the NHS Act 2006 was obtained to collect data from EDs and to link these data with mortality information.

Statistical analyses

Analyses were conducted using Cox Proportional Hazards models based on information gathered from an individual's first assessed episode of self-harm within the study period. The number of days between the index episode and an event (self-harm repetition or suicide) was calculated for each individual. The first hospital presentation in the study period where an assessment took place was defined as the index episode from which survival time was calculated. Where there was no event within twelve months, or the individual died from causes other than suicide, (or were otherwise lost to follow-up due to, for example, emigration or presentation to a hospital outside of the catchment area) data were right censored. Hospital-level clustering effects were accounted for statistically by correcting the standard errors. We were interested in the cumulative effect of risk factors by comparing repetition/suicide events for pairs of binary variables (e.g., feeling hopeless and risk factor of interest). Two reference categories were used. First, the group of individuals with neither relevant risk factor (e.g., no clinical impression of hopeless and risk factor not present, HR=1) were assigned as the reference category, allowing examination of the effect of separate and combined additional risk factors. Second, individuals who were not assessed as hopeless but who did present with the risk factor of interest were assigned as the reference category. We then calculated Hazard Ratios relative to these baselines for those individuals with both relevant risk factors (e.g., hopeless *and* the risk factor of interest). This allowed us to estimate the effect of hopelessness over and above the additional risk factor alone. To assess the sensitivity of results to change depending on clinician type, we repeated these analyses separately for patients assessed as hopeless by ED clinicians. For the majority of risk factors the numbers of suicides by subgroup were very low meaning that it was not possible to derive precise HR estimates. We excluded results where the number of events per subgroup was less than nine. Whilst guidance does exist (Peduzzi et al., 1995), there is no definitive minimum number of events required for Cox regression to be performed.

Results

Description of the study cohort

Between 1st January 2000 and 31st December 2010, 19,479 individuals aged 16 or over harmed themselves and presented to one of the three study hospitals. Data on hopelessness were not available for individuals with no psychosocial assessment so could not be included in the study. Seventy seven percent (15,021/19,479) of individuals had at least one episode of self-harm assessed by an ED medic or a mental health specialist and, of these, 91% (13,644/15,021) had information

about hopelessness recorded. This included 39% (5,280) who received an assessment by an ED clinician, 31% (4,287) by a mental health specialist and 30% (4,077) received both.

Compared to individuals without hopelessness status recorded, the 13,644 individuals assessed for hopelessness were more likely to be female (58% vs. 53%) and more likely to have poisoned (86% vs. 78%). The distributions of Black and South Asian individuals in the two groups (with and without hopelessness assessment) were almost identical (4% and 6% respectively vs. 4% and 7% respectively) although other non-White ethnic groups were less common among the patients assessed for hopelessness (3% vs. 7%).

The time at risk of self-harm repetition ranged from 11 years (for those with a first assessed episode in early 2000) to one day for those with a first assessed episode in late 2010. Twelve percent (1,575/13,644) of individuals repeated self-harm within 12 months of their first assessed episode, with a median time to repetition of 78 days. Amongst individuals who could be traced for mortality follow-up, 0.5% (60/13,310) died by suicide within 12 months, with a median of 120 days to suicide.

Overall, 35% (4,838/13,644) of the assessed patients were deemed by clinicians to be feeling hopeless. This proportion was higher amongst those whose only assessment was conducted by an ED clinician, where 50% were assessed as hopeless compared to 26% of individuals receiving a specialist mental health assessment (x^2 =769, p<0.001). The risk of further self-harm for those who received a specialist mental health assessment (12% repeated within 12 months) was similar to the risk among those receiving only an ED assessment (11%, x^2 =1.0, p=0.31). There was also no difference in the proportions dying by suicide within a year (0.51% and 0.35% respectively, x^2 =1.8, p=0.18).

Table 1 shows that the risk of repeat self-harm within 12 months of index episode was 35% greater amongst those considered to be hopeless at the time of assessment relative to those not hopeless, irrespective of other risk factors. The risk of suicide within this time period was over 2.5 times greater for those assessed as hopeless relative to those assessed as not hopeless.

Additive effects of hopelessness and other known risk factors

Individuals who were living alone or homeless, unemployed, reported problems with housing, had received psychiatric treatment in the past or were currently receiving treatment or used alcohol during the self-harm episode were at higher risk of repeat self-harm. Where a clinical impression of hopelessness was present alongside these factors a further increase in risk was observed (Table 2).

An elevated level of risk was observed for individuals presenting with a one-year history of self-harm and who presented with cutting as a method of harm, and an assessment of hopelessness did not elevate this risk further. Where individuals presented with forensic problems, physical health problems or bereavement, an increase in risk was only observed for those who were also assessed as hopeless. There was no increase in risk of future self-harm for individuals who were assessed as hopeless and also presented with interpersonal problems with their partner or financial problems, though a clinical impression of hopelessness negated the 'protective' effect of interpersonal problems. There was evidence that hopelessness was more prevalent amongst people reporting a greater number of problems: 32% of individuals reporting one problem were considered to be hopeless, increasing to 37% amongst those with two problems and 47% for those reporting three or more problems (x^2=113.2, p<0.001).

When these analyses were restricted to individuals with an ED assessment only, we found that the hazard ratios were similar (Table S1), though due to the smaller sample size the confidence intervals were wider.

Though the number of suicides was low, there was evidence that a clinical impression of hopelessness increased risk of suicide among individuals who were living alone or homeless, or used alcohol at the time of self-harm (Table 3).

Discussion

A clinical impression of hopelessness at the time of an individual's psychosocial assessment was associated with an increased risk of both repeat self-harm and suicide within a year. For some characteristics identified in previous research as associated with risk (living alone or homelessness, unemployment, problems with housing, receipt of psychiatric treatment and alcohol use at the time of the self-harm act), an assessment of hopelessness intensified existing risk, whilst for others (forensic problems, physical health problems and bereavement), an increase in risk was not observed unless hopelessness was also present.

A clinical impression of hopelessness did not elevate the risk of further self-harm for individuals presenting with a one-year history of self-harm or who self-cut as part of the self-harm episode being assessed, though an increased risk was observed among individuals with these characteristics. This may indicate that hopelessness leads to additional risk where problems are linked to life situation rather than longer-standing mental health problems where risk is already considerable. We found the overall proportion of individuals assessed as feeling hopeless increased as the number of

problems increased, which is consistent with Milnes et al who found that hopelessness scores increased with the number of problems reported (Milnes et al., 2002). Increasing numbers of problems may extend an individual's capacity to cope beyond their perceived limits, so that an appraisal of hopelessness may be more likely to ensue. Our findings highlight the importance of considering the cumulative risk when there is co-occurrence of hopelessness alongside factors indicating social deprivation and isolation and money, housing and work problems.

Previous epidemiological studies using some of the earlier data included here have suggested people using cutting as a method of harm are at increased risk of suicide (Cooper et al., 2005) and repeat self-harm (Steeg et al., 2012) independently of other risk factors. However, the findings here indicate that risks associated with cutting and hopelessness may also interact. Recent work found patients who attended the ED after self-cutting scored higher on the Beck Hopelessness Scale than those who attended with self-poisoning (Larkin et al., 2013). The authors hypothesised that individuals who self-cut are more likely to repeat because of certain psychological vulnerabilities; hopelessness may mediate the relationship between self-cutting and risk of further self-harm.

It is possible that hopelessness acts as a psychological driver to initiate an increase in risk associated with poor physical health, forensic problems, unemployment and bereavement – problems that in themselves may evoke feelings of entrapment. A case-control psychological autopsy study found that people under 35 who died by suicide were more likely to have experienced forensic and interpersonal life events in the preceding three months (Cooper et al., 2002). Unemployment has previously been identified as an independent risk factor for repeat self-harm (Kapur et al., 2006). Our results suggest hopelessness modifies this risk. The lower observed risk amongst those reporting problems with their partner or family in this study may reflect the protective nature of such social connections despite the interpersonal conflict being experienced within them. Whilst unhealthy relationships, losses and interpersonal difficulties are associated with increased risk of suicidal behaviour (Johnson et al., 2002; World Health Organization, 2014), in general, marriage is protective against suicide (O'Reilly et al., 2008), and a supportive network of family and friends can help to minimise the harm posed by social, financial and emotional strains (World Health Organization, 2014). Our results suggest that the absence of hopelessness in the context of interpersonal stressors may aid their resolution.

The presence of hopelessness is part of the definition of major depression and persistent depressive disorder. Therefore, the findings of increased risk observed amongst those who were assessed as feeling hopeless may also represent increased risk amongst those who would meet the criteria for a diagnosis of depression.

Finally, keeping in mind the low numbers of suicides, the socially isolating factor of living alone or being homeless combined with feelings of hopelessness may intensify the risk of suicide to a greater degree than one of these factors alone.

Strengths and limitations

Our results are based on a large, population-level cohort, spanning an eleven-year period with data obtained from three hospitals within an English city. Whilst a multicentre approach would improve the generalisability of the results, there is less consistency between centres/hospitals on the availability of psychological variables such as hopelessness from routine data sources. The use of routinely collected data to monitor adverse outcomes following self-harm offers wide coverage, strongly reducing selection bias and minimising loss-to follow-up.

Assessment of the presence of hopelessness relied upon clinicians classifying patients into a binary 'yes' or 'no' measure based on their own clinical impression of hopelessness. This binary measurement lacks the nuance and reliability of more detailed assessments of hopelessness. However, this study has ecological validity as it reflects the way hopelessness is measured in the ED setting. Psychological variables such as hopelessness are relatively under-used in clinical record-based studies despite their relationship with other social and clinical factors. As an initial investigation, this study has suggested hopelessness is an important factor to be considered, perhaps particularly where other key risk factors also exist. The results reflect judgements made by clinicians. While the hopelessness classifications are, therefore, subjective, they are nevertheless a pragmatic use of routinely collected data and have the advantage of being grounded in real-world clinical scenarios.

Assessments were obtained from a large number of staff from various disciplines, most commonly ED clinicians, psychiatric nurses and psychiatrists. However, we acknowledge that this is likely to result in some degree of measurement error. The use of a standardised assessment of hopelessness, such as the Beck Hopelessness Scale, might elucidate the constructs within hopelessness that are particularly important in augmenting risk. Furthermore, considering the negative attitudes expressed by some ED staff towards patients who have harmed themselves (Saunders et al., 2012), and the stigma reported by some self-harm patients when visiting the ED (Hunter et al., 2013), the assessment process may have elicited feelings of hopelessness in ED clinicians themselves. Through counter-transference, these feelings may have influenced their assessment of hopelessness in patients. This might partly explain the higher likelihood of ED clinicians judging the patient as

hopeless compared to mental health specialists. It is also possible that the observed differences reflect real changes in patients' mental state from their initial presentation to the ED to the time they are assessed by a mental health clinician which may be some hours or days later.

A clinical impression of hopelessness in this study was associated with increased risk of repetition, more so when identified alongside other known risk factors. We observed similar associations in the data after restricting the sample to those assessed by an ED clinician only (S1). This suggests these more subjective impressions are clinically useful despite their limitations.

The use of routine data meant that patients not receiving an assessment – just over a quarter in this cohort – could not be included in the study. Here, as in previous studies (Kapur et al., 2008), we observed differences in the characteristics of patients not receiving psychosocial assessment, suggesting results should be applied to this group with caution. For example, individuals who self-harmed by poisoning were more likely to receive assessment, possibly due to the greater likelihood of medical admission which in itself infers a stronger likelihood of assessment (Gunnell et al., 2005) but also perhaps due to perceived lethality and assumptions about how lethality relates to future risk of suicidal behaviour (Lilley et al., 2008). However, we found no association between the risk of further self-harm and type of assessor. When examining effects within risk factor subgroups we had abundant power for analyses of hopelessness and repeat self-harm outcomes, though even in this large dataset there was limited power with which to analyse suicide outcomes within subgroups. We addressed this issue by selecting key risk factors with sufficient numbers of suicide events to analyse. Even so, the results for suicide should be treated cautiously. The results for the risk factors we were able to examine suggest that the exacerbating effect of hopelessness may be more acute for suicide risk: in the presence of hopelessness the risk of suicide associated with living alone was more than doubled and for alcohol use was tripled. However, without access to a larger cohort, we cannot conclude that hopelessness is linked with such an exacerbation effect for suicide consistently across risk factors. In summary, whilst we have included these results, they are likely to be less robust than those for non-fatal repetition.

Conclusion and clinical implications

Risk and protective factors are likely to inform psychosocial assessment of people who have self-harmed. While some risk factors are fixed, hopelessness is potentially modifiable. Whilst hopelessness has traditionally been understood as a mental state that changes with time, there are

also indications that hopelessness may be linked to individual traits (O'Connor, 2011). There is evidence that it is possible to address both through, for example, strategies based on affect regulation, mentalisation and safety planning (O'Connor and Nock, 2014), such as a 'hope-kit' to be drawn on in times of crisis (Berk et al., 2004).

UK national clinical guidance for the management of self-harm (NICE, 2011) includes recommendations that structured, time-limited psychological therapy, tailored to need, should be considered as treatment. Given the enhanced risk of further self-harm amongst those with feelings of hopelessness and concurrent practical problems, such as living situation, approaches should aim to address social needs and target the underlying pathways that maintain hopelessness (e.g. cognitive behaviour therapy or problem-solving skills training). Social and psychological factors should not be considered in isolation of each other. Given the increased risk of suicide for individuals who were living alone or homeless, follow-up care should address unsettling living conditions and social isolation as well as mental health needs. An individualised case formulation which seeks to explain the presence and interaction of key risk factors would be an important output of the psychosocial assessment. In addition, due to the limitations of solely researcher- and clinician-led measures of hopelessness, it might be useful to ascertain how existing measures relate to service users' experiences of this state. A possible consequence of the significance of hopelessness that we have highlighted here may be a raised awareness of the need for measures that do translate to ED settings. It would also seem appropriate to examine hopelessness using existing validated and more detailed measures, alongside other existing risk factors, amongst people who attend the ED following self-harm.

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Table 1: Cox Proportional Hazard regression for time to repeat self-harm and suicide from first assessed self-harm episode

	Repetition within 12 months[1]				
	No	Yes	Total	HR (CI 95%)	*p*
Not assessed as hopeless	7,893	913	8,806	1	
Assessed as hopeless	4,176	662	4,838	**1.35** (1.16-1.58)	<0.001*
Total	12,069	1,575	13,644		
	Suicide within 12 months				
	No	Yes	Total	HR (CI 95%)	*p*
Not assessed as hopeless	8,570	25	8,595	1	
Assessed as hopeless	4,680	35	4,715	**2.56** (1.10-5.96)	0.03*
Total	13,250	60	13,310		

[1] Suicides were not treated as repetitions

Table 2: Cox Proportional Hazard regression for time to repeat self-harm from first assessed self-harm episode: clinical impression of hopelessness combined with other known risk factors (N=13,664)

Subgroup	Events (n)	Repeat self-harm[1] (12 months) HR	95% CI	Ratio of two HRs: (c) vs. (a)[2] (95% CI), p value
Not hopeless, male (ref.)	389	1		
Not hopeless, female (a)	524	0.93	0.79-1.11	
Hopeless, male (b)	291	1.33	0.97-1.83	
Hopeless, female (c)	371	**1.27**	1.03-1.57	**1.36** (1.29-1.44), p<0.001*
Not hopeless, no recent self-harm (ref.)	499	1		
Not hopeless, recent self-harm (a)	395	**2.66**	2.58-2.75	
Hopeless, no recent self-harm (b)	289	**1.27**	1.05-1.52	
Hopeless and recent self-harm (c)	357	**3.04**	2.65-3.49	1.14 (0.97-1.35), p = 0.11
Not hopeless, not living alone (ref.)	600	1		
Not hopeless, living alone (a)	287	**1.59**	1.53-1.66	
Hopeless, not living alone (b)	363	**1.28**	1.00-1.64	
Hopeless and living alone (c)	284	**2.08**	1.74-2.48	**1.30** (1.14-1.50), p <0.001*
Not hopeless, no cutting (ref.)	743	1		
Not hopeless, cutting (a)	169	**1.49**	1.31-1.69	
Hopeless, no cutting (b)	545	**1.41**	1.18-1.68	
Hopeless and cutting (c)	114	**1.58**	1.41-1.78	1.06 (0.08-1.32), p = 0.59
Not hopeless, no past psych treatment (ref.)	395	1		
Not hopeless, past psych treatment (a)	480	**1.95**	1.72-2.20	
Hopeless, no past pysch treatment (b)	218	**1.37**	1.08-1.74	
Hopeless and past psych treatment (c)	418	**2.28**	1.82-2.86	**1.17** (1.02-1.34), p=0.02
Not hopeless, no current psych treatment (ref.)	464	1		
Not hopeless, current psych treatment (a)	424	**1.74**	1.47-2.06	
Hopeless, no current pysch treatment (b)	264	1.28	0.98-1.69	
Hopeless and current psych treatment (c)	381	**2.20**	1.75-2.78	**1.27** (1.04-1.55), p = 0.02*
Not hopeless, not unemployed (ref.)	529	1		
Not hopeless, unemployed (a)	363	**1.34**	1.16-1.55	
Hopeless, not unemployed (b)	340	**1.38**	1.08-1.75	
Hopeless and unemployed (c)	302	**1.67**	1.36-2.06	**1.24** (1.10-1.41), p = 0.001*
Not hopeless, no alcohol used (ref.)	347	1		
Not hopeless, alcohol used (a)	518	**1.13**	1.04-1.24	
Hopeless, no alcohol used (b)	296	**1.49**	1.32-1.69	
Hopeless and alcohol used (c)	331	**1.45**	1.19-1.77	**1.28** (1.004-1.63), p = 0.046*
Not hopeless, no relationship problem with partner (ref.)	513	1		
Not hopeless, relationship problem with partner (a)	319	**0.63**	0.61-0.66	
Hopeless, no relationship problem with partner (b)	366	**1.22**	1.03-1.44	
Hopeless and relationship problem with partner (c)	227	0.97	0.76-1.21	**1.54** (1.22-1.93), p <0.001*

Not hopeless, no family problem (ref.)	683	1		
Not hopeless, family problem (a)	149	**0.94**	0.91-0.96	
Hopeless, no family problem (b)	476	**1.31**	1.09-1.58	
Hopeless and family problem (c)	117	**1.47**	1.22-1.77	**1.57** (1.31-1.88), p<0.001*
Not hopeless, no financial problem (ref.)	762	1		
Not hopeless, financial problem (a)	70	0.81	0.63-1.04	
Hopeless, no financial problem (b)	534	**1.39**	1.18-1.65	
Hopeless and financial problem (c)	59	0.96	0.76-1.21	1.18 (0.82-1.72, p = 0.88
Not hopeless, no housing problem (ref.)	725	1		
Not hopeless, housing problem (a)	107	**1.52**	1.33-1.75	
Hopeless, no housing problem (b)	500	**1.37**	1.14-1.66	
Hopeless and housing problem (c)	93	**1.77**	1.45-2.16	**1.16** (1.07-1.25), p<0.001*
Not hopeless, no legal problem (ref.)	800	1		
Not hopeless, legal problem (a)	32	1.07	0.84-1.36	
Hopeless, no legal problem (b)	562	**1.36**	1.12-1.65	
Hopeless and legal problem (c)	31	**1.43**	1.12-1.81	**1.33** (1.16-1.53), p<0.001*
Not hopeless, no health problem (ref.)	776	1		
Not hopeless, health problem (a)	56	0.99	0.74-1.33	
Hopeless, no health problem (b)	525	**1.34**	1.12-1.59	
Hopeless and health problem (c)	68	**1.56**	1.21-2.00	**1.57** (1.07-2.13), p = 0.02*
Not hopeless, no bereavement (ref.)	756	1		
Not hopeless, bereavement (a)	76	0.96	0.86-1.08	
Hopeless, no bereavement (b)	529	**1.36**	1.09-1.70	
Hopeless and bereavement (c)	64	**1.29**	1.14-1.46	**1.34** (1.06-1.70), p = 0.01*

[1]*Suicides were not included as 'repetitions'*

[2]*Risk factor without hopelessness (a) vs. risk factor with hopelessness (c), with '*' denoting 0.05 significance level of p values and bold text denoting statistical significance of HRs.*

Table 3: Cox Proportional Hazard regression for time to suicide from first assessed self-harm episode: clinical impression of hopelessness combined with other known risk factors (N=13,310)

	Suicide (12 months)			
Subgroup	Events (n)	HR	95% CI	Ratio of two HRs: (c) vs. (a)[2] (95% CI), p value
Not hopeless, male (ref.)	16	1		
Not hopeless, female (a)	9	**0.39**	0.23-0.65	
Hopeless, male (b)	26	**2.85**	1.17-6.98	
Hopeless, female (c)	9	0.74	0.23-2.34	1.89 (0.64-5.54), p=0.25
Not hopeless, not living alone (ref.)	16	1		
Not hopeless, living alone (a)	9	1.85	0.64-5.35	
Hopeless, not living alone (b)	19	2.47	0.61-10.0	
Hopeless and living alone (c)	15	**3.97**	1.18-13.37	**2.15** (1.63-2.83), p<0.001*
Not hopeless, no current psych treatment (ref.)	9	1		
Not hopeless, current psych treatment (a)	14	**2.82**	1.42-5.57	
Hopeless, no current pysch treatment (b)	15	**3.72**	1.45-9.57	
Hopeless and current psych treatment (c)	18	**5.01**	1.09-23.09	1.78 (0.52-6.10), p = 0.36
Not hopeless, not unemployed (ref.)	11	1		
Not hopeless, unemployed (a)	14	**2.44**	1.76-3.39	
Hopeless, not unemployed (b)	23	**4.40**	2.08-9.29	
Hopeless and unemployed (c)	10	**2.57**	1.68-3.92	1.05 (0.53-2.07), p = 0.88
Not hopeless, no alcohol used (ref.)	10	1		
Not hopeless, alcohol used (a)	14	1.06	0.68-1.64	
Hopeless, no alcohol used (b)	11	1.88	0.40-8.56	
Hopeless and alcohol used (c)	22	**3.25**	1.84-5.74	**3.08** (1.28-7.39), p = 0.01*

[2] *Risk factor without hopelessness (a) vs. risk factor with hopelessness (c), with '*' denoting 0.05 significance level of p values and bold text denoting statistical significance of HRs.*