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Authors	Griffin, Eve;Arensman, Ella;Perry, Ivan J.;Bonner, Brendan;O'Hagan, Denise;Daly, Caroline;Corcoran, Paul
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The involvement of alcohol in hospital-treated self-harm and associated factors: Findings from two national registries

Dr Eve Griffin*[1], Senior Postdoctoral Researcher

Professor Ella Arensman[1,2], Director of Research

Professor Ivan J Perry[2], Head of Department

Mr Brendan Bonner[3], Head of Health and Social Well-being Improvement (West)

Dr Denise O'Hagan[3], Consultant in Public Health Medicine

Ms Caroline Daly[1], PhD Researcher

Dr Paul Corcoran[2], Senior Lecturer

[1]National Suicide Research Foundation, University College Cork, Ireland.

[2]Department of Epidemiology and Public Health, University College Cork, Ireland.

[3]Public Health Agency, Belfast, Northern Ireland.

Corresponding Author:

Dr Eve Griffin,

National Suicide Research Foundation,

4th Floor, Western Gateway Building,

University College Cork,

Ireland.

+353 21 420 5551

evegriffin@ucc.ie

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Abstract

Background: Alcohol is often involved in hospital-treated self-harm. Therefore it is important to establish the role of alcohol in self-harm as well as to identify associated factors, in order to best inform service provision.

Methods: Data on self-harm presentations to hospital emergency departments in Ireland and Northern Ireland from April 2012 to December 2013 were analysed. We calculated the prevalence of alcohol consumption in self-harm. Using Poisson regression models, we identified the factors associated with having consumed alcohol at the time of a self-harm act.

Results: Alcohol was present in 43% of all self-harm acts, and more common in Northern Ireland (50% vs. 37%). The factors associated with alcohol being involved were being male, aged between 25-64 years, and having engaged in a drug overdose or attempted drowning. Presentations made out-of-hours were more likely to have alcohol present and this was more pronounced for females. Patients with alcohol on board were also more likely to leave without having been seen.

Conclusions: This study has highlighted the prevalence of alcohol in self-harm presentations, and has identified factors associated with presentations involving alcohol. Appropriate out-of-hours services in emergency departments for self-harm presentations could reduce the proportion of presentations leaving without being seen by a clinician and facilitate improved outcomes for patients.

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Introduction

The relationship between alcohol and suicidal behaviour are well established.[1,2] A recent study found that premature, alcohol-related deaths were nine times more likely among those who engage in self-harm compared to the general population.[3] Furthermore, acute alcohol consumption is linked to impulsive suicidal behaviours.[4,5]. One in ten self-harm patients have an alcohol dependency and alcohol misuse is associated with between 23%-36% of acts.[6,7] Alcohol is often consumed prior to or during an act of self-harm, with reported involvement ranging from 26-60%.[7,8,9]

Alcohol consumed during a self-harm act poses specific challenges for the management and assessment of self-harm patients in acute hospital settings. Having alcohol on board may lead to delayed assessment following a self-harm act as well as posing difficulties for medical staff in treating such patients.[6] Co-morbidity and dual diagnoses add further complexity. Therefore, it is important to establish a profile of self-harm patients who present to EDs following self-harm where alcohol is involved.

In this study, data from the National Self-Harm Registry Ireland and the Northern Ireland Registry of Self-Harm are utilised. We have previously established the incidence of hospital-treated self-harm in these countries [8,9] This is the first paper to use data from two national self-harm registries and the specific objectives were:

i) to establish the extent to which alcohol is involved in hospital-treated self-harm in Ireland and Northern Ireland;
ii) to investigate what factors are associated with alcohol being involved in self-harm acts.

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Methods

Self-harm data

Data on hospital-treated self-harm were obtained from both the National Self-Harm Registry Ireland [8] and the Northern Ireland Registry of Self-Harm.[9] All presentations due to self-harm made to acute hospital emergency departments (EDs) in Ireland and Northern Ireland between 1 April 2012 and 31 December 2013 were included. Both registries define self-harm as "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 expected physical consequences".[10]

The National Self-Harm Registry Ireland is operated by the National Suicide Research Foundation and covers thirty-six hospital EDs in Ireland. The Northern Ireland Registry of Self-Harm is operated by the Northern Ireland Public Health Agency. Since April 2012, all twelve hospital EDs across five Health and Social Care Trusts in Northern Ireland are included in the registry's data collection. Data are collected by independently trained data registration officers who operate according to the registries' standardised operating procedures. Identifying cases of self-harm involve a combination of manually checking consecutive presentations to the emergency departments, selecting potential cases on the basis of keyword searches and triage coding by hospital staff. Differences between hospital systems of recording emergency department presentations mean that flexibility in case finding is required.

Data items

Both registries have a core data set including the following variables: gender, date of birth, date and hour of attendance at hospital, method(s) of self-harm according to the tenth

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revision of the WHO's International Classification of Disease codes for intentional injury (X60-X84). Patient initials (in an encrypted format) and area of residence, coded to administrative area, are recorded. In addition recommended next care following ED presentations is recorded. The categories in this variable are: admission to a general medical ward; admission to a psychiatric admission; patient refused admission / left without being seen by a clinician; discharged from ED following treatment.

For the purposes of this study, alcohol involvement was defined as the intake of alcohol prior to or during the act of self-harm. The involvement of alcohol was recorded in a systematic way by the data registration officers, according to the standard operating procedures. Alcohol involvement was ascertained through hospital case notes – if it was recorded on registration or by the attending clinician, or if present on toxicology reports.

Ethical approval

The National Self-Harm Registry Ireland has ethical approval from the National Research Ethics Committee of the Faculty of Public Health Medicine. Ethical approval has been granted by the Office for Research Ethics in Northern Ireland (ORECNI).

Statistical analyses

As with common outcomes, odds-ratios provided by logistic regression can be prone to misinterpretation as they may be far greater than risk ratios. We used Poisson regression to identify the factors independently associated with alcohol involvement in self-harm as it provides risk ratios – specifically incidence-rate ratios (IRR). All self-harm presentations were included in the analysis and adjustment was made for the clustering in the data associated with multiple presentations by self-harm repeaters.

We explored the association between alcohol involvement and the most frequently-recorded methods of self-harm in the data: drug overdose (ICD-10 codes X60-64); self-cutting (X78); poisoning (X66-X69); attempted hanging (X70) and attempted drowning (X71). The

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association between alcohol involvement and repetition of self-harm was also explored. In this instance, a repeat presentation indicates that an individual had made a previous self-harm presentation within the study period.

We explored whether associations differed by country and gender (i.e. interaction) due to previously reported differences in these variables.[9,25] Because of the very large sample size some interactions reached statistical significance at $p<0.05$ but the difference in the magnitude of the associations was very small. To ensure we confined the reporting to non-trivial differences we applied a higher threshold whereby only interaction effects that were highly statistically significant, i.e. at $p<0.001$ level, were included in the multivariate model. Country- and gender-specific associations which were statistically significant in the multivariate model are reported.

Sensitivity analysis

Whether alcohol was recorded as being involved in the self-harm presentation depended on relevant information being present in the hospital notes. Such recording fluctuates by hospital, meaning that associations between patient characteristics and consuming alcohol vary depending on recording of information in each hospital. We tested whether the associations were modified by the hospital's level of recording of alcohol among self-harm presentations. This was done by including interaction effects in univariate Poisson regression models.

All analyses were conducted using Stata 13.0.

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Results

Sample characteristics

During the 21-month study period 24,513 individuals made a total of 34,429 presentations due to self-harm (table 1) – 19,831 (58%) were made to EDs in Ireland and 14,598 (42%) to EDs in Northern Ireland. Approximately 52% of the sample were female and 44% were aged between 25-44 years. The most common method of self-harm recorded was intentional drug overdose (71%). The only other common method of self-harm was self-cutting, present in 23% of acts. Less than one-third (29%) of all presentations were repeat presentations and 31% were made by residents of urban areas.

Insert Table 1

Involvement of alcohol in self-harm acts

Alcohol was involved in 14,637 (42.5%) presentations and more so in Northern Ireland than in Ireland (49.6% vs. 37.3%). Men were more likely than women to have consumed alcohol (46.6% vs. 38.8%), and alcohol involvement was most common among 45-64 year-olds (52.7%). Alcohol was involved most often in cases of intentional drug overdose (42.5%) and attempted drowning (47.2%). Half of all patients who left the ED without being seen by clinician/ refused admission had consumed alcohol (50.5%) (Table 2).

Factors associated with alcohol involvement

Table 2 also presents the results from the adjusted Poisson regression. Risk of consuming alcohol as part of the self-harm act was elevated for patients presenting to EDs in Northern Ireland (IRR 1.35, 95%CI 1.25-1.46). Women were less likely to have consumed alcohol (0.87, 0.84-0.90). Patients aged between 25 and 64 years were most likely to have alcohol on board (45-64yrs: 1.56, 1.49-1.63).

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Whether alcohol was involved varied according to the primary method of self-harm – being more common in presentations involving attempted drowning (1.27, 1.15-1.40), self-cutting (1.08, 1.02-1.13) or intentional drug overdose (Ireland: 1.50, 1.37-1.64). The association with the latter was less apparent in Northern Ireland (1.08, 1.02-1.13). In contrast, presentations involving self-poisoning were less likely to have alcohol involved (0.77, 0.65-0.91).

Time of presentation to the ED was associated with alcohol being involved and this marked variation was stronger for women. In particular presentations made between midnight and 9am were most likely to involve alcohol in both men (1.66, 1.58-1.74) and women (2.25, 2.14-2.37). Presentations made at the weekend were also more likely to involve alcohol (1.14, 1.11-1.17).

Self-harm patients brought to the ED by ambulance or by emergency services were more likely to have consumed alcohol than those self-presenting (1.39, 1.33-1.44). Compared to presentations admitted to a general ward, patients admitted to a psychiatric ward were less likely to have consumed alcohol (0.73, 0.65-0.81). Those leaving without being seen or refusing admission had an elevated risk of having consumed alcohol (1.11, 1.04-1.17). In Ireland, patients discharged from the ED were less likely to have consumed alcohol (0.86, 0.80-0.91). However the opposite was seen in Northern Ireland where patients discharged from the ED were more likely to have consumed alcohol (1.17, 1.12-1.22).

Alcohol being involved in a self-harm act varied depending on whether it was a patient's first presentation or a repeat presentation. If it was a repeat presentation, men were more likely to have consumed alcohol (1.08, 1.04-1.13), while female repeaters were less likely to have done so (0.88, 0.82-0.93).

Insert Table 2

Sensitivity analysis

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The association between each variable and alcohol being involved was examined for hospitals reporting below average levels of alcohol involvement and above average levels (in their respective countries) to see if associations were dependent on the level of reporting of alcohol in hospitals. There was little evidence to support this, as none of the interaction effects were associated with $p<0.001$. Thus the observed associations appear to be robust to the level of reporting across the hospitals included in the study.

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Discussion

Main findings of this study

The findings of this study have highlighted the role of alcohol consumption in hospital-treated self-harm and associated factors. While self-harm presentations made to hospital EDs in Northern Ireland were more likely to involve alcohol than those in Ireland, the factors associated with alcohol consumption and self-harm were similar in both countries. Those factors identified as being associated with alcohol consumption were being male, aged between 25-64 years and having engaged intentional drug overdose, self-cutting or attempted drowning. Time of presentation to the hospital was strongly associated with alcohol consumption, with cases involving alcohol more likely to occur outside of usual working hours and at the weekend. Self-harm patients with alcohol on board were more likely to leave the ED without being seen by a clinician.

What is already known on this topic

There is variation in the level of alcohol involvement in self-harm acts reported in previous studies.[1,6,11] Our findings are lower than those reported in a recent English study,[7] and consistent with previous findings from Irish data.[8] A previous study of self-harm in Northern Ireland highlighted the influence of alcohol on the timing of self-harm presentations to the ED [9] and its findings are supported here.

What this study adds

We found that those who consumed alcohol prior to or during the self-harm act were more likely to present out-of-hours and were also more likely to leave the ED without being seen by a clinician. In particular we found this effect greater among female patients, a result which has not previously been reported on. This highlights the challenge of providing appropriate and timely care and treatment for self-harm patients, particularly out-of-hours. Alcohol

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intoxication at the time of presentation to the ED provides challenges for the assessment of patients, and may prolong waiting time. The ED has now become an important option for care for patients engaging in suicidal behaviour, yet the availability of mental health teams varies across hospital sites and many do not have 24/7 or on-call access, as advocated by the NICE guidelines,[13] even though most presentations occur out-of-hours. An observational study in England found that the proportion of patients presenting with self-harm receiving an assessment by the mental health services in the ED varied from 22-88%[14] while a recent audit conducted by the Royal College of Emergency Medicine found that few hospitals were meeting the target of providing patients with an assessment by mental health services within one hour of referral.[15]

We found significantly higher levels of alcohol involvement in self-harm presentations in Northern Ireland. The observed difference in alcohol involvement in self-harm between both countries may be related to differences in alcohol drinking patterns within the population.[16] We have previously found higher rates of self-harm in Northern Ireland.[9,17] and population-based surveys have established a high incidence of DSM-IV disorders (particularly Post-Traumatic Stress Disorder) in the general population, which may negatively impact on mental health.[18,19] In particular we found a high proportion of alcohol involvement among residents of Northern Ireland aged between 45-54 years (61%), a group which have been exposed to the conflict in Northern Ireland.[17]

The findings from this study have highlighted the role of alcohol consumption in self-harm, associated with presentations occurring out of hours and at weekends, in particular presentations leaving without treatment, as well as among male repeaters. These patterns confirm the need to ensure that services are in place to provide adequate care for patients with issues relating to co-existing alcohol misuse and self-harm, as outlined in the NICE guidelines for the management of self-harm.[13] Given existing evidence linking alcohol misuse and alcohol-related disorders to self-harm, a range of services is needed to meet the

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needs of such patients – from managing addiction issues associated with self-harm through to addressing lower levels of alcohol misuse. Collaboration between mental health teams, addiction services and other non-statutory agencies is recommended where a patient presents with a dual diagnosis.[13] Although this study did not examine recreational drug misuse it is likely that other forms of substance misuse are also related to self-harm and future research in that area would be useful. It has previously been recommended that mental health staff in the ED, as well as emergency responders, would benefit from training in the management of patients presenting with alcohol intoxication.[20] The Northern Ireland Suicide Prevention Strategy – Protect Life – and the Irish National Clinical Programme for the Management of Self Harm Presentations to Emergency Departments both refer to national training programmes for mental health professionals and nurses relating to the care and management of self-harm in an ED setting.[21,22]

These findings also highlight the need to further strengthen efforts to address alcohol consumption at a general population level. In Northern Ireland, a framework for reducing alcohol and drug related harm (2011-2016) was published by the Department for Health in 2011.[23] In Ireland, a Public Health Bill is being developed to target issues of alcohol misuse.[24] Both identify the reduction of alcohol consumption at a general level, as well as targeting advertisement, labelling and pricing of alcohol as key priorities and activities. We have previously highlighted increased self-harm presentations around public holidays[25] and future work is warranted to explore the temporal patterns of alcohol use in self-harm presentations reported here.

We have established the important role that alcohol plays in self-harm presentations made to hospital EDs. In particular, the findings from this study have identified the factors distinguishing self-harm acts with alcohol present to those without. Presentations by men and those made outside of normal working hours are strongly associated with alcohol. Furthermore, having alcohol on board is associated with leaving the ED without being seen by a clinician. These findings underline the need for increased awareness of the dual

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relationship between alcohol misuse and self-harming behaviour among ED and mental health staff, as well as the importance of 24/7 access to mental health services for patients presenting with self-harm

Limitations of this study

A strength of this study is that it is based on data from two national registries, with a large sample of presentations. The standardised operation of both registries ensures comparability of the data captured, and the overall consistency in findings across both two jurisdictions is an indication of their robustness. A limitation of this study is related to the reporting of alcohol in self-harm presentations. Alcohol involvement at the time of the self-harm act was ascertained via clinical notes in each hospital, therefore in most cases there was no precise and objective information about the amount of alcohol consumed (e.g. blood alcohol content). As a result, the proportion of alcohol involvement varied slightly between hospitals. To this end, it is likely that percentages reported here underestimate the extent of alcohol involvement in self-harm. Nevertheless, the sensitivity analysis conducted confirm that the associations established are robust to this variation. Unlike previous studies, we did not have information on existing diagnoses of alcohol-related disorders, or information on existing alcohol dependency. Such information would help inform the development of services to meet the needs of this patient group.

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Table 1: Characteristics of self-harm presentations in study sample

Variable	Ireland	Northern Ireland	All
	19,831 (57.6%)	14,598 (42.4%)	34,329 (100%)
Gender			
Male	9,082 (45.8%)	7,294 (50.0%)	16,376 (47.6%)
Female	10,749 (54.2%)	7,304 (50.0%)	18,053 (52.4%)
Age			
<15yrs	501 (2.5%)	265 (1.8%)	766 (2.2%)
15-24yrs	5,733 (28.9%)	4,550 (31.2%)	10,283 (29.9%)
25-44yrs	8,999 (45.4%)	6,020 (41.2%)	15,019 (43.6%)
45-64yrs	4,108 (20.7%)	3,496 (24.0%)	7,604 (22.1%)
+65yrs	490 (2.5%)	267 (1.8%)	757 (2.2%)
Alcohol involved			
Yes	7,390 (37.3%)	7,247 (49.6%)	14,637 (42.5%)
Method of self-harm*			
Drug overdose	13,541 (68.3%)	10,820 (74.1%)	24,361 (70.8%)
Self-cutting	4,632 (23.4%)	3,424 (23.5%)	8,056 (23.4%)

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Poisoning	416 (2.1%)	165 (1.1%)	581 (1.7%)
Attempted hanging	1,287 (6.5%)	557 (3.8%)	1,844 (5.4%)
Attempted drowning	594 (3.0%)	147 (1.0%)	741 (2.2%)
Repeat presentation			
Yes	4,978 (25.1%)	4,938 (33.8%)	9,916 (28.8%)
City resident			
Yes	5,886 (29.7%)	4,875 (33.4%)	10,761 (31.3%)

*Note: Multiple methods of self-harm may be recorded for a single presentation, therefore the figures may sum to more than 100%.

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Table 2: Factors associated with alcohol being involved in self-harm

Variable	Ireland n (% alcohol)	Northern Ireland n (% alcohol)	All n (% alcohol)	Incidence rate ratio	95% Confidence interval	P-Value
Country (ref=Ireland)	7390 (37.3%)	7247 (49.6%)	14,637 (42.5%)	1.35	(1.25-1.46)	<0.001
Gender (ref=Male)	3696 (40.7%)	3938 (54.0%)	7,634 (46.6%)	1.00	Ref	-
Female	3694 (34.4%)	3309 (45.3%)	7,003 (38.8%)	0.87	(0.84-0.90)	<0.001
Age (ref=15-24)	1618 (28.2%)	1770 (38.9%)	3,388 (33.0%)	1.00	Ref	-
<15yrs	31 (6.2%)	23 (8.7%)	54 (7.1%)	0.29	(0.22-0.39)	<0.001
25-44yrs	3755 (41.7%)	3208 (53.3%)	6,963 (46.4%)	1.38	(1.32-1.44)	<0.001
45-64yrs	1853 (45.1%)	2156 (61.7%)	4,009 (52.7%)	1.56	(1.49-1.63)	<0.001
65+yrs	133 (27.1%)	90 (33.7%)	223 (29.5%)	0.94	(0.82-1.08)	0.411
Drug overdose in Ireland[a]	5590 (41.3%)	-	-	1.50	(1.39-1.61)	<0.001
Drug overdose in Northern Ireland[a]	-	5512 (50.9%)	-	1.08	(1.02-1.15)	0.008
Self-cutting[a]	1459 (31.5%)	1608 (47.0%)	3,067 (38.1%)	1.08	(1.02-1.13)	0.004
Poisoning[a]	99 (23.8%)	54 (32.7%)	153 (26.3%)	0.77	(0.65-0.91)	0.002
Attempted hanging[a]	392 (30.5%)	269 (48.3%)	661 (35.9%)	0.99	(0.92-1.07)	0.767
Attempted drowning[a]	262 (44.1%)	88 (59.9%)	350 (47.2%)	1.27	(1.15-1.40)	<0.001

Time of attendance for men (ref=9am to 6pm)	917 (30.9%)	899 (40.4%)	1,816 (23.8%)	1.00	Ref	-
6pm to 12am	1222 (40.1%)	1284 (52.8%)	2,506 (32.9%)	1.31	(1.25-1.37)	<0.001
12am to 9am	1550 (50.8%)	1755 (66.5%)	3,305 (43.3%)	1.66	(1.58-1.74)	<0.001
Time of attendance for women (ref=9am to 6pm)	857 (22.8%)	694 (28.9%)	1,551 (22.2%)	1.00	Ref	-
6pm to 12am	1161 (31.9%)	988 (40.7%)	2,149 (30.7%)	1.78	(1.66-1.90)	<0.001
12am to 9am	1670 (50.3%)	1627 (65.6%)	3,297 (47.1%)	2.25	(2.14-2.37)	<0.001
Weekend presentation[b]	1321 (41.1%)	2626 (56.9%)	3,947 (50.4%)	1.14	(1.11-1.17)	<0.001
Mode of arrival (ref=self-presented)	2107 (28.0%)	1418 (32.6%)	3,525 (29.7%)	1.00	Ref	-
Ambulance/ emergency services	5119 (45.8%)	5818 (56.9%)	10,937 (51.1%)	1.39	(1.33-1.44)	<0.001
Admission (ref=general admission)	3664 (36.7%)	1672 (20.8%)	6,222 (47.5%)	1.00	Ref	-
Psychiatric admission	500 (26.6%)	152 (27.5%)	652 (26.8%)	0.73	(0.65-0.81)	<0.001
Refused admission/ Left without being seen	1374 (46.3%)	153 (57.1%)	2,427 (50.5%)	1.11	(1.04-1.17)	0.001
Discharged from ED (Ireland)	1852 (37.0%)	-	-	0.86	(0.80-0.91)	<0.001

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Discharged from ED (Northern Ireland)	-	4370 (54.0%)	-	1.17	(1.12-1.22)	<0.001
Repeat presentation for men[c]	960 (42.7%)	1,376 (55.4%)	2,336 (49.4%)	1.08	(1.04-1.13)	<0.001
Repeat presentation for women[c]	820 (30.0%)	1,007 (41.1%)	1,827 (35.3%)	0.88	(0.82-0.93)	<0.001
City resident[a]	2074 (35.2%)	2550 (52.3%)	4,624 (43.0%)	1.02	(0.99-1.05)	0.259

[a]The reference groups for methods variables are the cases involving other methods (e.g. for drug overdose, the reference group is cases not involving drug overdose).
[b]Cases presenting on weekdays (Monday-Friday) is the reference group.
[c]Index act presentations is the reference group.
[d]Presentations by residents of rural areas and towns is reference group.

Note: Gender- and country-specific associations due to interaction are shown, where significant at p<0.001. Analysis adjusted for the clustering in the data associated with the inclusion of multiple presentations by self-harm repeaters.

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