

Factors associated with suicidal ideation in the general population

Five-centre analysis from the ODIN study

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Background Very few studies have examined the cross-national prevalence of suicidal ideation in the general population or variables associated with it.

Aims To examine the risk factors for suicidal ideas in the general population.

Method As part of a five-country two stage epidemiological study of depressive disorder (the ODIN study) a random sample of over 12 000 people were screened using the Beck Depression Inventory (BDI). There followed detailed analysis of item 9 of the BDI, which measured the severity of suicidal ideation.

Results Age, marriage, concern by others and severity of depressed mood independently increased or decreased the odds of suicidal ideation overall. An interaction between life events and social supports was identified, although this differed between men and women. Only concern by others and severity of depression were independently associated with serious suicidal ideation. The study does not allow for interpretation of the direction of the association.

Conclusions A number of social, clinical and demographic variables were independently associated with all suicidal ideation and with serious suicidal ideation. Longitudinal studies are required to confirm whether these are risk factors for or the result of suicidal ideation or have some other relationship.

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Just as there are international differences in the prevalence of self-harm (Schmidtke *et al*, 1996) and in completed suicide (Cantor *et al*, 1996), so international differences in the prevalence of suicidal ideation are recognised. However, most of these differences have been identified as a result of single-country studies, making replicative interpretation difficult. It is possible that the reported differences may be due to variations in method, differences between the sampling frames, or cross-national differences in the willingness to admit suicidal ideation or in the individual risk and protective factors for each country. Only two studies have made cross-national comparisons of suicidal ideation using a single method, and both measured lifetime rates. Weissman *et al* (1999) found a wide variation, ranging from a lifetime prevalence of 2.09% in Beirut to over 18% in Christchurch, New Zealand, whereas Bertolote *et al* (2005) found that Chennai, India, had the lowest (2.6%) and Durban, South Africa, the highest (25.4%) rate for suicidal ideation.

Among the social or psychological variables that have been found to be independently associated with suicidal ideation are depressive symptoms (Goldney *et al*, 2000; Turvey *et al*, 2002), decrease in income (Turvey *et al*, 2002), unemployment (Hintikka *et al*, 2001; Gunnell *et al*, 2004) and traumatic life events (Goldney *et al*, 2000). Whether all of these are risk factors for, or the consequence of, suicidal ideation or are related in some other way is uncertain, although the longitudinal study by Fanous *et al* (2004) confirmed the independent predictive value of recent life events and psychopathology.

Of note, none of these community studies have specifically examined the severity of suicidal ideation. However, it is likely that this will vary as it does in clinical practice, from being a passive death wish to a fully formed plan for

death, the latter being of most clinical significance.

The aim of this study was to examine the prevalence of suicidal ideation in six urban and rural European sites and to evaluate which variables might independently explain geographical differences. A further aim was to explore the severity of suicidal ideation in these sites, and to identify variables that might be associated with severe suicidal ideation; understanding the risk or protective variables separating milder suicidal ideation from clinically serious ideation is important in targeting appropriate interventions.

METHOD

This study was designed to test two hypotheses:

- (a) that variation in the prevalence of suicidal ideation between countries could be explained by a common set of social, demographic and clinical variables; and
- (b) that variation in the prevalence of serious suicidal ideation between countries could be explained by a common set of associated social, clinical and demographic variables.

Sites

The present cross-sectional study forms part of a large investigation, the Outcome of Depression International Network (ODIN), involving five countries in Europe. Details of the methods are provided elsewhere (Dowrick *et al*, 1998). The broad aim of the ODIN study was to examine the prevalence of depressive disorders, to identify risk factors and to compare the impact of psychological interventions by re-interviewing participants at 6 and 12 months after the index evaluation.

The countries participating in this study and for which data were available for the present analysis were Britain (rural North Wales, referred to hereafter as Wales), Ireland (urban Dublin and rural County Laois), Spain (urban Santander), Norway (urban Oslo and rural Rakkestad) and Finland (urban Turku and rural Marttila). The definition of rural was of a centre of population of no more than 15 000 with at least 20% of economically active citizens engaged in occupations directly related to fishing, forestry or agriculture.

Screening and risk factors

Adults aged between 18 and 64 were selected from the general population and screened for possible depressive disorder (adjustment disorder, single or recurrent depressive episode, bipolar or persistent affective disorder) using the Beck Depression Inventory (BDI; Beck *et al*, 1961).

In addition, participants completed the Oslo Social Support Scale (Nosikov & Gudex, 2003). This measured perceived concern shown by others (1–5), ease in obtaining practical help from neighbours (1–5) and people to count on when serious personal problems arose (none to 5). Life events over the previous 6 months were measured by the List of Threatening Experiences (Brugha *et al*, 1985), in which the person responds yes or no to a list of 12 events. Socio-demographic details including age, gender and marital status were also obtained. Those instruments not already available in the language of the participants were translated by the study group and then back-translated by a professional translator.

The present study consists of an analysis of item 9 of the BDI in the screened sample, covering the previous 2 weeks. Variables that were associated with suicidal ideation included those items measured during the screening phase, i.e. demographic data, life events and social supports. Severity of depressed mood was also included in the analysis, using the BDI total score minus the score for item 9 since its inclusion might have led to a spurious association between suicidal ideation and severity of depression. Details of question 9 of the BDI are provided in Table 1.

Suicidal ideation was measured using the response to questions SI (suicidal ideation) 1, SI2, SI3 and SI4. Two broad analyses were carried out. The first compared the non-ideators (SI–1) with all the ideators (SI–2,3,4), and the second was a

subgroup analysis of those with any suicidal ideation, comparing the milder (SI–2) with the serious ideators (SI–3,4).

Statistical analysis

Routine data management, including the description of results, was carried out using the Statistical Package for the Social Sciences (SPSS) for Windows, version 8. Logistic regression analyses were reinforced using the logistic command in Stata (version 8). Stratification (i.e. the sampling design) was allowed for in the logistic regression models by the inclusion of country and urban/rural differences in all models.

RESULTS

Questionnaires were sent to 12 396 people, of whom 7950 responded, yielding a response rate of 64.1% with variations between sites from 55.3% for Ireland to 74.2% for Spain. The response rates for Finland, Norway and Wales were 64.9%, 62% and 61.5% respectively. Among non-responders, gender-significant differences were apparent in Wales (men 35% *v.* women 26%), Ireland (52% *v.* 39%) and Norway (39% *v.* 30%) but not in Finland (39% *v.* 40%) or Spain (8% *v.* 9%). Response rate increased with age in Wales (53% among 18- to 24-year-olds to 68% among 55- to 64-year-olds), Ireland (42% and 59% respectively) and Finland (67% and 77% respectively) but not in Spain (84% and 86% respectively) or Norway (59% and 66% respectively).

Among responders, suicidal ideation was reported by 7.4% in Norway, 2.3% in Spain, 7.4% in Wales, 9.8% in Finland and 14.6% in Ireland. Details of the weighted prevalence of suicidal ideation and of serious suicidal ideation will be presented in a subsequent paper.

Variables associated with suicidal ideation

Certain variables were identified as significantly discriminating those with and without suicidal ideation in each site. These are shown in Table 2.

The discriminators appear to differ between the various sites although some, such as the presence of life events, concern shown by others, having people to count on and severity of depressive symptoms, are common to all countries. Gender was significant only in Spain, whereas

urban–rural differences were significant only in Norway.

A series of logistic regressions were carried out to investigate the independent influence of these variables, together with country, on suicidal ideation. The starting point was to fit a model containing only the main effects of all variables listed in Table 2 (results not shown). At the second stage we tested for all the potential two-way interactions between the variables involving gender and involving country, by adding them one at a time to the main-effects model. None was statistically significant except for the life events-by-gender interaction. In particular, there was no statistically significant country-by-gender interaction nor country-by-urban interaction (results not shown), demonstrating that the variables associated with suicidal ideation did not differ significantly between countries and that the sample could be considered as a whole.

The results of fitting the final model (including the non-significant main effects and the significant interactions, but excluding the non-significant interactions) are shown in Table 3.

Using Spain (Santander) as the reference country (i.e. OR fixed at 1.0), there are still statistically significant between-country differences. All of the Northern European countries had significantly more suicidal ideation than Spain, with OR ranging from 2.23 for Wales ($P=0.004$) to 3.45 for Finland ($P=0.001$). Urban–rural differences have disappeared, but all of the other discriminators are highly statistically significant. The risk for suicidal ideation is increased by depression (a BDI score ≥ 13 ; OR=16.32, $P=0.001$) but decreased by being older (age ≥ 30 years; OR=0.58, $P=0.001$), being married (OR=0.66, $P=0.001$), having someone who is concerned for you (OR=0.34, $P=0.001$) and having people to count on (OR=0.64, $P=0.049$).

The part of the table that needs more care in its interpretation is that reporting the joint effects of life events, having access to help for these life events, and gender (i.e. the events-by-gender interactions). In the absence of life events, women appear less likely to have suicidal thoughts than men (OR=0.57, $P=0.003$).

For those experiencing life events, the effects of having help differ between men and women. In men, having a life event, but with help, significantly increases the association with suicidal thoughts when

Table 1 Item 9 of the Beck Depression Inventory

Ideation	Grade
I don't have thoughts of killing myself	SI–1
I have thoughts of killing myself but I would not carry this out	SI–2
I would like to kill myself	SI–3
I would kill myself if I had the chance	SI–4

Table 2 Variables associated with suicidal ideation by country

Variable	Country											
	Ireland n=431		Spain n=1245		Wales n=1170		Finland n=1915		Norway n=2949		Total n=7710	
	%	P	%	P	%	P	%	P	%	P	%	P
Male	12.5	0.250	1.1	0.007	7.7	0.950	10.9	0.132	8.1	0.208	8.1	0.675
Female	16.5		3.4		7.6		8.8		6.9		8.1	
Urban residence	14.9	0.890	2.2	NA	–	NA	10.1	0.619	8.7	0.009	8.3	0.320
Rural residence	14.4		–		7.4		9.4		6.2		7.9	
Age 15–29 years	22.4	0.010	2.3	0.940	10.4	0.090	10.1	0.806	9.6	0.012	9.3	0.027
≥30 years	12.3		2.2		6.9		9.7		6.8		7.7	
0 Life events	2.2	<0.001	1.3	0.009	3.8	<0.001	6.3	<0.001	6.4	<0.001	4.7	<0.001
≥1 Life events	25.5		3.5		13.4		14.3		13.8		13.7	
Married/cohabiting	10.6	0.003	1.8	0.019	5.1	<0.001	8.6	0.060	5.3	<0.001	6.2	<0.001
Not married/cohabiting	21.2		2.8		14.2		12.2		11.9		11.8	
Somebody to count on	12.4	<0.001	2.1	0.137	7.2	<0.001	9.1	<0.001	6.7	<0.001	7.4	<0.001
Nobody to count on	55		5.9		14.8		24.1		28.1		25.3	
Some concern from others	7	<0.001	1.7	<0.001	4.2	<0.001	6.5	<0.001	12.6	<0.001	4.5	<0.001
No concern from others	20.1		2.3		10.0		10.8		25.3		10.1	
Lots/some help with life events ¹	24.1	0.048	2.9	0.246	13.7	0.350	13.5	0.002	12.6	0.002	12.9	<0.001
No help with life events ¹	43.5		5		18.5		26.9		25.3		19.7	
BDI score 0–12	4.9	<0.001	0.8	<0.001	2.0	<0.001	4.9	<0.001	2.7	<0.001	2.9	<0.001
BDI score ≥ 13	46.1		36.7		33.7		38.9		41.1		40.6	

BDI, Beck Depression Inventory; NA, not applicable.

1. Applies to participants who reported one or more life events.

compared with men not experiencing life events (OR=1.72, $P=0.001$), whereas having a life event, but without help, seems to have very little effect on the risks for suicidal thoughts when compared with men not experiencing life events (OR=1.18, $P=0.582$). However in women, having a life event, but with help, does not increase the association with suicidal ideation (OR=1.29, $P=0.284$), whereas experiencing an event without help is highly statistically significant (OR=3.03, $P=0.005$). In other words, lack of help shows an increased association with suicidal thoughts in women who experience life events but, among men who experience an event, a lack of help makes no difference to suicidal ideation whereas help with events increases the association.

Variables associated with serious suicidal ideation

Since the BDI assesses suicidal ideation of varying severity, ranging from none to passive death wishes to an active wish to

end life, a subgroup analysis was carried out to ascertain which variables were associated with clinically serious ideation, by comparing the combined statements 'I would like to kill myself' (SI-3) and 'I would kill myself if I had the chance' (SI-4) with 'I have thoughts of killing myself but I would not carry this out' (SI-2) for each country individually and for the sites combined, using univariate analysis. Those who had no suicidal ideation (SI-1) were excluded. Thus, the sample used for these analyses was much smaller than that used for Table 3.

In Table 4 it can be seen that a pattern emerges of differing associations, with clinically serious suicidal ideation in the five sites studied and in the total combined. Severity of depression was significant only in Spain and Norway and urbanicity significant in Finland. People to count on and help with life events were significant in Ireland and Finland.

Because of different associations with serious suicidal ideation across countries, the independent effects of these variables

were investigated using multiple logistic regression. As in the analysis for any suicidal ideation reported above, the starting point was to enter all the variables, and then each country-by-risk factor interaction was added in turn to this model (results not shown). This failed to find any statistically significant country-risk factor interaction, demonstrating that the variables associated with serious suicidal ideation did not differ statistically between the countries. It was thus appropriate to consider the sample as a whole and the results of the final model are shown in Table 5.

The only variables that were independently associated with serious suicidal ideation were concern shown by others, which lowered the odds (OR=0.31, $P=0.014$), and high BDI score, which increased the odds (OR=3.78, $P=0.005$). Thus, after allowing for the independent effects of the other discriminators, there were no statistically significant between-country differences in the risks for having serious suicidal ideation when compared with milder suicidal ideation.

Table 3 Logistic regression analysis of variables associated with any suicidal ideation

Variable	Odds ratio	P	(95% CI)
Spain	1.00 (Reference)		
Norway	2.81	<0.001	(1.77–4.47)
Finland	3.45	<0.001	(2.18–5.46)
Wales	2.23	0.004	(1.30–3.83)
Ireland	3.38	<0.001	(1.94–5.87)
Urban residence	0.96	0.768	(0.75–1.23)
Age ≥30 years	0.58	<0.001	(0.45–0.75)
Married/cohabiting	0.66	<0.001	(0.52–0.82)
Concern shown by others	0.34	0.001	(0.18–0.62)
People to count on	0.64	0.049	(0.41–1.00)
BDI score ≥13	16.32	<0.001	(13.00–20.48)
Women with no life events	0.57	0.003	(0.39–0.83)
Life events with help in men ¹	1.72	0.001	(1.23–2.39)
Life events without help in men	1.18	0.582	(0.66–2.10)
Life events with help in women ²	1.29	0.284	(0.81–2.06)
Life events without help in women ²	3.03	0.005	(1.40–6.59)

BDI, Beck Depression Inventory.

1. Reference category 'men without life events'.

2. Reference category 'women without life events'.

DISCUSSION

To our knowledge this study is unique, in that it is the only evaluation of the risk factors for suicidal ideation in the general population at several international sites using similar methods, thereby enhancing the validity of the cross-national comparisons. It is also the first study to specifically examine the variables associated with serious suicidal ideation in a multinational setting.

However, it is also important to acknowledge the weaknesses of this investigation. The first is that only a limited number of variables were examined in testing their relationship with suicidal ideation and, in particular, the failure to include substance misuse may be a deficiency in view of the increased risk of suicidal thoughts among substance misusers (Gunnell *et al*, 2004). Socio-economic and employment status were not examined either, although these variables have been shown to be significantly associated with suicidal ideation (Hintikka *et al*, 2001; Gunnell *et al*, 2004). However, those variables that were included in this study have been found, in the existing literature, to be associated with suicidal ideation and/or behaviour (Goldney *et al*, 2001; Turvey *et al*, 2002; Fanous *et al*, 2004). The cross-sectional design of this study is also a limitation, since it does not allow us to demonstrate whether the variables shown to be associated with

suicidal ideation are risk factors, or whether they represent some other relationship. Third, this design, involving a sample from the general population, does not allow measurement of the duration of suicidal ideation or of its full clinical significance. Suicidal ideation may be fleeting or protracted, associated with established psychiatric disorder or with transient reactions to stressful events as occurs in clinical practice. On the other hand, the separate examination of serious suicidal ideation does add additional information not available from other similar studies. Fourth, the small sample size, particularly for the subgroup with serious suicidal ideation, suggests a cautious interpretation of the results as the presence of a type 2 error cannot be excluded. Finally, the variable response rate between sites and the poorer response among men as compared with women, particularly in Wales and Ireland, may have introduced hidden biases in the results. However, it is not possible to speculate on how the final models might have differed from those presented, since neither site nor gender emerged as significant on multivariate analysis. Nevertheless, the possibility cannot be totally discounted.

Variables associated with suicidal ideation

The failure to find any country-by-variable interaction suggests that a common set of

variables independently determined suicidal ideation irrespective of the site, thus supporting our first hypothesis. However, a caveat also exists, in that this may represent a type 2 error due to underpowering. On multivariate analysis, our study identified the role of being married and of negative life events in lowering and increasing, respectively, the risks for having suicidal ideation. These findings are similar to those of others (Weissman *et al*, 1999; Fanous *et al*, 2004). Multivariate analysis further showed that having people to count on and others who show concern reduced the risks for suicidal thoughts. This confirmed as others have done (Alexopoulos *et al*, 1999; Turvey *et al*, 2002), the importance of social supports. Increasing age (>30 years) was found on multivariate analysis also to reduce the risks for suicidal thoughts, a finding at variance with that of other studies (Fanous *et al*, 2004).

The differential between men and women in relation to life events and help with these, as identified in the interaction, was an unexpected finding in this study and has not been reported before. Interpreting this finding is complex. It is not possible to confirm the direction of the association in either gender, since this was a cross-sectional rather than a longitudinal study.

In relation to the role of help with life events and suicidal ideation in women, two possibilities exist. Having help with events may act as a buffer against the negative impact of life events in women, and lower their risk of suicidal ideation; alternatively, it may be that those who develop suicidal ideation or low mood in the presence of a life events are less able to access help, as either of these may have a negative impact on social networks. It is also possible that lack of social support may stem from a depressive perception (itself associated with suicidal ideation) rather than being a true cause.

For men it is possible that having social supports is an indicator of pre-existing vulnerability and thereby associated with a higher risk of suicidal ideation. Another possibility is that, for men, having social supports increases the likelihood of being exposed to relationship-related life events that ultimately lead to suicidal ideation. It is not the intention or purpose of this study to attempt to unravel these questions, but clearly this finding requires replication, and then further analysis to explain these gender differences.

Table 4 Variables associated with serious suicidal ideation by country

Variable	Country											
	Ireland n=63		Spain n=28		Finland n=187		Norway n=219		Wales n=87		Total n=629	
	%	P	%	P	%	P	%	P	%	P	%	P
Aged < 30 years	9.1		25		6.7		10.4		5		9	
Aged ≥ 30 years	9.8	0.932	20	0.771	9.9	0.516	14.5	0.418	6	0.870	11.5	0.375
Male	12		0		8.4		13.3		11.9		11.1	
Female	7.9	0.587	28.6	0.111	9.8	0.746	11.2	0.988	0	0.017	10.6	0.840
Not married/cohabiting	8.6		20		12.7		11		9.8		11.8	
Married/cohabiting	10.7	0.773	23.1	0.843	6.5	0.147	14.8	0.403	2.2	0.140	9.7	0.401
0 Life events	0		22.2		8.6		7.4		3.6		7.3	
≥ 1 Life events	7.7	0.565	21.1	0.940	7.2	0.740	17.1	0.200	6.9	0.540	11.9	0.123
Somebody to count on	4		19.2		7.2		12.2		4.9		24.6	
Nobody to count on	27.3	0.011	50	0.307	25	0.009	20	0.275	25	0.093	9	<0.001
Some concern from others	16.7		10		0		15.9		0		7.8	
No concern from others	8.2	0.375	27.8	0.272	10.8	0.064	12.2	0.514	7.8	0.180	11.5	0.216
Lots/some help with life events ¹	0		16.7		4.9		18.1		4.4		9.1	
No help with life events ¹	30	<0.001	28.6	0.539	19	0.030	15	0.739	10	0.484	22.4	<0.001
Urban residence	10.3		NA		13.5		14.5		NA		14	
Rural residence	8.8	0.838	NA	NA	4.4	0.030	11.6	0.525	5	NA	7.5	0.009
BDI score 1–12	0		0		6.3		2.9		0		3.6	
BDI score ≥ 13	12.8	0.587	33.3	0.039	11.2	0.243	18	0.002	7.4	0.223	14.1	<0.001

BDI, Beck Depression Inventory; NA, not applicable.

1. Applies to participants who reported one or more life events.

Variables associated with serious suicidal ideation

This subgroup analysis examined the differences between those with milder suicidal ideation, and those with serious ideation, as this distinction is clinically important; yet is incompletely understood, and has received little attention in general population studies with some few exceptions (Renberg, 2001; Turvey *et al.*, 2002). For those with serious suicidal ideation, the odds ratios indicate some variability across countries, although these differences were not statistically significant. Thus, the apparent differences between the sites found on univariate analysis might be the result of random fluctuations between the samples from the five countries, and of lack of statistical power for the within-country significance tests. Multiple logistic regressions failed to find any country by risk factor interactions demonstrating that (as in the case of any suicidal thoughts) there is little or no evidence that the effects of the variables associated with serious suicidal thoughts vary from one country to another,

supporting our second hypothesis. Another explanation may lie in the underpowering of this part of the study to identify other variables independently associated with

serious suicidal ideation, when compared with milder ideation.

For all countries combined, multivariate testing identified two variables of

Table 5 Logistic regression analysis of variables associated with serious suicidal ideation

Serious suicidal thoughts	Odds ratio	P	(95% CI)
Spain	1.00 (reference)		
Norway	0.76	0.636	(0.24–2.41)
Finland	0.47	0.219	(0.14–1.56)
Wales	0.37	0.204	(0.08–1.72)
Ireland	0.30	0.122	(0.07–1.38)
Urban	1.52	0.254	(0.74–3.13)
Woman	0.83	0.561	(0.44–1.56)
Age ≥ 30 years	0.84	0.629	(0.41–1.72)
Married/cohabiting	0.88	0.703	(0.47–1.67)
People to count on	0.59	0.232	(0.25–1.40)
Concern shown by others	0.31	0.014	(0.12–0.79)
Life events with help	1.17	0.691	(0.53–2.59)
Life events without help	1.45	0.457	(0.54–3.88)
BDI score ≥ 13	3.78	0.005	(1.50–9.51)

BDI, Beck Depression Inventory.

interest; concern shown by others, which lowered the risk; and severity of depression, which increased the risk. However, the importance of depressed mood was less for serious suicidal ideation (OR=3.78) when compared with suicidal ideation in general (OR=16.32), a finding that was somewhat surprising. As with suicidal ideation overall, the same caveats exist in relation to demonstrating the direction of the association between concern shown by others and serious suicidal ideation. Clearly, longitudinal studies are required to address these questions.

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