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Research report

Risk factors for suicidality in Europe: Results from the ESEMED study

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Abstract

Background: Precise knowledge of the epidemiology of suicidality provides necessary information for designing prevention programs. The aims of the present study were to investigate the prevalence and correlates of suicidal ideas and attempts in the general population of Europe.
Methods: The European Study on the Epidemiology of Mental Disorders (ESEMED) is a cross-sectional household survey carried out in a probability representative sample of non-institutionalised adults (aged 18 years or older) of six European countries (Belgium, France, Germany, Italy, the Netherlands and Spain). The Composite International Diagnostic Interview (CIDI 3.0) was administered to 21,425 individuals.
Results: Lifetime prevalence of suicidal ideation was 7.8% and of suicidal attempts 1.3%. Being women, younger and divorced or widowed were associated with a higher prevalence of suicide ideation and attempts. Psychiatric diagnoses were strongly related to suicidality. Among them, major depressive episode (Rate ratio 2.9 for lifetime ideas and 4.8 for lifetime attempts), dysthymia (RR 2.0 and 1.6), GAD (RR 1.8 and 2.3 for lifetime), PTSD (RR 1.9 and 2.0) and alcohol dependence (RR 1.7 and 2.5) were the most important. Population attributable risks for lifetime suicidal attempt was 28% for major depression.

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Limitations: Information about suicidal ideas and attempts was self reported, psychiatric diagnoses were made using fully structured lay interviews rather than clinician-administered interviews.
Conclusions: In spite of meaningful country variation in prevalence, risk factors for suicidality are consistent in the European countries. Population prevention programmes should focus on early diagnosis and treatment of major depression and alcohol abuse and in those individuals with recent appearance of suicidal ideas.

Keywords: Mental disorders; Suicide; Prevalence; Depression; Risk factors

1. Introduction

Deaths as a result of self-inflicted injuries account for 1.5% of total deaths for both sexes, have ranked within the leading two causes of death among 15–34-year-old people in a selection of European countries, and are one of the leading causes of death in Europe (Murray and Lopez, 1996). The problem may even be higher than this statistics suggest, as suicide is sometimes hidden in many societies and may be underreported (Phillips and Ruth, 1993). The establishment of universal prevention programs based on the identification of risk factors for suicidal behavior represents a public health priority (Pearson and Brown, 2000). Precise knowledge of the epidemiology of suicidality may provide necessary information for designing such programs.

Previous research has estimated the lifetime prevalence of suicidal ideas to range from 4.8% (Paykel et al., 1974) to 18.5% (Weissman et al., 1999) and the lifetime prevalence of attempted suicide to range between 1.1% (Paykel et al., 1974) and 5.9% (Weissman et al., 1999). However, the differing age ranges, question wording and samples across previous studies make direct comparisons difficult. Multiple risks factors for suicidal ideation and attempts have been reported. The most consistent of these are sociodemographic variables including age, sex, marital status, and religion (Weissman, 1974; Moscicki, 1995; Kessler et al., 2005; Agoub et al., 2006; De Leo et al., 2005). Research has also documented that mental disorders are risk factors for suicidality, especially, major depression, alcohol or drug abuse and dependence, panic disorder, social phobia, and schizophrenia (Kessler et al., 2005; Möller, 2003; Vilhjalmsson et al., 1998; Lewinsohn et al., 1996; Moscicki, 1997).

At the European level, the WHO/EURO multicentre study provided comparable data among countries about suicidality (Platt et al., 1986). However, that study was based on treated samples and it is impossible to extrapolate results to the general population. To our knowledge, there is no community survey that, at the European level, has estimated the prevalence and correlates of suicidal ideas and attempts, and its relationship with mental disorders. The aims of the present study were to do this in general population surveys carried out six European countries.

2. Methods

The European Study on the Epidemiology of Mental Disorders (ESEMED) is a cross-sectional household survey carried out in a probability representative sample of non-institutionalised adults (aged 18 years or older) in six European countries (Belgium, France, Germany, Italy, the Netherlands and Spain). In total, 21,425 respondents were interviewed between January 2001 and August 2003 and provided data for the project. The overall response rate for the six countries investigated was 61.2%, with the highest rates in Spain (78.6%) and Italy (71.2%), followed by Germany (57.8%), the Netherlands (56.4%), and Belgium (50.6%) and the lowest in France (45.9%). A detailed description of the methods and the participants in the ESEMED project is provided elsewhere (Alonso et al., 2004).

Participants were assessed in person at their homes using a computer-assisted personal interview (CAPI). The diagnostic instrument was a new version of the Composite International Diagnostic Interview, named CIDI 3.0, which was developed and adapted by the Coordinating Committee of the WHO World Mental Health (WMH) Survey Initiative (Kessler and Ustun, 2004). The survey was administered in two parts. Part I included a core diagnostic assessment of all respondents. Part II included questions about risk factors, consequences, other correlates, and additional disorders. In an effort to reduce respondent burden and control study costs, part II was administered only to all part I respondents with a lifetime disorder plus a 25% random subsample of other respondents.

Respondents were asked about suicidality in their lifetime and during the previous 12 months. The specific question that was asked was: have any of these experiences happened to you? First the interview questioned: 'You seriously thought about committing suicide', and after 'You attempted suicide'.

Using the CIDI 3.0, lifetime prevalence estimates of mental disorders were determined by analysing whether respondents' past or current symptomatology met the diagnostic criteria for a mental disorder according to the fourth revision of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). Disorders included in these analyses were: mood disorders (major depressive episode and dysthymia), anxiety disorders (panic disorder, agoraphobia, post-traumatic stress disorder (PTSD), generalized anxiety disorder (GAD), specific phobia, social phobia) and alcohol abuse and dependence.

The CIDI 3.0 and the questions about suicidality were originally developed in English. The World Health Organization translation protocol was followed to translate and adapt the questionnaire to each of the countries. In Belgium, a Dutch and a French versions were used.

Clinical reappraisal studies carried out by in France, Italy and Spain as part of the ESEMED project and the US have documented good concordance between diagnoses based on CIDI 3.0 and diagnoses based on blinded clinical re-interviews, with area under the receiver operator characteristic curve in the range .73–.93 for lifetime anxiety-mood disorders and 0.83–0.88 for 12-month anxiety-mood disorders (Haro et al., in press).

3. Statistical analysis

The analyses presented here are based on a part II questionnaire, that was administered to 8796 individuals. Cases were weighted to account for the known probability of selection as well as to restore the distribution of the population within each country. In addition, overall estimates were weighted to restore the relative dimension of the population across countries (i.e. German totals represented the highest share, followed by French and Italian, with Belgium representing the least, proportional to the adult population in each country).

A Cox proportional hazards model with psychiatric diagnoses as time variant covariate was used to examine the association of suicidal thoughts and suicidal attempts with sociodemographic variables (sex, age, marital status, employment, country) and psychiatric diagnosis. The use of a model with time variant covariates is justified by the fact that mental disorders can only be associated to suicidal ideation in the case that age of onset of the mental disorder is previous to the suicide attempt. Thus, in the Cox model mental disorders were considered to be associated to suicidal ideation or attempts if they began at the same time or before the suicidal ideation or attempt (a 1 year difference was allowed). Rate ratios (RR) with 95% confidence intervals adjusting for covariates were calculated. Interactions of the independent variables with country were tested. A logistic regression model was also used to analyze the predictors of suicidal attempts among those with suicidal ideation.

The RR of the Cox model and the prevalence (P) of mental disorders were used to calculate the population attributable risk (PAR) of lifetime suicidal attempts of each mental disorder using the formula $PAR = (P*(RR-1))/(P*(RR-1)+1)* 100$.

A Kaplan Meier survival function was calculated to analyze age of first suicidal idea, age of first suicidal attempt and time from first suicidal idea to first suicide attempt.

Analyses were carried out using SAS 9.1.3 and STATA 8 software (subgroup analysis).

4. Results

The characteristics of the study sample are shown in Table 1. Mean age was 47 years with the majority of respondents being between 35–49 years old. Forty-eight percent of them were male. Most of the subjects were married or living with a partner (67%) and more than half were in paid employment at the time of the interview (57%).

Lifetime prevalence of suicidal ideas was 7.8% and of suicidal attempts 1.8% (Table 1). Lifetime suicidality (i.e., suicide ideation and suicide attempts) was more prevalent among women, younger ages, and persons living in large urban areas. Those previously married (separated, divorced, widowed) had the highest frequency of lifetime suicidality.

Lifetime prevalence of suicidality was much higher among individuals with lifetime major depression, dysthymia, GAD and alcohol dependence, with rates approximately 30% prevalence of suicidal ideas and 10% of suicidal attempts among responders (Table 1). Differences among the mental disorders appeared to be small, which may be a consequence of comorbidity among them.

Table 2 shows the factors associated to lifetime suicidality among the general European population using a Cox proportional hazards model. Two different models were fitted for lifetime ideas and lifetime attempts as dependent variables. Females were more likely to have lifetime suicidal ideas and attempts. Respondents from Italy and Spain had the lowest frequency of suicidal ideation, and in Italy also the lowest number of attempts.

Suffering from a mental disorder was the most important determinant of suicidality. The highest RR were for major depressive episode (2.9 for lifetime ideas, 3.9 for lifetime attempts), dysthymia (2.0 for lifetime ideas,

Table 1
Sociodemographic and psychiatric diagnosis of the individuals included in the analysis (absolute numbers and weighted proportions) and lifetime prevalence of suicide ideation and attempts (univariate results)

Group	*N*	%	Lifetime suicide thoughts	95% CI	Lifetime suicide attempts	95% CI
Number of individuals	8796	100.0	7.8%	(7.3, 8.3)	1.81%	(1.58, 2.05)
Age						
18–24	664	11.4	8.6%	(6.8, 10.32)	1.80%	(1.08, 2.53)
25–34	1599	18.4	8.4%	(7.2, 9.57)	2.10%	(1.49, 2.72)
35–49	2669	27.8	8.6%	(7.7, 9.45)	2.05%	(1.61, 2.48)
50–64	2197	21.8	7.6%	(6.6, 8.55)	2.06%	(1.56, 2.57)
>64	1667	20.7	6.1%	(5.0, 7.15)	0.98%	(0.53, 1.43)
Gender						
Male	3689	48.2	6.2%	(5.5, 6.81)	1.06%	(0.83, 1.3)
Female	5107	51.8	9.3%	(8.6, 10.05)	2.51%	(2.12, 2.9)
Marital status						
Married or living with someone	5788	66.7	6.7%	(6.2, 7.28)	1.46%	(1.22, 1.71)
Previously married	1327	11.1	11.7%	(9.9, 13.44)	3.64%	(2.54, 4.74)
Never married	1681	22.1	9.2%	(7.9, 10.34)	1.97%	(1.46, 2.48)
Geographical area of residence						
Rural (<10.000)	2525	33.2	7.5%	(6.6, 8.4)	1.58%	(1.17, 1.99)
Mid-size urban (10.000–100.000)	3840	38.7	7.2%	(6.4, 7.94)	1.64%	(1.32, 1.97)
Large urban (>100.000)	2431	28.1	9.0%	(7.9, 9.99)	2.33%	(1.82, 2.84)
Employment status						
Working	4863	56.5	7.6%	(6.9, 8.26)	1.67%	(1.39, 1.96)
Student	172	2.8	6.8%	(3.9, 9.71)	1.27%	(0, 2.58)
Homemaker	986	9.1	7.3%	(5.8, 8.71)	1.96%	(1.25, 2.67)
Retired	1881	23.5	6.8%	(5.9, 7.83)	1.24%	(0.8, 1.68)
Other	894	8.1	13.1%	(10.9, 15.3)	4.54%	(3.17, 5.92)
Country						
Belgium	1043	3.8	8.4%	(6.4, 10.5)	2.49%	(1.71, 3.27)
France	1436	20.5	12.4%	(10.9, 13.83)	3.37%	(2.6, 4.14)
Germany	1323	31.5	9.8%	(8.7, 10.87)	1.70%	(1.24, 2.16)
Italy	1779	22.4	3.0%	(2.5, 3.52)	0.54%	(0.32, 0.76)
The Netherlands	1094	6.1	8.2%	(6.87, 9.59)	2.27%	(1.56, 2.98)
Spain	2121	15.6	4.4%	(3.74, 4.97)	1.48%	(1.1, 1.86)
Mental disorders						
Major depressive episode	2987	13.4	26.2%	(24.11, 28.35)	8.36%	(7.03, 9.69)
Dysthymia	958	4.4	30.7%	(26.65, 34.65)	10.12%	(7.47, 12.76)
GAD	556	2.8	31.9%	(27.15, 36.79)	12.01%	(8.56, 15.46)
Social phobia	386	2.8	23.0%	(18.59, 27.49)	7.60%	(4.56, 10.63)
Specific phobia	945	8.3	18.3%	(15.66, 20.86)	5.11%	(3.63, 6.6)
PTSD	411	2.5	32.9%	(26.12, 39.63)	10.73%	(7.02, 14.44)
Agoraphobia	176	1.2	19.4%	(13, 25.8)	10.10%	(5.11, 15.09)
Panic disorder	350	1.6	23.7%	(17.5, 29.9)	10.00%	(5.74, 14.27)
Alcohol abuse	496	4.7	16.2%	(13.29, 19.11)	5.43%	(3.79, 7.06)
Alcohol dependence	143	1.1	27.8%	(20.23, 35.36)	11.62%	(6.44, 16.8)

1.9 for lifetime attempts), GAD (1.8 and for lifetime ideas, 2.0 for lifetime attempts), PTSD (1.8 for lifetime ideas, 1.9 for lifetime attempts) and alcohol dependence (1.7 for lifetime ideas, 1.8 for lifetime attempts). PAR for lifetime suicidal attempts were 28% for major depression and 4% for GAD.

A logistic regression analysis was carried out to identify the factors associated to lifetime suicide

Table 2
Rate ratios and 95% confidence intervals for factors associated to lifetime suicide ideation and suicide attempts (Cox proportional hazard model with time varying covariates)

	Lifetime ideas		Lifetime attempts	
	RR	95% CI	RR	95% CI
Age group				
18–24	1		1	
25–34	0.67	(0.49,0.90)	0.61	(0.36,1.03)
35–49	0.47	(0.35,0.63)	0.40	(0.24,0.69)
50–64	0.26	(0.18,0.35)	0.27	(0.14,0.53)
>64	0.16	(0.10,0.25)	0.13	(0.06,0.29)
Female	1.31	(1.13,1.54)	2.10	(1.55,2.85)
Marital status				
Married/living with someone	1		1	
Previously married	1.37	(1.11,1.70)	2.00	(1.36,2.92)
Never married	1.45	(1.20,1.75)	1.28	(0.88,1.87)
Urbanicity				
Rural (<10.000)	1		1	
Mid-size (10–100.000)	0.97	(0.82,1.15)	0.99	(0.71,1.38)
Large urban (>100.000)	1.26	(1.06,1.50)	1.50	(1.10,2.07)
Employment				
Working	1		1	
Student	0.82	(0.48,1.40)	0.66	(0.22,2.03)
Homemaker	1.02	(0.78,1.33)	1.06	(0.63,1.79)
Retired	0.99	(0.75,1.32)	0.93	(0.55,1.57)
Other	1.41	(1.12,1.77)	1.94	(1.33,2.83)
Country				
Spain	1			
Belgium	1.99	(1.57,2.51)	1.72	(1.20,2.47)
France	2.46	(1.97,3.07)	1.85	(1.25,2.74)
Germany	2.30	(1.87,2.83)	1.21	(0.80,1.81)
Italy	0.71	(0.55,0.92)	0.45	(0.30,0.68)
The Netherlands	1.69	(1.31,2.18)	1.19	(0.73,1.90)
Mental disorder				
Major depressive episode	2.91	(2.44,3.48)	3.91	(2.74,5.60)
Dystimia	1.99	(1.61,2.46)	1.88	(1.24,2.83)
GAD	1.80	(1.39,2.34)	1.98	(1.33,2.94)
Social Phobia	1.31	(1.01,1.71)	1.19	(0.70,2.01)
Specific Phobia	1.33	(1.11,1.60)	1.26	(0.89,1.78)
PTSD	1.83	(1.39,2.40)	1.86	(1.18,2.92)
Agoraphobia	0.63	(0.40,0.99)	1.00	(0.49,2.04)
Panic Disorder	1.04	(0.71,1.51)	1.39	(0.80,2.39)
Alcohol abuse	1.13	(0.82,1.52)	1.84	(0.17,2.90)
Alcohol dependence	1.74	(1.16,2.62)	1.77	(0.95,3.32)

attempts among those individuals with a lifetime suicidal idea. The variables associated to a higher risk were being female vs. male (OR 1.89, 95% CI 1.32–2.72), suffering from a major depressive episode (OR 1.632; 95% CI 1.14–2.33), panic disorder (OR 1.89; 95% CI 1.03–3.46) or alcohol abuse (OR 2.11; 95% CI 1.28–3.50) and having other employment (mostly permanent sick leave) vs. working (OR 1.82; 95% CI 1.16–2.84). Respondents in Italy had lower risk when compared to Belgium used as reference category (OR 0.43; 95% CI 0.23–0.79).

The analysis of age of onset of suicidal ideas, the age of first suicide attempt and the number of years from the first suicidal idea to the first suicidal attempt showed that suicidal ideas and attempts may appear for first time at any age, with suicidal ideas having the highest rate of first presentation during teenage years and young adulthood. Number of years from first suicidal idea to first suicide attempt has also a high variability, but for most individuals it happens within one or few years (data available upon request).

5. Discussion

Lifetime prevalence of suicide ideation in the six European participating countries of our survey was 7.8%. Suicidal ideation can appear at any time in life, and most individuals who report suicidal ideation will never try a suicide attempt. Major depressive episode appeared to be the most important risk factor for lifetime suicide attempt among those examined, with a population attributable risk proportion (PAR) of roughly 28%, which implies that the lifetime prevalence of suicide attempts could be cut by almost one-third by preventing major depression. Major depressive episode and alcohol related problems were the most relevant determinant of progressing from suicidal ideation to making a suicide attempt.

The prevalence of suicidal ideation found in the ESEMED survey is within the range of other studies. Our lifetime prevalence of attempts is 1.8% and ranks among the lowest rates obtained in previous population surveys and clinical studies (Paykel et al., 1974; Weissman et al., 1999; Kessler et al., 2005; Corcoran et al., 2004). Some of these differences might be due to different question wording used to assess suicidal behavior and different age ranges included in population studies. Statham et al. (1998) showed that when asking for persistent ideas compared to just having suicide thoughts once, population prevalence decreases to one-third the level it has when ideation is assessed without asking about persistence.

Increased frequency of suicidal ideas is associated with being women and previously married, which confirm in a population sample the findings of most previously published clinical studies (Kessler et al., 2005; Moscicki, 1997; Kuo et al., 2001). Although non-statistically significant, we also found that elder individuals tended to show a lower frequency of suicidality. Previous studies have found higher frequency of

suicidal ideation and attempts among the younger individuals and women, and higher frequency of completed suicide among men and the eldest (Möller, 2003).

In our cross-national study, we have confirmed that suicidality varies considerably across countries and geographical areas. Germany and France have the highest rate ratios of suicidal ideation and Belgium and France of attempts, while the lowest risk of ideas was found in Italy and Spain, societies that are, in general, more traditional and conservative (Hawton et al., 1998; Levi et al., 2003; Hjelmeland et al., 2002). Although completed suicide is qualitatively different from suicide ideation and attempts, comparison of frequencies of suicidality from our study to suicide rates (http://www.who.int/mental health/prevention/suicide/suiciderates/en/) provided largely consistent results. The two countries with the largest suicide rates are Belgium and France, which are also the countries with the largest frequency of suicidal attempts. Similarly, the countries with the lowest rates were Italy and Spain, who also rank last in suicidality in our survey. The exception may be the Netherlands with a relatively low rate of completed suicide and intermediate rates in suicidal ideation and attempts. Living in a large population is also associated to a higher frequency of suicidality, which may be related to higher frequency of social isolation in cities (Middleton et al., 2004).

As previously found, the most important predictor of suicidality among the predictors considered here is suffering from a mental disorder. The highest frequencies of suicidality are in individuals with major depression, social phobia, specific phobia, GAD, PTSD, and alcohol related disorders. Rate ratios are similar to other published studies (Kessler et al., 1999; Statham et al., 1998; Osvath et al., 2003; Kuo et al., 2001; Kelly et al., 2004). The high suicidality rates in individuals with specific phobia and social phobia and the fact that patients with GAD have a higher frequency of suicidal ideation and attempts than patients with major depression can be due to comorbidity among mental disorders. As a matter of fact, the regression model, which adjusts for comorbidity, shows that the relevance of social and specific phobia in suicidality is much smaller than could be supposed from crude rates.

Population attributable risk (PAR) measures the relevance of a risk factor in a disease or health problem in the population. Although rate ratios of suicide attempts for several mental disorders (e.g. major depression, GAD, alcohol abuse, dysthymia) are high, the differences in prevalence among these disorders imply that major depression is by far the disorder with the higher PAR, followed by alcohol related problems. This has a major public health implication since it indicates that population prevention programs of suicide should focus on patients with major depression. However, the most effective interventions in these cases are still a matter of debate. While the role of antidepressants is not clear (Khan et al., 2003), there is evidence that other measures, as restricting access to lethal methods may be useful (Mann et al., 2005). Alcohol dependence is also associated to a high risk ratio.

We have not only described the factors associated to suicidal thoughts and attempts, but also the factors that influence that a person with suicidal ideation makes a suicide attempt. Our data shows that being female and having major depression are associated to the highest risk of acting out on the suicidal ideas. Individuals who were not working also had a higher risk of making suicide attempts, which indirectly informs us about the relevance of social support and inclusion. The gender difference has already been reported (Kessler et al., 1999; Moscicki, 1994; Möller, 2003), although male sex is associated to higher risk of completed suicide (Hoyer et al., 2004).

Several limitations should be considered when interpreting these results. First, the information about suicidal ideas and attempts was self reported and, thus, subject to recall bias and denial. However, self reported data have been used in most studies on the epidemiology of suicidality and have proven to be valid and reliable. Second, psychiatric diagnoses were made using fully structured diagnostic interviews administered by lay interviewers and not by mental health specialists. Although agreement between diagnosis based on interviews administered by lay interviewers and clinical diagnosis is far from perfect, previous CIDI validation studies have shown acceptable reliability and validity (Wittchen, 1994) and clinical re-interviews administered to a sample of the individuals participating in the ESEMED surveys also confirmed these findings (Haro et al., in press) Third, differences among countries could be influenced by the significant differences in response rates and differences in the cultural acceptability of acknowledging and describing the presence of suicidal thoughts. Finally, since we were assessing lifetime risk of suicidal ideation and attempt, risk factors should be present before or at the time of the appearance of the suicidal ideas or attempts. For psychiatric diagnosis, since we had asked the respondent the age of onset of the disorder, this was taken into account. However, the sociodemographic variables (employment, marital status) were assessed at the moment of the interview and not at the time of the suicidal ideation or attempt. This is probably a non-differential bias that could have

artificially decreased the influence of these sociodemographic factors on suicidality.

In conclusion, we have found that, in spite of country variation in rates, risk factors for suicidality are common in the six European countries that participated in the survey. Population prevention programs should be focused on major depression and alcohol dependence early diagnosis and treatment and in those individuals with recent appearance of suicidal ideas.

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