

Adolescents' self-reported suicide attempts, self-harm thoughts and their correlates across 17 European countries

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Background: Suicide is a leading cause of death among adolescents in Europe. Self-harm thoughts and behaviours are documented precursors of completed suicide. It is therefore of great importance to investigate the prevalence of suicide thoughts and attempts and their correlates, with the aim of preventing this major life-threatening public health problem. This study provides cross-national European data on self-reported suicidal thoughts and attempts among adolescents. **Methods:** Data were obtained from 45,806 high school students aged 15–16 years from 17 countries that participated in the European School Survey Project on Alcohol and Other Drugs (ESPAD) 2007 school survey. The standardised methods of the ESPAD survey ensure comparability across countries. Students completed an anonymous questionnaire in their classrooms. The prevalences of suicidal thoughts and attempts are reported as well as their sociodemographic and psychosocial correlates identified in logistic regression. **Results:** The median prevalence of any lifetime self-reported suicide attempt was 10.5% across the participating countries (range 4.1%–23.5%). The median of frequent self-harm thoughts (at least five times) was 7.4% (range 2.1%–15.3%). Suicidal behaviour and thoughts had significant associations with gender, substance use, family integrity and socioeconomic status. Countries with higher prevalence of substance use tended to have a weaker association between substance use and self-reported suicide attempts. **Conclusion:** Although self-reported self-harm thoughts and suicide attempts vary in prevalence within Europe, there are common correlates across countries. These have an important impact on understanding the phenomenon of suicide among young people and in guiding prevention. **Keywords:** Adolescents, self-reported suicide attempts, self-harm thoughts, European ESPAD school survey.

Introduction

Suicide is the second or third most frequent cause of death in adolescents in Europe. Rates have increased from the 1980s in Western Europe (Hawton & Fagg, 1992; McLoone & Crombie, 1996) and from the 1990s in the former Soviet Union countries, following the opening of their borders (Värnik, Wasserman, Dankowicz, & Eklund, 1998). A principal factor incriminated in this trend, especially among males, is increased use of alcohol and other substances (Fombonne, 1998; Hawton, 1998).

Suicidal thoughts and behaviour covary with rates of suicide, as indicated by a longitudinal WHO European multicentre study on parasuicide in adolescents and young adults (Hawton et al., 1998). A strong connection between self-harm and later suicide emerges from a systematic review of studies of samples of all ages (Owens, Horrocks, & House, 2002) and is further supported by the finding that approximately half of those who commit suicide have a history of previous attempts (Hawton & Catalan, 1987). Suicide attempts therefore represent an invaluable signal for preventing fatal incidents of suicidal behaviour among young people, and the

timely identification of factors associated with suicidal behaviour could contribute to the effective guidance of policies and interventions. Reports indicate that the sociodemographic and psychosocial factors most strongly associated with suicide attempts in young people are female gender (Hawton et al., 2003; Peter, Roberts, & Buzdugan, 2008; Waldrop et al., 2007), age (Howard & Wang, 2003; Molina & Duarte, 2006; Waldrop et al., 2007), mental health problems (Chabrol, Mabila, & Chaudard, 2008; Culp, Clyman, & Culp, 1995; Hacker, Suglia, Fried, Rappaport, & Cabral, 2006; Hawton, Rodham, Evans, & Weatherall, 2002; Nruham, Larsson, & Sund, 2008; Rey Gex, Narring, Ferron, & Michaud, 1998), problems in the relationship with parents (Hawton et al., 2003; Peter et al., 2008), socioeconomic adversity (Fergusson, Woodward, & Horwood, 2000), low parental education (Haavisto et al., 2005) and the use of legal and illegal substances (Borowsky, Resnick, Ireland, & Blum, 1999; Fombonne, 1998; Haw & Hawton, 2011; Huas, Hassier, & Choquet, 2008; Kokkevi & Fotiou, 2009; Kokkevi, Politikou, & Stefanis, 1997).

The estimated prevalence of suicide attempts among adolescents varies widely among countries (Madge et al., 2008). Although these variations may reflect cultural differences, they can also be

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influenced heavily by methodological differences between studies, including the type of sample (community or hospital-based), data collection procedures (self-administered questionnaire, interview, registers), question wording (e.g. attempts at self-harm or suicide attempts) and the level of anonymity and confidentiality (De Wilde, 2002; De Wilde & Kienhorst, 1995; Moscicki, 1989; Safer, 1997). It is therefore important to standardize methodology in order to establish to what extent findings from local studies can be generalized (Pirkis, Irwin, Brindis, Patton, & Sawyer, 2003). Cross-national studies of self-reported suicide attempts by adolescents based on reliable and valid comparable data could be of great value in providing deeper insight into the nature of suicidal acts and in directing more effective policy measures.

As far as we are aware, the only published cross-national investigation of self-reported deliberate self-harm by adolescents that follows standardized methodology and consequently allows valid comparisons is a recent study based on school surveys of adolescents aged 15–16 years old in six European countries and Australia (Madge et al., 2008). That study reported mean rates of lifetime self-harm of 13.5% in female adolescents (range 5.7%–17.0% across countries) and 4.3% in males (2.4%–6.5%). The criterion for self-harm was a self-report of one or more of the following deliberate acts: behaviour intended to cause self-harm (e.g. self-cutting, jumping from a height), ingesting a substance in excess of the therapeutic dose, ingesting a recreational or illicit drug in an act that the respondent regarded as self-harm, or ingesting a noningestible substance or object.

The present study represents another cross-national comparison, in a wider sample of European countries. Data are drawn from the most recent wave of the European School Survey Project on Alcohol and Other Drugs (ESPAD), conducted in 2007. ESPAD follows strict standard methodological procedures in order to permit valid international comparisons (Hibell et al., 2009). The present study aims to provide and analyse reliable and valid comparable data on self-reported self-harm thoughts and suicide attempts by adolescents, using nationwide samples from 17 European countries. An additional objective of the study was to explore the relationship of suicidal thoughts and suicide attempts with legal and illegal substance use, taking into account not only gender but also family-related sociodemographic factors that may vary widely in prevalence between countries.

Methods

Sample

The ESPAD school survey of 15- to 16-year-old school students was carried out in 35 European countries in

2007. The sampling procedures within each country and other aspects of the standardised survey methodology are described in detail by Hibell et al. (2009). The appropriate ethical procedures for informed consent were followed in each country.

The present analysis is based on 45,806 students from the 17 countries listed in Table 1 that had chosen to include the entire optional Psychosocial Module of the questionnaire, where the questions on self-reported self-harm thoughts and suicide attempts that are examined in this article are located. A further three countries (Germany, Finland and Ireland) used part of this module but omitted these questions. The countries included in this study were found not to differ from the other ESPAD participants in respect of self-reported substance use. The median prevalence of daily smoking was exactly the same, 29.0% in both groups. The median prevalence of current alcohol consumption was 10.8% in the participating countries and 11.0% in the other ESPAD countries. Any lifetime drug use had a median prevalence of 19.0% in participating countries and 17.9% in the rest. Comparative data on self-reported suicide attempts and self-harm thoughts were not available from those countries that had not chosen to use the relevant questions from the optional Psychosocial Module of ESPAD.

Questionnaire

The questionnaire used in the 2007 ESPAD survey, including the optional Psychosocial Module, can be found in full in English in Hibell et al. (2009). *Self-reported suicide attempts* were recorded from the student's response to the question 'Has it ever happened that you attempted suicide? If so, how many times?' Responses were made on the scale never/once/twice/3–4 times/5 or more times. *Self-harm thoughts* were obtained from answers to the question 'Have you ever thought of harming yourself?' on the same response scale.

Current smoking was defined as smoking at least one cigarette per day in the last 30 days. (The question was 'How frequently have you smoked cigarettes during the last 30 days?' with possible responses: not at all, < 1 cigarette per week, < 1 per day, 1–5 per day, 6–10 per day, 11–20 per day, more than 20 per day). *Current alcohol use* was defined as drinking alcohol at least 10 times in the last 30 days, obtained by combining the responses to separate questions about consumption of beer, wine and spirits with possible responses: not at all, once or twice, 3–5 times, 6–9 times, 10–19, 20–39 and 40 times or more. *Any lifetime use of illegal drugs* was established from responses to a series of questions that asked, for each substance separately, how many times the respondent had ever used marijuana or hashish (cannabis), amphetamines, lysergic acid diethylamide (LSD) or other hallucinogenics, crack, cocaine, heroin or ecstasy. The response categories for these questions were the same as for alcohol consumption.

Family structure was obtained by recoding the responses to the question 'Which of the following people live in the same household as you?' to indicate *living with both parents* (yes/no). *Socioeconomic status* was assessed by the question 'How well off is your family

Table 1 Any and more than one self-reported suicide attempt (%) by 15- to 16-year-old adolescents in the 2007 ESPAD survey, by country and gender

	Total sample			Males		Females	
	<i>n</i>	Any (%)	> 1 (%)	Any (%)	> 1 (%)	Any (%)	> 1 (%)
Hungary	2,817	23.5	13.4	14.9	7.9	31.3	18.4
Cyprus	6,340	14.9	7.4	11.6	6.5	18.1	8.3
Latvia	2,275	14.2	6.7	10.1	5.4	18.1	7.8
Isle of Man	740	13.6	6.2	8.8	3.3	18.4	9.0
Greece	3,060	12.5	6.2	6.6	3.7	17.6	8.4
Slovenia	3,085	12.5	5.5	8.3	3.2	17.0	7.9
Austria	2,571	11.1	4.8	8.2	4.4	14.4	5.4
Faroe Islands	552	10.5	5.5	6.9	2.4	13.7	8.1
Iceland	3,510	10.5	4.8	7.3	3.3	13.7	6.4
Romania	2,289	10.1	4.2	5.1	2.0	14.0	5.9
Bulgaria	2,353	10.0	4.2	6.9	3.5	13.2	5.0
United Kingdom	2,179	9.2	4.0	6.3	2.6	11.6	5.1
Croatia	3,008	8.4	4.2	6.1	3.6	10.7	5.0
Ukraine	2,447	7.5	2.7	5.0	2.2	9.5	3.1
Slovak Republic	2,468	7.4	3.2	4.8	2.1	9.9	4.3
Belgium (Flanders)	1,889	6.4	2.6	3.9	1.0	9.1	4.3
Armenia	4,055	4.1	1.4	1.9	0.9	5.6	1.8
Median		10.5	4.8	6.9	3.3	13.7	6.4

compared to other families in your country?'; responses on the 7-point scale from *very much better off* to *very much worse off* were recoded as better off, about the same, or worse off.

Statistical analysis

The main analysis consisted of three separate logistic regression analyses, first for any self-reported suicide attempt, second for multiple attempts, and third for frequent self-harm thoughts. Each analysis is presented in a separate subsection of the Results section below. The dependent variable in the first analysis was any self-reported suicide attempt versus none. The second analysis was restricted to the subsample of students who reported at least one attempt; it took as dependent variable more than one attempt versus only one. In the third analysis, the dependent variable was self-harm thoughts five or more times versus none or fewer than five. These analyses were performed using the *svyset* and *svy logistic* commands in the STATA (StataCorp LP, College Station, Texas, USA) package, which take account of the complex sample design (clustering into school classes).

The independent variables in these logistic regressions were the following sociodemographic and behavioral characteristics: gender, socioeconomic status, not living with both parents, current smoking, alcohol use and any lifetime drug use. Dummy (indicator) variables for the countries were included and the interactions between country and other independent variables were also examined. The Faroe Islands were excluded from these analyses because one substance use variable was unavailable.

In order to aid the presentation of the interaction effects, we did not use the usual coding in which the interaction between country (represented by a set of indicator variables C_1, C_2, \dots) and a factor (X) is represented by a set of variables obtained from the products XC_i . Instead we replaced X and the XC_i in

the regression model by another set of dummy variables X_i defined by $X_i = X$ in country i , 0 otherwise. The coefficients of the X_i show directly the different effects of X on the rate of self-reported suicide attempts in each country. This change in coding has no effect on the fit of the model or on the overall statistical significance of interactions.

One further analysis was carried out, at the national level, in order to examine whether the strength of the association between self-reported suicide attempts and substance use within a country was correlated with the prevalence of substance use in that country. The strengths of the associations between self-reported suicide attempts and substance use within each country were represented by the corresponding odds ratios (OR) from the first logistic regression. Separately for each substance, Spearman's correlation coefficient was calculated between these OR and the national prevalences of use of the same substance. This analysis is reported at the end of the subsection on the analysis of any self-reported suicide attempt versus none.

Results

Rates of self-reported suicide attempts and self-harm thoughts

Table 1 presents the rates of self-reported suicide attempts by 15- to 16-year-old school students in the 17 participating European countries. Lifetime rates ranged from 4.1% in Armenia to 23.5% in Hungary with a median rate of 10.5% across countries. Large gender differences were found, rates of self-reported suicide attempts among females being almost double those of males. In Hungary, the country with the highest rates, almost one third of female adolescents (31.3%) reported at least one suicide attempt, and 14.9% of males. Overall, among adolescents who reported suicide attempts, nearly half reported more

Table 2 Any and five or more self-reported self-harm thoughts (%) by 15- to 16-year-old adolescents in the 2007 ESPAD survey, by country and gender

	Total		Males		Females	
	Any (%)	5+ (%)	Any (%)	5+ (%)	Any (%)	5+ (%)
Hungary	31.5	8.0	20.8	4.5	41.2	11.0
Cyprus	26.5	4.0	20.0	2.8	32.6	5.0
Latvia	43.8	11.0	32.2	6.9	54.7	14.8
Isle of Man	41.3	11.6	29.1	6.1	53.4	17.0
Greece	26.4	5.3	16.4	3.7	35.1	6.7
Slovenia	30.8	6.9	17.4	3.6	44.8	10.4
Austria	31.3	9.3	20.9	5.8	43.3	13.3
Faroe Islands	37.4	15.3	23.1	6.4	50.0	23.1
Iceland	30.5	8.8	20.7	5.1	40.4	12.6
Romania	27.8	4.9	15.8	2.0	37.1	7.1
Bulgaria	26.0	4.8	17.7	3.4	34.6	6.3
United Kingdom	36.8	8.5	23.1	4.6	47.8	11.6
Croatia	31.2	7.4	20.2	5.0	42.8	9.9
Ukraine	27.6	4.6	16.0	3.8	37.2	5.3
Slovak Republic	36.2	7.1	24.3	4.4	47.7	9.6
Belgium (Flanders)	28.2	8.7	15.8	3.1	41.1	14.4
Armenia	15.0	2.1	10.7	1.3	18.1	2.6
Median	30.8	7.4	20.2	4.4	41.2	10.4

than one attempt (Table 1). Rates of self-harm thoughts ranged from 15.0% in Armenia to 43.8% in Latvia with a median rate of 30.8% (Table 2), and the rates of frequent self-harm thoughts (at least five times) ranged from 2.1% of students in Armenia to 15.3% in the Faroe Islands (median 7.4%). Either self-harm thoughts or suicide attempts, or both, were reported by 30.7% of students in the total sample (20.9% of males and 39.9% of females).

Among students who had reported having attempted suicide, the large majority (from 80.9% in Armenia to 93.9% in Iceland) also reported self-harm thoughts, while overall about one third of those who reported self-harm thoughts also reported attempted suicide (from 17.9% in Slovakia to 66.8% in Hungary). Suicide attempts were strongly associated with the number of self-harm thoughts. Among students who reported no self-harm thoughts, the median prevalence across countries of any suicide attempt was 1.5%, increasing to 21.2% among students reporting self-harm thoughts one to four times and 53.8% among those who reported self-harm thoughts five times or more.

Logistic regression for any self-reported suicide attempt versus none

Table 3 shows the results of the first logistic regression analysis, in which the dependent variable was any self-reported attempt versus none. The predictors were country, gender, socioeconomic status, not living with both parents, smoking, alcohol consumption and any lifetime illegal drug use. In this analysis, and also in the subsequent logistic regression analyses, collinearities among the independent variables led to the terms corresponding to Romania and the Isle of Man being dropped from the model-fitting procedure. All of the independent

variables had statistically significant main effects ($p < .001$). Among the psychosocial and sociodemographic factors, the largest effects ($OR > 2.0$) were for female gender, any lifetime drug use, current smoking and low socioeconomic status, whereas the effects for current alcohol consumption and not living with both parents were a little weaker ($OR < 1.50$, Table 3). In addition, statistically significant interactions ($p < .01$) were found between country and gender, country and smoking, and country and drug use. The interpretations of these interactions are as follows.

In every country, there was an increased risk ($OR > 1$) for suicide attempts among females compared to males, but this increase was particularly high in Armenia ($OR = 5.67$, 95% CI: 3.30–9.75), Greece ($OR = 3.93$, 95% CI: 3.00–5.15) and Romania ($OR = 3.59$, 95% CI: 3.52–3.66). All other countries had OR for gender falling in the range from 1.92 in the United Kingdom and 2.88 in Hungary. Drug use was associated with suicide attempts in every country, but notably more strongly in Cyprus ($OR = 4.55$, 95% CI: 3.41–6.07) than in any other country (range of OR from 1.45 in the Isle of Man to 2.83 in Greece). Smoking was associated with suicide attempts everywhere, but more so in Belgium (Flanders; $OR = 3.71$, 95% CI: 2.11–6.53), Iceland ($OR = 3.51$, 95% CI: 2.74–4.49) and Armenia ($OR = 3.20$, 95% CI: 1.53–6.70) than in other countries (range of OR from 1.50 in Bulgaria to 2.71 in Romania). Thus, the significant interactions arose in each case partly because the association between the factor and self-reported suicide attempts was somewhat stronger in a few countries than elsewhere.

However, the additional analysis at the country level showed that there was also a general tendency for the association between a risk factor and self-reported suicide attempts to be weaker (lower OR)

Table 3 Logistic regression for self-reported suicide attempts and self-harm thoughts

Factor	Self-reported suicide attempts		Self-harm thoughts 5+ versus fewer OR (95% CI)
	Any versus none OR (95% CI)	2+ versus 1 OR (95% CI)	
Female gender	2.46 (2.28–2.65)	0.89 (0.78–1.02)	2.56 (2.33–2.81)
Current smoking ^a	2.14 (1.97–2.32)	1.26 (1.10–1.44)	2.21 (1.98–2.46)
Current alcohol consumption ^b	1.49 (1.34–1.66)	1.11 (0.93–1.32)	1.43 (1.25–1.62)
Any lifetime illegal drug use ^c	2.22 (2.02–2.43)	1.43 (1.22–1.67)	1.73 (1.55–1.94)
Not living with both parents	1.43 (1.33–1.53)	1.15 (1.01–1.32)	1.28 (1.17–1.41)
Socioeconomic status			
High ^d	1	1	1
Medium	1.05 (0.97–1.13)	0.94 (0.82–1.08)	1.22 (1.11–1.34)
Low	2.00 (1.79–2.24)	1.39 (1.14–1.70)	2.60 (2.28–2.98)
Country ^e			
Armenia ^d	1	1	1
Austria	1.55 (1.23–1.95)	1.05 (0.69–1.59)	2.55 (1.94–3.35)
Belgium (Flanders)	0.87 (0.65–1.17)	0.82 (0.50–1.35)	2.51 (1.87–3.38)
Bulgaria	1.44 (1.12–1.86)	1.04 (0.67–1.62)	1.35 (0.99–1.86)
Croatia	1.30 (1.02–1.65)	1.48 (0.95–2.31)	2.15 (1.62–2.84)
Cyprus	3.40 (2.78–4.14)	1.58 (1.11–2.25)	1.41 (1.08–1.84)
Greece	2.85 (2.30–3.54)	1.72 (1.18–2.50)	2.08 (1.58–2.74)
Hungary	5.03 (4.08–6.21)	2.07 (1.43–3.00)	2.56 (1.95–3.35)
Iceland	2.09 (1.68–2.60)	1.25 (0.83–1.87)	3.27 (2.52–4.23)
Latvia	2.08 (1.69–2.57)	1.19 (0.76–1.86)	3.15 (2.40–4.14)
Slovak Republic	0.94 (0.73–1.20)	1.02 (0.65–1.59)	1.90 (1.43–2.52)
Slovenia	2.07 (1.64–2.60)	1.13 (0.75–1.70)	1.99 (1.50–2.63)
Ukraine	1.19 (0.93–1.51)	0.87 (0.55–1.36)	1.41 (1.01–1.97)
United Kingdom	1.23 (0.96–1.57)	1.06 (0.69–1.64)	2.39 (1.75–3.26)

Odds ratios (OR) are adjusted for the other factors. 95% confidence intervals (CI) are shown in parentheses. Results from models including interactions are given in the text.

^aAt least one cigarette per day in the last 30 days (yes–no).

^bDrinking alcohol at least 10 times in the last 30 days (yes–no).

^cAny of cannabis, amphetamines, lysergic acid diethylamide (LSD) or other hallucinogenics, crack, cocaine, heroin or ecstasy (yes–no).

^dReference category.

^eThe terms corresponding to Romania and the Isle of Man were dropped from the model in the fitting procedure because of collinearities.

within countries with a higher prevalence of the risk factor. Thus, countries with a higher prevalence of smoking tended to have a lower OR between self-reported suicide attempts and smoking (Spearman correlation of $-.59$ between smoking prevalence and OR at the national level). Countries with a higher prevalence of any lifetime drug use tended to have a weaker association (lower OR) between drug use and self-reported suicide attempts (Spearman correlation of $-.71$ between drug use prevalence and OR).

Logistic regression for multiple self-reported suicide attempts

The second logistic regression analysis was carried out for multiple self-reported suicide attempts versus one only, among students who reported at least one attempt (Table 3). The sample size was 4,378 for this analysis. Main effects were not statistically significant ($p > .05$) for gender and only marginally significant for alcohol consumption and not living with the family ($p = .04$). Current smoking, any lifetime drug use and low socioeconomic status all had statistically significant main effects ($p \leq .001$) but with lower point estimates than in the regression for any attempts versus

none. Interactions were not tested in this analysis because the small sample size in conjunction with the low prevalence of repeated attempts led to many collinearities in the regression model.

Logistic regression for frequent self-reported self-harm thoughts

The third logistic regression analysis was for frequent self-harm thoughts (Table 3). The main effects of all the factors were statistically significant ($p < .001$). Point estimates of the effects of female gender, current smoking, current alcohol consumption and not living with both parents were similar to those found in the regression for any suicide attempts. Only drug use had a weaker association with frequent self-harm thoughts than with any suicide attempts. On the other hand, low socioeconomic status appeared to be more strongly related to frequent self-harm thoughts than to suicide attempts. Significant interactions at $p < .001$ were found between country and current smoking and between country and current alcohol consumption. The point estimate of the OR for alcohol consumption was below one in Iceland (OR = 0.54, 95% CI: 0.18–1.57),

Belgium (0.91, 0.54–1.53) and Greece (0.92, 0.57–1.49) and ranged up to 1.93 (1.33–2.80) in Croatia. The estimated OR for current smoking was lower in Latvia (1.07, 0.79–1.44) and higher in Iceland (3.30, 2.56–4.25) than elsewhere but these confidence intervals overlapped those of several other countries.

Discussion

Cross-national European data from the present study of suicide attempts among 15- to 16-year-old adolescents showed a median lifetime self-reported suicide attempt rate of 10.5% among the 17 participating countries. Rates for females were commonly almost double those of males. Repetition of suicide attempts was high: half of the students who reported any suicide attempt reported more than one. These findings confirm those from other studies (Hawton et al., 2003; Madge et al., 2008). Compared to the rates of self-harm reported in the Child and Adolescent Self-Harm in Europe (CASE) international school survey of adolescents of similar age in Belgium, England, Hungary, Ireland, the Netherlands, Norway and Australia (Madge et al., 2008), our data show similar rates of suicide attempts for females, but the median rate of suicide attempts for males was higher in our study (6.9%) than in CASE (4.3%). Apart from the fact that the studies have only three countries in common, the difference between rates among males could possibly also be attributable to the 6–7 years time lag between the two surveys. Rates of attempted suicide as well as completed suicide rates are reported to be increasing over time among males (Kokkevi, Rotsika, Arapaki, & Richardson, 2011; Mittendorfer Rutz & Wasserman, 2004; O'Loughlin & Sherwood, 2005).

Self-reported self-harm thoughts were strongly associated with self-reported suicide attempts. The large majority of adolescents who reported suicide attempts also reported self-harm thoughts, and about one third of those who reported self-harm thoughts also reported suicide attempts. While it is important to note that this means that two thirds of those who reported self-harm thoughts did not report a suicide attempt, nevertheless this last group should not be considered free of risk of a possible future attempt, because of the close association reported to exist between suicidal thoughts and acts. It is to be noted that adolescents who reported frequent self-harm thoughts (5+ times) were at greatly increased risk for self-reported suicide attempts.

As indicated by the results of the logistic regression analyses, self-reports of suicide attempts and self-harm thoughts are highly correlated with substance use. Apart from gender, lifetime illegal drug use was the factor most highly associated with attempted suicide with an OR of 2.22, followed by current smoking (2.14), and alcohol consumption was also a significant factor (OR = 1.49). These findings confirm a previous analysis of ESPAD sur-

vey data, which further showed that there appears to be a graded association between the frequency and intensity of involvement with legal and illegal drug use and suicidal thoughts and attempts (Kokkevi & Fotiou, 2009). They also agree with other recent reports (Haw & Hawton, 2011; Laukkanen et al., 2009). Current smoking and illegal drug use were also associated with repeated suicide attempts, among adolescents who reported at least one attempt, although current alcohol consumption was not. All three substance use variables were correlated with frequent self-harm thoughts.

Our regression analyses further indicate that self-reported suicide attempts are associated with the integrity and socioeconomic status of the adolescent's family. Not living with both parents and low socioeconomic status significantly increased the risk of self-reported suicide attempts. These findings confirm other reports (Fergusson et al., 2000; Hawton et al., 2003; Kokkevi et al., 2011; Laukkanen et al., 2009). Low socioeconomic status was also associated with repeated suicide attempts and strongly correlated with frequent self-harm thoughts. The patterns of factors associated with one suicide attempt versus none and with repeated attempts versus only one were similar. This similarity is further confirmed by studies on populations that have been hospitalized due to their suicide attempt (Csorba et al., 2007; Haw & Hawton, 2011; Hawton & Fagg, 1992; Hawton et al., 2003). However, gender was associated with any self-reported suicide attempt (commoner among females) but not with repeated suicide attempts among those adolescents who reported at least one attempt. It is possible that repeated suicide attempts indicate more serious self-harm intent than a single attempt which might have a higher probability of being motivated by attention-seeking. In that case, we would not expect female gender to be associated with repeated attempts, given that worldwide mortality statistics demonstrate higher rates of completed suicide among males than females (Wasserman, Cheng, & Jiang, 2005).

Among the strengths of this study is that it is the only one reporting on adolescent suicide attempts from a large sample of European countries. The data used in this study can be considered as comparable between countries because of the standardized methodology of the ESPAD study. Although participating countries were self-selected (by choosing to use the optional Psychosocial Module of ESPAD), they were similar to the nonparticipants in respect of the variables that could be compared. We also examined the link between suicide attempts and the self-harm thoughts that may constitute a precursor of attempts. Multivariate analysis was further performed to assess the association of suicide attempts with substance use and sociodemographic factors that have been identified in previous studies as being among the main risk factors associated with suicidal behaviors. The stability of results across many countries

with different cultural backgrounds supports the generalisability of the findings.

A weakness of this study is that it is based on self-reported data. However, it has been reported elsewhere that reporting sensitive data such as suicidal behaviors and thoughts, especially in the age group of adolescents, is facilitated through the method of anonymous questionnaires, and the validity of self-reported data has been confirmed by relevant studies (De Wilde & Kienhorst, 1995; Safer, 1997).

Another limitation is that our study does not provide information on the severity of attempts, on the methods used, or on motivations and causes. However, studies which go into further detail on these issues indicate that even non-life-threatening suicide attempts by adolescents have to be taken into serious consideration because they indicate that the adolescent is facing a conflicting situation in which suicide attempts might serve as a means of coping, as an attempt to obtain the attention of parents or to seek help (Madge et al., 2008; Scoliers et al., 2009). Suicide ideation and attempts might also be the expression of depressive disorder (Hacker et al., 2006; Hawton et al., 2002; Kandel, Raveis, & Davies, 1991; Laukkanen et al., 2009; Rey Gex et al., 1998), or of low impulse control or some other mental disorder (Gould et al., 1998; Haw & Hawton, 2011; Hawton et al., 2003) that requires medical treatment.

The interpretation of variations between rates of suicide attempts reported by adolescents in the participating countries can only be speculative at this stage. Differences in sociocultural backgrounds, and economic, political and other social changes occurring over time in the different countries, such as changes in family structure or in the epidemic of substance use, might all contribute to the differences found. Our findings indeed indicate that countries with a higher prevalence of drug use tended to have weaker association between drug use and self-reported suicide attempts.

The high rates of adolescent self-reported suicide attempts in this study compared with the much lower rates reported from other studies of actual attempts that require medical assistance and care, indicate the presence of a 'hidden' life-threatening problem that affects a large number of adolescents in the general population (Choquet & Ledoux, 1994; Grunbaum et al., 2000; Madge et al., 2008). It has

been documented that young people who attempt suicide are at high risk of eventual suicide, while almost half of the deceased from suicide had a history of previous attempts. It is also reported that the risk of suicide after attempted suicide in young people is greater in males than females (Hawton et al., 1998). It is consequently of great importance that early recognition of adolescents at risk in schools, followed by early intervention and assistance towards them and their family, are given priority in the planning of preventive policies in the social and health care sectors. This may become of even greater relevance in a time when European countries are facing the threat of an economic recession accompanied by an increase in unemployment rates. These are both situations that have been incriminated as causes of increases in suicide rates (Gunnel et al., 1999; Hawton, 1998; Pritchard, 1992). The ESPAD survey is repeated at 4-year intervals. Given the current economic situation, repetition of this analysis using data from the next round of ESPAD should provide an interesting comparison with the present results.

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Key points

- Suicide attempts and self-harm thoughts are predictors of suicide among adolescents. Therefore, it is important to obtain insight into the factors associated with these phenomena.
- This study provides comparative data on the prevalence of suicide attempts and self-harm thoughts from 17 European countries, and identifies substance use and other common factors associated with them.
- The stability of results across many countries with different cultural backgrounds supports the generalisability of the findings.
- Prevention of suicide among adolescents will be aided by timely identification of markers such as suicide attempts and thoughts and associated factors.

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