

Changes in associations between psychosocial factors and suicide attempts by adolescents in Greece from 1984 to 2007

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Background: Suicide is the second commonest cause of death among adolescents and young adults aged 15–35 years in Europe. Suicide attempts are a strong risk indicator for suicide. This article examines psychosocial factors associated with self-reported suicide attempts in adolescents in Greece and whether the reported increase in suicide attempts from 1984 to 2007 was accompanied by changes in the pattern of related psychosocial factors. **Methods:** Data were taken from nationwide probability sample surveys of Greek high school students aged 14–18 years in 1984 ($n=10\,507$) and 2007 ($n=9873$). Logistic regression analysis was used to relate any self-reported suicide attempts to basic sociodemographic and psychosocial variables including family and psychological characteristics, and substance use. **Results:** Female gender, smoking, illicit drug use, low socio-economic status, not living with both parents, dissatisfaction with relationship with parents, visits to a doctor for psychological problems, depression, anti-social behaviour and low self-esteem were risk factors for self-reported attempted suicide by adolescents in both surveys. Significant interaction terms showed that the effects of gender and illicit drug use were smaller in 2007 than in 1984. However, low self-esteem became significantly more important. **Conclusions:** Several common psychosocial factors seem to be steadily related to self-reported suicide attempts by Greek adolescents in 1984 and 2007. However, the increase in self-reported suicide attempts between 1984 and 2007 has been accompanied by changes in the relative importance of correlates.

Keywords: adolescents, Greece, psychosocial factors, school survey, self reports, suicide attempts, trends

Introduction

Suicide is the second commonest cause of death in the age group of 15- to 35-years in the World Health Organisation's European Region and increased rates of suicide and suicidal behaviours among adolescents and young adults have been reported in recent years.¹ Because suicidal behaviour and especially suicide attempts are considered to be the most significant predictors of completed suicide,^{2,3} understanding and preventing the factors that are associated with suicide attempts may be of great importance in reducing the risk of completed suicide.

Suicidal behaviours are undoubtedly linked to multiple causes, biological and psychosocial. There is an extensive bibliography from studies examining the sociodemographic and psychosocial factors related to suicide attempts. Among the most important socio-demographic risk factors are female gender and age.^{3–5} Among psychosocial risk factors, mental health problems are prominent. The most strongly related to suicide attempts are depressive disorders^{6,7} and persistent self-harm thoughts.^{4,5,8}

Legal and illegal substance use is closely related to thoughts of self-harm and suicide attempts in adolescents,^{6,9} while there also seems to exist a graded association of suicidal thoughts

and behaviours with the intensity and frequency of drug use.^{10,11}

Among environmental factors, the most strongly related to suicidal behaviours are problems concerning the relationship with parents,^{3,4} low connectedness with parents and peers and absence of familial and peer support,^{5,8,12,13} family violence,⁶ peer modelling of suicidal behaviours,^{7,9,14} social isolation by increasing depression and low self-esteem,¹⁵ physical or sexual abuse,^{3,6,7,9,16} bullying,^{3,6,7,17} violent behaviours,^{5,18} low self-esteem,¹⁸ school failure and low connectedness and satisfaction with the school.^{3,12}

Reports of protective factors against suicidal behaviours are scarcer. Among the most important protective factors against suicide attempts are having friends.⁶ Feelings of connectedness with the family constitute the only protective factor reported for girls,¹⁵ while school achievement and school connectedness have also been cited for boys.¹⁹

In spite of the abundant literature on psychosocial risk factors of suicidal behaviours among adolescents, there is a lack, to our knowledge, of studies that examine psychosocial factors in relation to changes in trends in suicide attempts among adolescents. The aim of the present article is to assess those psychosocial factors that could contribute to understanding the increased rates of self-reported suicide attempts that have

been recorded in large nationwide surveys of adolescents of age 14–18 years in high schools in Greece in 2007 compared with 1984. In this time, the prevalence of self-reported suicide attempts almost doubled overall (from 7.0% in 1984 to 13.4% in 2007), increasing from 11.5% to 17.9% in females and 2.4% to 8.4% in males.²⁰

Methods

Surveys

Nationwide sample surveys of adolescents attending the last four grades of high school (ages 14–18 years) were carried out in 1984 and 2007. Multistage stratified probability samples were drawn, starting with geographical stratification, followed by selection of schools and selection of classes within schools. In the first survey,²¹ the four strata were the two major conurbations (Greater Athens and Thessaloniki), other urban areas and semi-urban/rural areas. In the 2007 survey, the strata were 10 of the 13 regions of Greece defined for European Union purposes, excluding the islands other than Crete and Evia. Because both surveys drew equal probability samples of students, this difference between the sample designs does not affect the comparability of the two surveys. Schools for adolescents with special needs were excluded in both years. The 2007 survey was conducted following the protocol of the European School Survey Project on Alcohol and Other Drugs (ESPAD),²² but extended to cover a wider age range. Further details can be found in Kokkevi *et al.*²³ As required for conducting surveys in schools in Greece, ethical approval for each survey was obtained from the Pedagogical Institute of the Ministry of Education.

The anonymous questionnaires were completed in the classroom under the supervision of trained research assistants by all students of the selected classes who were present in school that day. Absence rates were 7.3% in 2007 and 6.2% in 1984. The level of refusal to participate by students who were present was 1.8% in 2007 and below 1% in 1984. Final sample sizes were 9873 in 2007 and 10 507 in 1984.

Instruments and measures

The 2007 survey employed the ESPAD questionnaire; this can be found in full in English in Hibell *et al.*²² The items that are analysed in the present article are located chiefly in the optional Psychosocial Module of the questionnaire. ‘Self-esteem’ was measured by Rosenberg’s 10-item scale,²⁴ but with reversed scoring so that high values expressed low self-esteem, for the purposes of presentation. ‘Depressive mood’ was measured by a short 6-item version of the Center of Epidemiological Studies Depression (CES-D) scale.²⁵ The scale for measuring ‘antisocial behaviour’ was taken from the Monitoring the Future Survey conducted in the USA.²⁶ It consists of 10 items relating to causing damage to property, being involved in fights and theft in the last 12 months; answers are given on a scale of frequencies from 0 to 10 times or more. Values of Cronbach’s α in the 2007 survey were 0.815 for self-esteem, 0.819 for depressive mood and 0.895 for anti-social behaviour. Further description of these scales and their psychometric properties have been published elsewhere.¹¹ All scale scores were expressed on the response scale 1–4 that was used on the questionnaire. The same scales had also been used in the 1984 Greek school survey that is analysed here.

The dependent variable examined in this article was 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, but were recoded to no/yes in order to carry out analysis

of the factors associated with any self-reported suicide attempt. The factors considered were the survey year, gender and the items described in the following two paragraphs.

‘Current smoking’ was defined as smoking at least 1 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/week, <1/day, 1–5/day, 6–10/day, 11–20/day and >20/day). ‘Frequent alcohol use’ was defined as drinking alcohol at least 20 times in the last 30 days, obtained from combined 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. We also used the variable of lifetime drunkenness (at least 3 times) and obtained very similar results which are not reported here. ‘Any lifetime use of illegal drugs’ was established from a series of questions that asked, for each substance separately, how many times the respondent had ever used marijuana or hashish (cannabis), amphetamines, LSD or other hallucinogenics, crack, cocaine, heroin and ecstasy (the response categories 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). ‘Personal relationships’ were assessed by responses on 5-point scales from ‘very satisfied’ to ‘not at all satisfied’ to the questions ‘How satisfied are you usually with your relationship (a) to your mother (b) to your father, (c) to your friends?’ The relationship with parents was defined as the higher of the separate ratings of satisfaction with the relationships with mother and father. ‘Socio-economic status’ was assessed as high, medium or low from the answers to the question ‘How well off is your family compared to other families in your country?’; high status corresponded to responses that the family was better off than others, medium status that it was about the same and low status that it was worse off.

Statistical analysis

Logistic regression analyses were used to investigate whether self-reporting of any suicide attempt is associated with the sociodemographic and psychosocial characteristics listed in the preceding paragraphs. First, logistic regressions were performed to examine suicide attempts in relation to these characteristics in the 1984 and 2007 surveys separately. Then a regression model was applied to the entire data, taking as independent variables the year of survey and all the characteristics that were common to both surveys. This model also included all the interaction terms between the survey year and the other characteristics in order to test whether the associations between suicide attempts and the independent variables were different in the two survey years. The relationship of adolescents with their parents was not included in the joint analysis of the two surveys because the relevant question was not the same in both years. Cases with missing data for the dependent variable or any of the independent variables were omitted from the analysis; 17 813 cases remained for analysis.

In order to aid presentation of the interaction effects, we did not use the usual coding in which the interaction between year (dummy variable Y) and a factor (X) is represented by a third variable equal to their product XY. Instead, we replaced X and XY in the regression model by two variables X_1 and X_2 defined by $X_1 = X$ in 1984, 0 otherwise and $X_2 = X$ in 2007, 0 otherwise. The coefficients of X_1 and X_2 show directly the different effects of X on the rate of self-reported suicide attempts in 1984 and 2007. The statistical significance of the interaction is unaffected by the coding.

Results

Table 1 shows the odds ratios (OR) and 95% confidence intervals (95% CI) for the separate logistic regressions for self-reported suicide attempts in the 1984 and 2007 surveys. Certain factors appear to be associated with self-reported suicide attempts in both years. Specifically, female gender, daily smoking, use of illegal drugs, frequent consumption of alcohol, dissatisfaction with the relationship with parents, self-reported visits to a doctor or psychologist for a psychological problem, low self-esteem and high scores on the depression and anti-social behaviour scales were all statistically significant factors ($P \leq 0.001$) in both surveys. Relationship with friends was not statistically significant in any analysis ($P > 0.05$) and will not be mentioned further.

However, there were some differences between the surveys regarding the effect of each factor on the probability of reporting any suicide attempts. Although suicide attempts were reported more commonly by girls than boys in both surveys, the gender difference was much larger in 1984 (OR = 6.49, 95% CI 4.88–8.64) than in 2007 (OR = 2.70, 95% CI 2.28–3.20). The association of any lifetime use of any illegal drug with self-reported suicide attempts also appeared to be much stronger in 1984 (OR = 2.61, 95% CI 1.92–3.53) than in 2007 (OR 1.43, 95% CI 1.15–1.78). On the other hand, low self-esteem was more strongly associated with self-reported suicide attempts in 2007 (OR = 2.13, 95% CI 1.89–2.44) than 1984 (OR = 1.56, 95% CI 1.35–1.82).

In order to confirm whether these and other associations were indeed of different strengths in the 2 years, logistic regression was applied to the data of both years within one analysis. Table 2 shows the results of this analysis including, in addition to the main effects of the explanatory variables, interactions with the year of survey. Interactions indicate that a factor's association with suicide attempts does not have the

same strength in each year. Only the statistically significant ($P < 0.01$) interaction terms are reported. These interactions confirm that the associations of gender and illicit substance use with self-reported suicide attempts were weaker in 2007 than in 1984. In contrast, low self-esteem was more strongly associated with suicide attempts in 2007 than in 1984. As noted earlier, the adolescents' satisfaction with their relationship with their parents was not included in this analysis because of important differences in the format of the relevant questions in the 2 years.

Discussion

The present analysis examined the relationship of socio-demographic and psychosocial factors to self-reported suicide attempts by Greek adolescents. Our findings are in agreement with other reports that depression^{4–7}, low self-esteem^{7,15,18} and anti-social behaviour²⁷ are predictors of suicide attempts. Other risk behaviours such as substance use, daily smoking and frequent alcohol use were also associated with suicide attempts. Many other studies have also reported associations between suicide attempts and smoking,^{6,7,9,11,18,28} and numerous studies have also found associations with alcohol and illegal drugs.^{5,6,8,11,29,30}

Family variables were also found to contribute to the risk of suicide attempts as indicated by the increased risk among adolescents who were not living with both their parents; this was also reported from a school survey in England.⁷ The main protective factors against suicide attempts, which have also been found in other studies, were satisfaction with relationships with parents^{6,15,19} and higher levels of self-esteem.^{15,18}

These findings provide further support for the view that psychological and behavioural problems are risk factors for self-harm by adolescents. However, it appears that the relative strengths of the associations between some of these factors and suicide attempts have changed across the 23-year period examined.

The monitoring of trends in self-reported suicide attempts among adolescents in Greece in relation to socio-demographic factors showed that the prevalence of this behaviour doubled

Table 1 Logistic regression with dependent variable any self-reported suicide attempt

	1984 OR (95% CI)	2007 OR (95% CI)
Female	6.49 (4.88–8.64)	2.70 (2.28–3.20)
Smoking ≥ 1 cigarette/day last month	2.32 (1.90–2.82)	1.72 (1.48–2.00)
Frequent alcohol consumption ^a	1.90 (1.37–2.65)	1.40 (1.06–1.85)
Any illicit drug lifetime	2.61 (1.92–3.53)	1.43 (1.15–1.78)
Socio-economic status		
High	1	1
Medium	1.34 (0.99–1.81)	1.07 (0.93–1.24)
Low	1.49 (1.08–2.06)	1.61 (1.23–2.11)
Not living with both parents	1.21 (0.92–1.58)	1.32 (1.12–1.58)
Problems with parents ^b	1.70 (1.39–2.10)	
Satisfaction with relationship with parents ^c		
No parents		3.21 (1.11–9.32)
Dissatisfied		2.32 (1.74–3.10)
Neither satisfied nor dissatisfied		1.54 (1.16–2.05)
Satisfied		1
Visits to a doctor/psychologist for psychological problem	2.98 (2.34–3.78)	2.54 (2.02–3.19)
Low self-esteem scale (1–4)	1.56 (1.35–1.82)	2.13 (1.89–2.44)
Depression scale (1–4)	1.66 (1.41–1.94)	2.05 (1.83–2.29)
Anti-social behaviour scale (1–4)	1.81 (1.36–2.40)	2.50 (2.03–3.10)

Separate analyses for 1984 and 2007 surveys

a: at least 20 times in the last 30 days

b: not asked in 2007

c: Not asked in 1984

Table 2 Logistic regression with dependent variable any self-reported suicide attempt: results from combined analysis of 2007 and 1984 surveys, including statistically significant ($P < 0.01$) interactions between year of survey and other independent variables

	OR (95% CI)
Survey year 2007 (vs. 1984)	2.96 (1.91–4.60)
Female	
2007	2.76 (2.34–3.25)
1984	7.16 (5.49–9.33)
Any illicit drug lifetime	
2007	1.45 (1.18–1.78)
1984	2.52 (1.89–3.36)
Low self-esteem (1–4)	
2007	2.30 (2.05–2.59)
1984	1.51 (1.32–1.74)
Smoking ≥ 1 cigarette per day last month	1.94 (1.72–2.18)
Frequent alcohol consumption	1.58 (1.28–1.95)
Socio-economic status	
High	1
Medium	1.15 (1.01–1.30)
Low	1.51 (1.26–1.81)
Not living with both parents	1.29 (1.12–1.50)
Visits to a doctor/psychologist for psychological problem	2.77 (2.35–3.26)
Depression scale (1–4)	1.96 (1.79–2.15)
Anti-social behaviour scale (1–4)	2.35 (1.99–2.77)

in the period 1984–2007, with the increase concentrated at the end of the 1990s.²⁰ Female gender, level of urbanization of place of residence and low socio-economic status of the family were all significantly associated with self-reported attempted suicide. Similar findings have been reported elsewhere.^{31,32} Our further analysis of the psychosocial factors that contributed to the increased rates of suicide attempts in 2007 compared with 1984 shows that although gender and illicit drug use remained significantly associated with suicide attempts in 2007, they were less important than in 1984. Similar trends towards weaker relationships in 2007, although not statistically significant, appeared in the OR for smoking and visiting a doctor for a psychological problem. Only low self-esteem became statistically significantly more important in 2007 as compared with 1984. The OR for depression and anti-social behaviour also increased in the direction of greater importance in 2007, but not statistically significantly.

We can tentatively interpret these changes in associations. The convergence of various aspects of behaviour between males and females in Greece has been witnessed in the last 30 years. This is reflected in various risk behaviours such as the use of licit and illicit drugs, where the gender gap has narrowed.^{33,34} Furthermore, extreme behaviours such as drug taking and suicide attempts were much less common phenomena in Greece in the 1980s than in more recent years. One could thus expect a higher association between deviant behaviours in the 1980s than when these phenomena become more widespread among the population. On the other hand, suicide attempts are becoming relatively more strongly associated with the self-concept of adolescents and less so with gender and drug use. Thus self-concept appears to be becoming an increasingly important factor in explaining suicidal behaviours, while other psychosocial and socio-demographic factors take on relatively less importance. This might be associated with changes in Greek society creating higher levels of stress in young people, such as the increased importance placed by the family and the education system on academic success.³⁵ Suicide attempts might serve as a way to cope with or escape from negative feelings and low self-esteem created by a stressful environment.³⁶

Among the strengths of this study are the large nationwide probability samples on which its findings are based, the standardized methodology that was employed, and the multivariate approach that provides a more valid profile of socio-demographic and psychosocial correlates of self-reported suicide attempts not only at specific time points but also in relation to changing trends.

A possible limitation of the study is the self-reported nature of data, considering especially the nature of the issues (suicide attempts, use of illicit substances and anti-social behaviour). However, it has been claimed that self-reports provide more valid information than other methods on sensitive issues.^{16,37,38} Nonetheless, the restriction to self-reports prevents us from assessing the impact of psychiatric disorders. The cross-sectional nature of the surveys does not allow the inference of causal or even temporal relationships between self-reported suicide attempts and associated psychosocial variables. However, longitudinal studies have demonstrated that low self-esteem is a risk factor for suicide.³⁹ Also, the measure of suicide attempts in this study does not take into account the severity of the attempt. It might be the case that a different pattern of associations characterizes less life-threatening suicide attempts than the more serious ones. However, the associations found in this study do not seem to differ from those identified in suicide attempters who required hospitalization because of the severity of the attempt.³ Finally, although our findings can be generalized to the school

population of Greece by virtue of the large samples and their national representativeness, their generalizability to other countries with different socio-cultural histories remains to be confirmed. This will be possible in a future report using international data from the ESPAD survey.

The results of the present study stress the importance of implementing school health education programmes, with the aim of raising self-esteem and reducing emotional distress that may lead to suicidal behaviours. This becomes more imperative in a changing and increasingly demanding society that may tend to increase the level of stress in young people. There is evidence from various studies showing that depressive mood and low self-esteem are linked not only with suicidal acts but also with other health compromising behaviours such as substance use, problem drinking and eating disorders.^{3,6–8,18} This underlines further the importance of the timely screening of emotional problems in adolescents and of early interventions that can also serve broader preventive targets related to health-damaging and life-threatening behaviours.

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Conflicts of interest: None declared.

Key points

- Information is lacking regarding changes in the psychosocial factors associated with increases in the prevalence of suicide attempts by adolescents.
- Gender and illicit drug use now have weaker associations with self-reported suicide attempts by adolescents in Greece than they did 20 years ago, but low self-esteem has a stronger association.
- Changes in Greek society may explain these findings.
- Findings may contribute to the fine-tuning of prevention strategies towards this major public health problem in adolescence.

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