

Increasing self-reported suicide attempts by adolescents in Greece between 1984 and 2007

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Abstract

Purpose This study examines trends in self-reported suicide attempts by Greek adolescents.

Methods Data were obtained from five nationwide school probability surveys, each of approximately 8,000–10,000 adolescents aged 14–18 years, carried out from 1984 to 2007. Students answered an anonymous questionnaire in their classrooms supervised by research assistants. Logistic regression analysis used as dependent variable any self-reported suicide attempts and as independent variables basic sociodemographic information and the year of the survey.

Results Self-reported suicide attempts doubled in prevalence from 7.0% in 1984 to 13.4% in 2007. Female gender (odds ratio OR 2.49, 95% confidence interval CI 2.30–2.71), living in a single parent family (OR 1.91, CI 1.73–2.11), lower paternal education (OR 1.20, CI 1.10–1.31) and living in a major city (OR 1.17, CI 1.08–1.27 for Greater Athens and OR 1.13, CI 1.00–1.28 for Thessaloniki) were significantly associated with suicide attempts. A larger increase among males, from 2.4 to 8.4%, compared to females (11.5 to 17.9%) contributed to a decrease in gender differences.

Conclusions Changes in Greek society during the last 30 years, including loosening of family ties, increased drug

use and stress because of the demands of school work, are hypothesised to have had an impact on the increasing trend in suicide attempts among adolescents.

Keywords Survey descriptive study · Suicide attempts · Adolescents · Trends · Greece

Introduction

Suicide and attempted suicide are major public health problems, especially among adolescents and young adults. In the United States, suicide is the third leading cause of death among young people aged 10–24 years [1]. In the WHO European region, suicide is the second commonest cause of death among young people aged 15–35 years, after traffic accidents [2].

Suicide rates among adolescents rose fourfold from the 1950s to the 1980s in the USA, from 2.7/100,000 in 1950 to 11.3/100,000 in 1988 [3]. This was followed by a decline between 1990 and 2003, from 9.5 to 6.8 in the 10–24 age group. A new increase of 8% from 6.8 to 7.3 was reported in 2004, noted especially among 10–19 year old girls [1]. As stated by WHO [2] “all predictions show that a dramatic increase in suicidal behaviour is to be expected in the coming decades unless effective preventive measures are put in place”.

Only a small percentage of suicide attempters complete suicide. For every fatal suicide attempt in adolescents, 31 non-fatal attempts were reported in 1988–1993 [4]. It is estimated that two-thirds to three-quarters of attempts by adolescents are of low lethality, about half are done with a high likelihood of rescue, and a substantial minority of attempters deny wanting to die at the time of the attempt, but 2% are very serious [3]. The National Youth Risk

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Behavior Survey in USA reported that 2.7% of suicide attempts in the last 12 months required hospitalisation [5]. On the other hand, suicide attempts are considered to be the strongest predictor of subsequent completed suicide. Approximately half of the people who commit suicide have a history of suicide attempts [3] and one-third of hospitalised adolescents have a history of previous suicidal episodes [6].

Studies on rates of suicide attempts reported by adolescents from the general population provide a rather broad range of rates across countries, from 3% or less [7–11], to 6% [12–14] and up to 9% or more [15–18]. A review of 128 studies of school populations by Evans, Hawton, Rodham, and Deeks [19], gives an average of 9.7% of adolescents reporting suicide attempts. The CASE study reported lifetime prevalence of 11.1% for any episode of self-harm in adolescents across seven European countries [20]. Studies in North America tend to report higher rates (mean 12.6%) compared to European countries (mean 6.9%) [19]. Differences in reported rates of suicide attempts could be attributed to different cultural backgrounds, and to variations in the methodological approaches and the population groups from which data are drawn [19, 21, 22].

Data on trends in suicide attempts among adolescents in Europe are scarce. The few existing studies among adolescents or young adults have been conducted on hospitalised populations [6, 23, 24] and examine short time spans of 2–3 years, and provide divergent findings. Furthermore, studies on hospitalised populations are likely to underestimate the true rate of attempted suicide which may be three to four times higher among those adolescents who do not receive medical intervention [25–27].

The aim of the present paper is to examine trends in self-reported suicide attempts among student adolescents aged 14–18 years in Greece over the 23-year period from 1984 to 2007, and to identify the socio-demographic correlates of this life-threatening behaviour. The findings are potentially of great importance for planning appropriate policies in order to prevent this major health problem among young people.

Materials and methods

Surveys

Nationwide sample surveys of adolescents attending the last four grades of high school (aged 14–18 years) were carried out in 1984 ($n = 10,507$), 1993 ($n = 10,062$), 1998 ($n = 8,240$), 2003 ($n = 7,986$) and 2007 ($n = 9,873$). Multistage stratified probability samples were drawn, starting with geographical stratification, followed by random selection of

schools and classes within schools. The sampling frames were official lists of all schools of all types, and their numbers of classes and numbers of students in each grade. In the first three surveys, the strata were Greater Athens, Thessaloniki, other urban areas and semi-urban/rural areas. In the last two surveys, the strata were the European Union NUTS II regions. Islands other than Crete and Evia were always excluded. Schools for adolescents with special needs were also excluded. Further details of the first three surveys can be found elsewhere [28, 29]. The 2003 and 2007 surveys were conducted following the protocol of the European School Survey Project on Alcohol and Other Drugs (ESPAD), but extended to cover a wider age range. Further details can be found in Kokkevi, Fotiou, Arapaki, and Richardson [30] and in the ESPAD reports for the corresponding years [31, 32]. 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 6.2% in 1984, 7.8% in 1993, 11.5% in 1998, 13.9% in 2003 and 7.3% in 2007. The purpose of the survey was explained and careful attention was paid to ensuring that the students understood that their anonymity was assured. The level of refusal to participate by students who were present was negligible.

Measures

Students answered the question “Has it ever happened that you attempted suicide? If so, how many times?” using the scale never/once/twice/3–4 times/5 or more times. Responses were recoded to no/yes in order to carry out an analysis of the factors associated with any self-reported suicide attempt. The factors considered were the year of the survey, gender, age, place of residence (Greater Athens/Thessaloniki/other places), father’s educational level (primary/junior high/senior high/university or college/unknown) and whether the student lived with both parents or not. The place of residence variables separated the two major conurbations from the rest of Greece. Father’s educational level was used as an indicator of social class.

Statistical analysis

The relationship between any self-reported suicide attempt and the above factors was examined using logistic regression. Interactions between the factors were also tested, using likelihood ratio tests for the change in deviance when interactions were added to the model that already contained

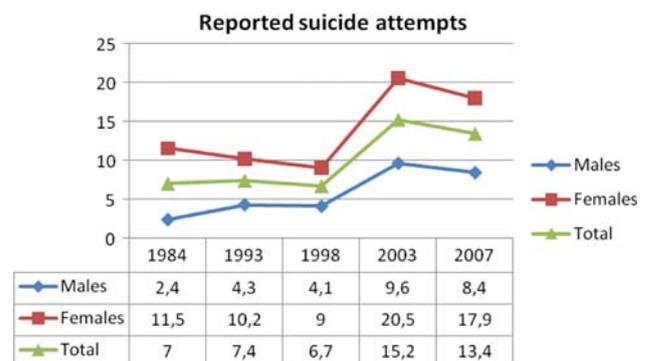
Table 1 Percentage of high school students who reported suicide attempts, by survey year and sociodemographic characteristics

	Survey year				
	1984 (n = 10,507)	1993 (n = 10,062)	1998 (n = 8,240)	2003 (n = 7,986)	2007 (n = 9,873)
Total sample	7.0	7.4	6.7	15.2	13.4
Gender					
Boys	2.4	4.3	4.1	9.6	8.4
Girls	11.5	10.2	9.0	20.5	17.9
Age (years)					
14–15	5.9	5.8	6.2	14.2	11.1
16	6.5	6.9	6.8	14.7	12.1
17	7.7	8.8	6.6	15.2	14.4
18	8.1	8.3	7.3	17.1	14.7
Place of residence					
Greater Athens	7.7	8.5	6.9	17.6	12.7
Thessaloniki	4.8	6.7	7.0	14.1	14.7
Other areas	6.9	6.7	6.5	13.8	12.7
Lives with both parents					
Yes	6.7	6.9		13.8	11.7
No	9.5	11.4		25.1	21.3
Father's education					
Unknown	7.1	10.0	9.3	19.4	16.2
Primary	7.9	7.6	7.3	18.3	15.0
Junior high	7.0	7.3	6.4	15.6	12.6
Senior high	5.4	7.5	5.5	15.3	12.1
Univ/college	5.7	6.4	6.2	12.7	12.3

main effects. A first set of analyses was run in which there were two independent variables: the survey year and one of the other factors. A further analysis included all the factors simultaneously. Because the information about living with both parents was not available in the 1998 survey, analyses that included this factor were limited to the other four survey years. Because of lack of information from the older surveys, it was not possible to adjust the statistical analysis for the clustered sample design.

Results

Table 1 shows the percentage of students in each survey year who said that they had attempted suicide at least once in their lives, with breakdowns by gender, place of residence, father's level of education and whether the student lived with both parents or not. The results for the total sample show that the prevalence of self-reported suicide was around 7% in the first three surveys, followed by a sudden jump to 15% in 2003 and remaining at a similar level in 2007 (Fig. 1). This pattern of results was similar for both genders. Self-reported suicide prevalence rates were higher for girls than boys, higher for students who did

**Fig. 1** Percentage of high-school students who reported suicide attempts, by year and gender

not live with both parents than those who did, and higher when the father's education level was very low (only primary) or unknown. Results in relation to place of residence were less clear but prevalences were generally higher in the two major cities than in other areas of Greece.

All main effects were statistically significant at very high levels. In addition, in the logistic regressions that included year and one of the other factors, the year-by-gender ($\chi^2 = 56.1$ from the change in deviance, $p < 0.0001$) and

year-by-place ($\chi^2_8 = 29.5$, $p < 0.001$) interactions were highly significant, but not year-by-father's education ($\chi^2_{16} = 14.8$, $p = 0.54$) nor year-by-age ($\chi^2_4 = 5.22$, $p = 0.27$). The interaction between year and living with both parents was negligible considering the very large sample size ($\chi^2_3 = 9.57$, $p = 0.023$). In the logistic regression model that examined all factors simultaneously and tested all the possible two-way interactions between them, only the interactions between year and gender ($\chi^2_3 = 57.6$, $p < 0.0001$) and between year and place of residence were statistically significant ($\chi^2_6 = 23.9$, $p = 0.001$), with $p > 0.05$ for the rest.

Inspection of Table 1 indicates that the year-by-gender interaction appears likely to have arisen because of the extremely low percentage of boys who reported suicide attempts in the 1984 survey. Therefore the analysis was repeated excluding this year. Indeed, the year-by-gender interaction ceased to be significant and there remained only the year-by-place of residence interaction, which however was rather weak ($\chi^2_4 = 13.1$, $p = 0.011$) given the large sample. It was concluded that the pattern of prevalence of self-reported suicide attempts can be described adequately as depending on gender, age, living with both parents or not, place of residence and father's education, as well as on the year of the survey, and that the effects of these factors on prevalence were essentially separate. Estimated odds ratios for these effects are given in Table 2.

Table 2 Logistic regression for any self-reported suicide attempt by gender, age, living with both parents, place of residence, father's educational level and year of survey: odds ratios and 95% confidence intervals

Factor	Categories	OR (95% CI)
Survey year	1993	1
	2003	2.41 (2.18–2.67)
	2007	1.83 (1.66–2.03)
Gender	Male	1
	Female	2.49 (2.30–2.71)
Age (years)	14–15	1
	16	1.05 (0.94–1.17)
	17	1.24 (1.12–1.38)
	18	1.27 (1.14–1.42)
Lives with both parents	Yes	1
	No	1.91 (1.73–2.11)
Place of residence	Greater Athens	1.17 (1.08–1.27)
	Thessaloniki	1.13 (1.00–1.28)
	Other places	1
Father's educational level	Primary/unknown	1.20 (1.10–1.31)
	Beyond primary	1

Discussion

In Greece, the suicide rate among the total population (2.8 per 100,000) is the lowest in the European region, where the highest rates are found in the former communist countries, up to 44.0 per 100,000 in the case of Lithuania [2]. The suicide rates for young people of 15–24 years old do not show any clear trend from 1984 to 1995. They fluctuated for boys between 3.02 and 4.39 per 100,000 population and for girls from 0.58 to 1.33 per 100,000 [33]. According to the National Statistical Office in Greece, deaths from suicide from 1984 to 2007 at ages 15–19 were between 6 and 22 in each year (mean = 12.3). The low suicide rates in Greece could be attributed to the characteristics of Greek society and possibly also to underreporting because of social stigma and the attitude of the Church towards suicide [33].

In contrast to the lack of trend in the national figures for completed suicide, the Poisoning Centre at the Children's Hospital in Athens reported a steady increase by 32% of suicide attempts by poisoning from 1994 to 1999 in young people, females constituting three quarters (76%) of the cases [34]. Of all 5,619 suicide attempts by poisoning in the year 2007, 16.9% were made by young people aged 14–19 years.

The present study reports trends on self-reported suicide attempts by adolescents in Greece over more than 20 years, from 1984 to 2007. In this period the rate of self-reported suicide attempts doubled among adolescent students. The most important increase was noted between the surveys in 1998 and 2003, followed by a slight decline in 2007. Because of the lack of similar studies on trends in attempted suicide among adolescents in Europe, our data can be only compared to those from the National Youth Survey conducted on adolescent students in the USA. Those data showed no change in suicide attempts between 1991 and 2001, but a decrease between 2001 and 2007 [5].

The most important factor associated with suicide attempts during our 23-year period in Greece was gender. From 1984 to 2007 the rates of attempted suicide reported by females remained higher than those of males. Higher rates of suicide attempts among females than males is a stable finding of many surveys [6, 8, 19, 35]. However, our data showed that over the years gender differences have decreased markedly because the rate of attempts has quadrupled for males but only doubled for females. This resulted in a significant change of the female/male ratio from 5.34 in 1984 to 2.38 in 2007. Similar decreases in gender differences have been indicated by studies on hospitalised populations [24].

Apart from the gender influence, strong associations with suicide attempts were found for demographic

variables such as living in a single parent family, low paternal educational level (acting as proxy for the socio-economic status of the family) and living in the metropolitan areas of Athens and Thessaloniki. Interactions between these factors were not significant. Associations of suicide attempts with family disruption, lower socioeconomic status and living in highly urbanised areas have also been reported by other studies [9, 18, 23, 36–39].

Changes that have taken place in Greek society during the last 30 years may help to explain our findings. Young people's lifestyles have been increasingly influenced by western European countries as a result of the growth in travelling facilities and of technological advances in means of communication. This period has seen a growth of population, divorces have increased and the one-parent family became more common. Traditionally strong family ties are loosening. The participation of women in the labour force has become larger: for example, it grew from 30.9% in 1981 to 60.2% in 2001 in the 35–44 years age group [40]. An increasing number of adolescents do not live in an intact family with both their parents and probably do not enjoy the necessary warmth and sense of safety to the child that has been shown by many surveys to constitute protective factors against suicide attempts [8, 15, 17, 18, 35, 41–43]. Another factor that should be considered is increasing levels of drug abuse, which in the USA is regarded as implicated in the increase in suicides among young people [44]. One impact of the opening of Greece's borders with the countries of the former Eastern Bloc in 1990 was increased availability of illegal drugs compared to the previous decade, contributing to an increase in drug use among young people [29].

Because of these changes, young people of today live in an environment different from that of two decades ago. In addition, one also has to consider parental attitudes and expectations of their offspring. Parents invest heavily in their children's academic attainments, considered to be a passport to success. These achievement-oriented attitudes constitute a significant source of stress for young people in times where unemployment has become a major threat. Other surveys such as the EURO-BLCS [45] show that Greek students feel that their parents are very interested in their performance at school and results from the HBSC surveys show that students in Greece feel under pressure because of the demands of their school work to a greater degree than the average in Europe [46]. However, we were unable to identify evidence confirming that this perceived pressure has increased.

The finding of an increase in suicide attempts in adolescents in Greece is not in line with the figures on completed suicide, which do not show the same trend. A similar discrepancy has been observed in the USA, where suicide

attempts among adolescents rose from 7.3% in 1991 to 8.8% in 2001 although suicide deaths decreased in the same period [47]. The fact that the increase in suicide attempts in Greece is not paralleled by rates of completed suicide might be explained by the growth of health services during the last three decades which facilitate easier and more rapid access [48]. Improvements in family economic status and educational level further enhance the timely contact with health services which provide effective interventions towards those severe life-threatening attempts. Finally demand for the treatment of depression which constitutes a major risk factor for suicide attempts is facilitated through new medications and also by preventive interventions to reduce the stigma of mental illness in the country [49, 50].

Among the strengths of this study is that it is based on nationwide probability samples of students aged 14–18 years, across a rather lengthy period of time (23 years). The non-response rate was low. The same methodology was applied in all five surveys carried out during this period (1984, 1993, 1998, 2003 and 2007), which ensures valid comparisons across the years. Among the limitations is the self-report nature of the data on suicide attempts. To reduce possible biases from any reluctance to answer, great attention was paid to administering the surveys in a way that would increase the students' confidence in their anonymity. Studies of the validity of information related to sensitive data collected by self-report methods have concluded that it is higher compared to other methods [19, 21]. A possible limitation of the analysis is the nonavailability of a standardised measure of social class, for which we had no other proxy available than the educational level of the respondent's father.

Findings from this study can contribute to orienting prevention efforts towards vulnerable youth in a changing society. Although vulnerability is a complex phenomenon associated not only with sociodemographic and psychosocial but also with biological factors, a more thorough assessment of the psychosocial correlates of risk of suicide attempts (presence of mood disorders, other psychiatric disorders, substance abuse, family disruption) could assist timely interventions and reduce risks of self-harm behaviours and life-threatening acts. Psychosocial risk factors that are associated with suicide attempts in Greece will be examined elsewhere.

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