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ORIGINAL PAPER

Depressive Symptomatology in High School Students: The Role of Age, Gender and Academic Pressure

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Abstract To clarify the prevalence of depressive symptomatology in high school students in Athens and to evaluate risk factors for depressive symptomatology the CES-D scale was administered to 713 students (age 15–18). Demographic, school performance and extracurricular activities data were collected. A high prevalence (26.2%) of depressive symptomatology (CES-D cut-off score >28) was found. Regression analysis showed depressive symptomatology to be associated to gender (girls had higher scores than boys), school record (students with a better record had lower scores) and the interaction of gender and grade (males were found to have higher depressive symptomatology scores as they grew older).

Keywords Adolescence · Depressive symptomatology · High school students · Age · Gender · Academic pressure

Introduction

The boundaries between depression and "normal" mood fluctuations during adolescence are unclear and epidemiological studies show great variations in the rates of depression in this age group (Birmaher et al. 1996; Lewinsohn et al. 1994).

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Biological and social changes occurring during adolescence, also contribute to the feelings of depression and lack of satisfaction of the individual. As a consequence, the establishment of diagnostic criteria for the differentiation between "normal and pathological depression" is very difficult in adolescence (Rutter et al. 1976). Furthermore, the crisis of adolescence is a dynamic process whose evolution includes feelings of depression, but will normally lead to its resolution (Jeammet 1994).

According to the psychodynamic formulation normal development during this phase of life ("crisis of adolescence") includes depressive features, since the adolescent has to work through the symbolic separation from the parents, which requires severing of the ties attaching him/her to them, in order to face the new realities and requirements posed by adult life. The process of this separation goes through the same stages as any mourning procedure following the loss of an object (Braconnier 1987).

Because of this, much of the psychiatric formulations about adolescence are influenced by the view that youth is going through a period of severe discomfort and turmoil. The resulting difficulties in clarifying the various psychosocial phenomena and distinguishing them from authentic psychiatric symptoms make the epidemiological studies rather weak and potentially disputable.

For adolescents in a community sample the rates of clinically defined major depression ranged from 0.4 to 8.3% (Lewinsohn et al. 1994). In other studies the rates are considerably higher (even up to about 75%), mainly in those in which rating scales for depression are used. (Garrison et al. 1991; Madianos et al. 1993; Li et al. 2001; Chabrol et al. 2002).

This variability can be partially explained by the differences among studies regarding various rating scales or

full diagnostic criteria. Other methodological issues might be also responsible. For example, depression rates have been found to be considerably lower when parents answer the scales than the adolescents themselves (Rutter et al. 1976; Fleming and Offord 1990; Cantwell et al. 1997). On the other hand, adolescents avoid communicating their feelings to adults and they prefer to share them with peers (Offer et al. 1991).

Clinical studies and studies in the general population emphasize the increase of feelings of misery and depression during adolescence in both sexes but to a greater degree in girls. (Rao 2002; Wittchen et al. 1998).

Population differences might also play a role since it has been observed that adolescents with learning disabilities tent to score high in self-report depression scales (Huntington and Bender 1993).

Greek society is relatively small and less diverse (compared, for example, to the American) and shows more uniform cultural attitudes towards academic and educational matters. Since the 19th century, in Greece there is a strong tradition which overvalues University studies. As a consequence, there is a strong cultural component in Greek families to pressure their children during high school years in order to succeed in the National University Entry Exams, which are uniform throughout the whole country. This attitude is found across all socio-economic levels throughout the country. The fact that practically all students (>97%) take part in the national entry exams, when they end the high school education, is quite indicative. Thus, during the last 3 years of the Senior High School, which correspond to 10–12th grades in the American system, all students prepare for these exams. To this aim, in parallel to school classes, they usually receive extracurricular private tutoring, financed by the family. This extra economical burden contributes to high pressure for achievement which is reflected in the family's and society's expectations. It is characteristic that every year in early summer the national entry exams are the main issue that occupies Greek society (e.g. the names of the successful students gain publicity through all the kind of mass media). During the last two decades there have been several transformations of the University entry system which have led to increased difficulties instead of ameliorating them.

The purpose of the present study was to evaluate the presence of depressive symptoms in an adolescent population of senior high school students in Athens, Greece, through a self-completed questionnaire. Also, to examine the association of symptoms of depression and their severity with various demographic and socio-cultural factors, as well as with academic requirements, performance and school programme.

Materials and Methods

Subjects

Our population consisted of 713 (396 girls and 317 boys, age 15–18) adolescent students out of a total 753. Forty (5.3%) students refused to participate to the study, due to time restriction, since the questionnaires were distributed after the end of the programme. The students were on Grades 1–3 of senior high school (SHS) of the Greater Athens Metropolitan Area (Fig. 1). The subjects included all student population of three state-run senior high schools. This sample was chosen since these three schools represent the different academic tracks and school schedules. Two of these schools were general education institutions (GE1 and GE2), while the third was a technical one (TE). Students of general education schools are required to take part in the national baccalaureate exams (National University Entry Exams) at the end of both the second and third grade in order to succeed their entry to the Universities; students following technical education, also take part in national-level exams, but these are much easier, with considerably less competition, and lead to a polytechnic type of technical higher education. The sample of schools was selected to reflect the proportion between the two different types of SHSs in Athens and other major urban areas in Greece. At the time of the research there were 129 general education (GE) and 85 technical education (TE) SHSs with 28,045 and 22,450 students respectively

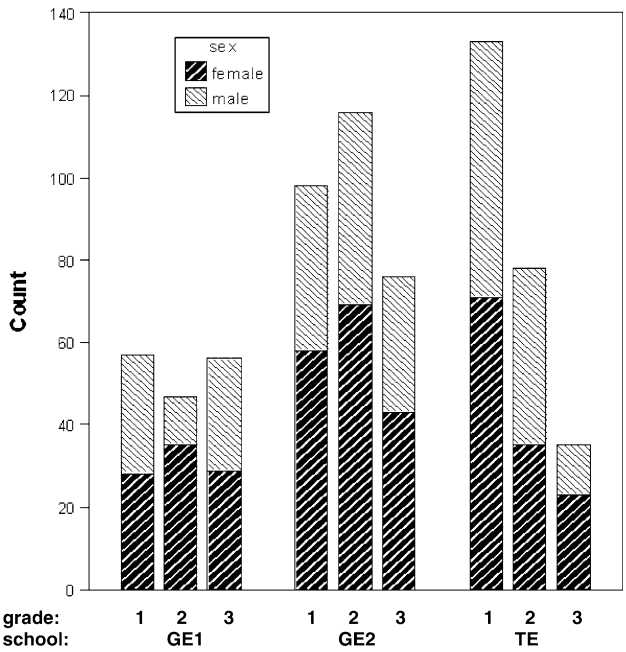

Fig. 1 *Barchart* of study population per school, grade and gender

(National Statistical Service of Greece 2007). Accordingly, our sample consisted of 2 GE/1TE SHS with 466 and 247students respectively.

Assessment

Self-administered questionnaires were distributed by a social worker or a psychologist with the help of teachers to all students of the three grades of the participating schools during morning classes, around the middle of the school year. For this study we obtained approval by the Ethics Committee of our Hospital as it is required for any research initiative.

A week before the administration of the questionnaires to the students a letter was distributed to their parents by their teachers, in which there was an explanation of the purposes of the study and their agreement was asked, that their children participate in it. Also the investigators informed the students on the nature of the questionnaires and that the purpose of the study was to assess aspects of mental health and psychological characteristics in conjunction with academic requirements. It was stated to the students that the participation to the study was voluntary. Around 45 min were required to complete the whole questionnaire.

The questionnaire had an introductory part in which the following personal and family data were recorded: school, grade, gender, living with none, one or both parents, birth order and number of siblings, parental education level, time spent per week in school-related (tutorials, courses etc.) and extracurricular (sports, music etc.) activities, and school records in the previous year (categorised as 0–5 with 0 = very bad and 5 = excellent student). School records consisted of the systematic description of academic achievement separately for each subject (e.g., mathematics, language, physics) during a three-month period. The teachers recorded the grades and the information was subsequently recorded by the researchers.

For the assessment of depressive symptomatology the CES-D (center for epidemiological studies-depression) was administered. This scale consists of 20 items to be answered in a Likert-type fashion. The score of each item ranges from 0 (never or rarely) to 3 (usually/most of the time); for four items the scoring is reversed. The total score of the scale ranges, thus, from 0 to 60. In the present study we used the translation of the CES-D, which was used in the past among Greek adolescent and young adults (9). Although various cut-off scores, have been proposed for the evaluation of depressive symptomatology by the CES-D in adolescents (Garrison et al. 1991; Madianos et al. 1993; Li et al. 2001; Chabrol et al. 2002; Rushton et al. 2002; Vickers et al. 2003) we used cut-off score of 28 to categorise the subjects into groups with and without depressive symptomatology, as suggested by stratum-specific likelihood ratio analysis (Yang et al. 2004).

Statistical Analysis

Comparisons of mean CES-D values among student groups were statistically evaluated through *t*-tests and ANOVAs as appropriate, while the association of CES-D score with demographic characteristics, family structure and school record were assessed by multiple regression analysis. All predictor variables were entered in the model by the ENTRY option. Finally, parametric correlations of depressive symptomatology score with time spent in curricular and extra-curricular activities were performed. All *P* values reported are two-tailed. Statistical significance was set at $P \leq 0.05$ and analyses were conducted using the SPSS statistical software (version 12.0).

Results

The mean score of CES-D (±SD) was 22.23 ± 11.01 (range 0–60, median 21); 24.52 ± 11.34 for female and 19.13 ± 9.94 for male subjects. The difference between males and females was statistically significant ($t = 5.979$, $df = 581$, $P < 0.001$). Mean values of CES-D scores by school and class schedule, grade, and gender are presented in Table 1.

There were no significant differences between mean CES-D values by the three schools ($F = 1.324$, $df = 2$,

Table 1 Total score of CES-D (mean ± S.D.) of Greek adolescent students according to school schedule, school, grade and gender

School	Grade	Male	Female	Total sample
GE1	1	15.1 ± 9.4	23.4 ± 9.5	20.0 ± 10.3
	2	19.1 ± 8.9	25.3 ± 11.0	23.0 ± 10.6
	3	22.2 ± 10.1	20.2 ± 11.1	21.1 ± 10.7
GE2	1	18.8 ± 11.9	24.4 ± 9.6	21.6 ± 11.0
	2	16.9 ± 9.0	28.3 ± 12.0	25.4 ± 12.2
	3	21.0 ± 13.4	20.4 ± 10.5	20.7 ± 11.8
TE	1	19.3 ± 8.9	27.5 ± 13.0	23.7 ± 11.9
	2	20.0 ± 8.0	26.9 ± 12.9	23.1 ± 11.0
	3	21.0 ± 10.2	21.4 ± 8.8	21.4 ± 9.0
Means	GE1	18.5 ± 9.7	23.4 ± 10.7	21.4 ± 10.5
	GE2	19.3 ± 12.0	24.6 ± 11.2	22.4 ± 11.8
	TE	19.6 ± 8.5	26.3 ± 12.4	23.1 ± 11.2
	1st grade	17.7 ± 10.0	25.2 ± 11.1	21.8 ± 11.2
	2nd grade	19.1 ± 8.4	26.5 ± 11.6	23.5 ± 11.0
	3rd grade	21.6 ± 11.4	20.5 ± 10.3	21.0 ± 10.8
Total		19.1 ± 9.9	24.5 ± 11.3	22.2 ± 11.1

580, $P = 0.267$), the three grades ($F = 2.458$, $df = 2, 580$, $P = 0.086$) or when each grade in each school was considered separately ($F = 1.464$, $df = 8, 574$, $P = 0.167$).

Taking into account the cut-off score of higher than 28, 26.2% of the students (33.7% of females and 16.1% of males) could be considered as having depressive symptomatology. When a cut-off of 16 or more was tried, the 74.6% of our population presented with depressive symptomatology, while this percentage was 39.1% for a cut-off score of 24 or higher and 1.7% for a cut-off score of 48 or higher.

When multiple linear regression analysis of the factors potentially influencing CES-D score was performed, CES-D score was found to be associated to sex ($b \pm SE = 5, 42 \pm 0.92$, $P < 0.001$) and school record (being less for students with a better record), while there was no significant influence of grade, number of parents living with the student, birth order and parental education. The interaction of gender and grade however was significant, with males having higher CES-D scores as they grew older. Furthermore to examine the impact of depressive symptomatology on the time spent for curricular and extracurricular activities, the correlation between CES-D total score and hours spent weekly in such activities was explored. CES-D score was negatively associated with the hours spent in extracurricular activities, especially in sports and in computer-related activities. No statistically significant correlation was found with time spent in activities related to arts, other extracurricular activities private or group tutorials, foreign language courses and total time spent in curricular activities. (Table 2).

Table 2 Multiple linear regression of CES-D total score from gender, grade, number of parents living with the adolescent ("Parents"), birth order, school record, father education, mother education, and time spend in school-related and extracurricular activities (SRA and ECA, respectively)

	Beta ± S.E.	*P*
Gender (0 = *M*, 1 = *F*)[a]	5.250 ± 0.950	0.001
Grade[a]	−0.347 ± 0.604	0.566
Parents	−1.065 ± 1.041	0.307
Birth order	−0.018 ± 0.464	0.969
School record	−1.013 ± 0.474	0.033
Father education	−0.166 ± 0.425	0.696
Mother education	−0.416 ± 0.467	0.373
SRA	0.010 ± 0.065	0.877
ECA	−0.028 ± 0.037	0.458

[a] The interaction of grade and gender was also significant ($F = 11.150$, $df = 1$, $P = 0.001$ in univariate analysis of variance based on general linear model with all the above plus the interaction as independent variables)

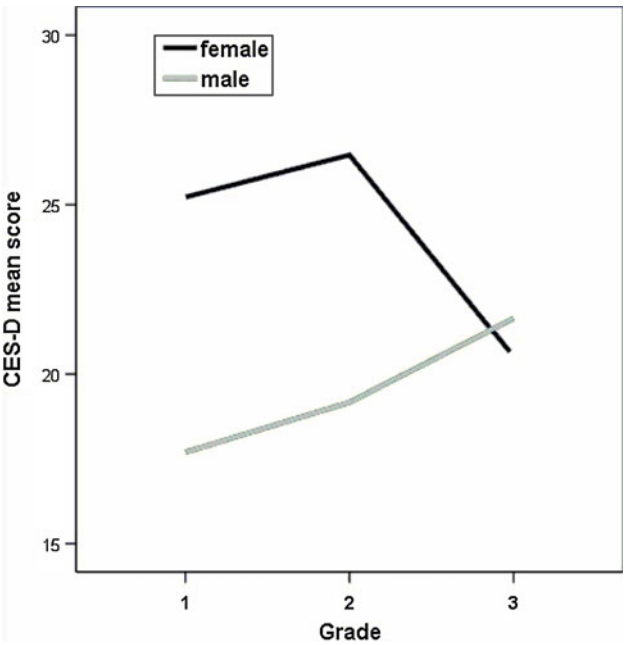

Fig. 2 CES-D mean score by grade in male and female students

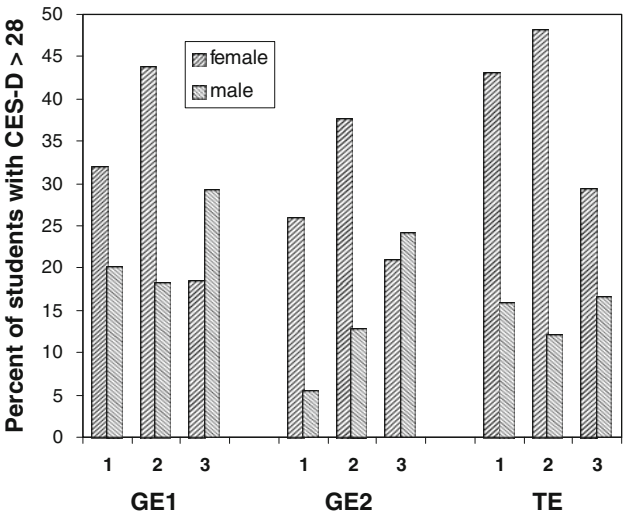

Fig. 3 Percentage of students with CES-D score grater than 28 per school (GE1, GE2, TE), school grade (1, 2, 3) and gender

In Fig. 2 is presented the CES-D mean score by grade in male and female students and in Fig. 3 the percentage of students with CES-D score greater than 28 per school (GE1, GE2, TE), school grade (1, 2, 3) and gender.

Discussion

The CES-D, a self-administered questionnaire assessing depressive symptomatology, was administered to 713 adolescent students (age 14–18) of Athens SHSs. When

using a diagnostic cut-off score of higher than 28 in the CES-D, a rather high proportion (26.2%) was found to suffer from depressive symptomatology. This proportion might had been considerably higher (about 75%) if the cut-off score was set at a value greater than 16, which was used in a study on a similar population in Greece about 15 years ago (Madianos et al. 1993).

Our findings are in agreement with a study in American students 74.5% of whom could be considered as having "clinical depression" for a cut-off score of 16 or more and 42.9% for a cut-off score of 23 or more (Li et al. 2001). Two other studies on adolescents have found lower rates of depression: using a cut-off score of 24 or more in a French sample, Chabrol et al. (2002) report a rate of 24.2% for females and 9.9% for males, while Rushton et al. (2002) had found lower rates (9%) using a similar cut-off score on American population. In general however, depression rates and mean CES-D scores vary considerably among studies in which this instrument was used on adolescents (Poulin et al. 2005).

These differences possibly reflect inherent problems with the diagnostic validity of the CES-D. Actually, if the originally proposed cut-off score of 16 is to be chosen to diagnose depression in adolescents, the rates for the disorder found in this and other studies should be considered as reflecting a "public health crisis". This scale is an old instrument, not keyed to DSM diagnostic criteria, and its ability to screen for various DSM disorders is limited (Roberts et al. 1998).Thus, it is considered that a single cut-off point for CES-D cannot be used as a reliable method for case ascertainment (Roberts et al. 1991). So, we could not claim that the rates of depressive symptomatology, which we found using the specific cut-off score (>28), reflect the percentage of clinical depression in our population. Some of the symptoms reported may rather reflect mood fluctuations or feelings of unhappiness related to adolescence crisis than to depression.

Thus, our findings could not be interpreted as reflecting psychiatric morbidity but rather a general expression of suffering and distress most probably aggravated by the academic pressure related to national entry exams. Even if this is the case, it has been strongly supported that depressive symptoms in adolescence are quite important risk factors for the development of major depressive disorder (Georgiades et al. 2006).

The difference between the rates found in our study and in the previous one in the Greek population (Madianos et al. 1993) could be explained by a number of hypotheses. First, depressive symptomatology rates could have been underestimated in that study. Findings from another study, which was conducted on 1,080 students of similar age to those in our study, using the 14-item DSSI/sAD (delusion symptoms states inventory/states of anxiety and depression) questionnaire, showed that 33.4% of males and 60.6% of females suffered from depression (Angelopoulos and Economou 1994). Second, it is possible that the rates of depressive symptomatology among Greek students are on the rise during the last years. Third, it might be that, while depressive symptomatology is not rising, there is a different attitude among students in nowadays towards questionnaires. It seems that are more keen to report personal feelings now than in the past. The widespread use of questionnaires concerning psychological issues, as well as the increase understanding, among medical practitioners and the general population, of the importance of depression might have influence this trend. Actually, in one study with the CES-D, it was found that its availability to clinicians of a mental health service was associated with a 2–8 fold increase in the frequency of the diagnosis of depression among adolescents (Rey et al. 2002).

It is pointed out by several studies that girls have higher rates of depression than boys during adolescence (Pataki and Carlso 1995; Takakura and Sakihara 2000). A surprising finding in our study was that girls' depressive symptomatology scores were higher in the first and second grade and showed a tendency to decrease in the third. For boys, conversely, while depressive symptomatology scores were lower in the two-first grades, they became higher in the third. Possible explanations for this finding may include: (a) there is a higher pressure for academic achievement to the boys than girls, particularly manifest during the last year before the national entry exams. This hypothesis coincide with the fact, that in the technical education school, depressive symptomatology scores of males, in the last year of their studies, was not higher of those of females; (b) the mean girls' performance in school was higher than that of boys (2.82 ± 0.96 for boys *vs.* 3.10 ± 1.04 for girls, $t = 3.689$, $df = 691$, $P < 0.0003$). This might signify that girls were better prepared to face the demands of the exams than boys and less distressed because of this; (c) there were less girls in the third grade. It could be explained by the fact that girls who do not perform well at school and are in higher risk to show depressive symptomatology had drop out. Since for social reasons it is less appropriate for boys than for girls to leave school before the completion of their studies; and (d) there are factors related to biological and psychological differences between the two sexes which contribute to the different rates of depressive symptomatology of the different sexes in the different psychosexual developmental phases. This is supported by Angold's et al. (1998) study on students 9–16 years old. They found that boys had higher depression rates than girls before the middle of adolescence and from there on girls started to present with more depressive symptomatology.

In a recent study by Wright et al. (2004) depression was find to be higher among adolescents coming from families

with a lower income; we did not collect data on household income but in our sample depressive symptomatology scores were not correlated with parental education at a statistically significant level. Similarly we did not find any correlation with the number of parents living at home, contrary the O' Farrell's study (2005) in which was found that to be from a single parent family it is a risk factor for presenting depression during adolescence.

Finally, the finding of our study, that higher depressive symptomatology scores were associated with less time spent in various activities, is in agreement with two other studies. In the one it is reported that the group of adolescents, who scored above the clinical cut-off point of the CES-D, spent less time doing homework, had a lower grade point average and spent less time exercising (Field et al. 2001). In the other it is claimed that having low physical activity is a risk factor for depression in adolescence (Goodwin 2006).

Clinical implications

Based on the findings of the present study depressive symptomatology in general appears to be frequently present among high-school students. It is an established fact that individuals who experience clinical depression during adolescence are in increased risk of recurrent episodes, other forms of psychopathology, suicidal risk and long-term psychosocial impairment in adulthood (Lewinsohn et al. 1993). Recently there has been growing interest in the theoretical and clinical significance of subthreshold depression (the presence of clinically significant depressive symptoms, but below the required number to warrant a proper diagnosis of MDD). Consistent with the literature in adults, adolescents with subthreshold depression are at elevated risk of developing MDD, substance use and anxiety disorders (Georgiades et al. 2006; Anderson and Mc Gee 1994).

Our results suggest that CES-D is simple and easy to use, and could be useful in the screening of subthreshold depression in adolescents. This is important as a preventive measure concerning mental health of adolescents.

The second implication of our study relates to the impact of academic pressure related to the national entry exams on the psychological status of students, especially boys. The consequences of this must be considered when educational system plans are developed.

Limitations

Our convenience sample was limited to an urban population of students. The schools were located in middle-class neighborhoods. Not all the multitude of other factors (temperament, various socio-cultural factors, parental expectations etc.), which may influence development of psychopathology could be assessed trough the interviewing method of this research. In addition, the self-reporting nature of scales and the questionnaire used may have an impact on the results. Finally it is acknowledged that CES-D cannot be considered as a diagnostic instrument, but rather a measure of depressive symptoms.

Conclusions

A relatively high number of adolescent students in Greek schools can be considered as having significant depressive symptomatology. The higher depressive symptomatology score in girls is consistent with existing literature. The fact that boys have higher depressive symptomatology scores in the last grade of high school may be an indication of the higher pressure for academic achievement imposed by the family and the educational system on them.

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