

## 1: Depression in late adolescence: a cross-sectional study in senior high schools in Greece

*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 students (age ).

Received Nov 16; Accepted Aug This article has been cited by other articles in PMC. Abstract Background Depression is a common mental health problem in adolescents worldwide. The aim of the present study was to investigate the prevalence, comorbidity and sociodemographic and socioeconomic associations of depression and depressive symptoms, as well as the relevant health services use in a sample of adolescents in Greece. Methods Five thousand six hundred fourteen adolescents aged 16–18 years old and attending 25 senior high schools were screened and a stratified random sample of 2, were selected for a detailed interview. The use of substances, such as alcohol, nicotine and cannabis, and several sociodemographic and socioeconomic variables have been also assessed. Results In our sample the prevalence rates were 5. Anxiety disorders, substance use, female gender, older age, having one sibling, and divorce or separation of the parents were all associated with depression. In addition, the presence of financial difficulties in the family was significantly associated with an increased prevalence of both depression and depressive symptoms. Conclusions Prevalence and comorbidity rates of depression among Greek adolescents are substantial. Only a small minority of depressed adolescents seek professional help. Significant associations with financial difficulties are reported. Electronic supplementary material The online version of this article doi: Background Depression is one of the leading causes of disease burden and disability across all age groups [ 1 ] and a major risk factor for suicide, substance abuse and serious social and educational impairments [ 2 – 4 ]. Although adolescents are often considered as a healthy population, they appear to be particularly vulnerable to depressive disorders [ 5 ]. Prevalence rates in childhood are low with no gender differences [ 6 ] and then increase significantly in adolescence, while gender differences emerge [ 7 , 8 ]. During the last decades the prevalence of depression in adolescence appears to have increased in the most recent birth cohorts [ 13 ]. Although it is not yet clear if this is due to a pure rise in the prevalence of the disorder or if it can be at least partially attributed to methodological problems, the World Health Organization reports a rise in the burden of depression globally and a World Health Assembly resolution in May called for a coordinated response to mental disorders at country level [ 14 ]. In Greece there has been limited research on the epidemiology of depressive disorders in adolescence. A recent study, which investigated depressive symptomatology in Greek adolescents attending senior high schools, reported a prevalence rate of An earlier study has also shown high prevalence of depressive symptoms in adolescents aged 12–17 years old [ 16 ]. In the same study, younger age was identified as a risk factor for major depression in the Greek population [ 17 ]. However, it is worth noting that the above mentioned study was a telephone survey. Another study of Greek adults, which has implemented a different sampling procedure and has used a fully structured psychiatric interview, reported a lower prevalence rate of depression, which increased with age [ 18 ]. Depression in adolescence shows substantial comorbidity with anxiety and substance abuse disorders and this finding has been well established through various studies [ 19 ]. Another common finding regarding adolescent depression is the relatively low use of health services, despite the high prevalence and disability associated with the disorder. Health services utilization appears to be even lower in cases of non-comorbid depression [ 20 ]. Regarding the correlates of depression, beyond the well established sociodemographic factors of age and gender, socioeconomic factors are also important. A socioeconomic gradient in adolescent depression has been documented in both the United States and Europe. Similarly to findings reported by studies in adults [ 21 ], lower socioeconomic status has been correlated with a greater prevalence of depression in adolescents [ 22 ]. Greece has recently entered a long period of economic crisis with fundamental adverse effects on many areas of the life of the population. Our study took place during the years and just before the eruption of the financial crisis. We therefore consider as important the investigation of some significant mental health aspects of Greek adolescents during the crucial period that preceded the onset of the current socioeconomic crisis. The study was approved by the Ethical committee of the Ministry of Education and the Greek Educational Institute and was conducted according to the Helsinki

declaration. The study was also approved by the Head of each participating School. All students in the selected schools were invited to participate in the study, while the participation was voluntary. Consent was actively obtained from both the students and their parents. Secondary education in Greece is distinguished into lower secondary grades 7â€™9; ages 13â€™15 years; attendance is compulsory and upper secondary grades 10â€™12; ages 16â€™18 years; attendance is not compulsory. At the time of the design of the study approximately 75, students attended 1, senior high schools in Greece. Sampling of schools and pupils Schools were selected according to the following rules: A total of 25 schools took part in the study. The mean number of participants per school was pupils ranging from to The main fieldwork took place between January and April Design of the study and data collection procedure The study used a two-phase design [ 24 ]. The screening instrument of the first phase was developed from the revised clinical interview schedule CIS-R used in the second phase of the study. Students were selected for the second phase psychiatric interview using a stratified random sampling procedure according to the scores on the screening questionnaire: It is noted that in two schools both in the island of Paros all consenting students were interviewed that is the two phases were merged into one. The reason was the availability of the fieldworkers of the island of Paros, which allowed us to provide the instrument of the CIS-R interview in full to all consenting students. From the remaining 1, pupils who were selected according to the stratified random sampling procedure, Four out of the 2, selected pupils had missing values on the sociodemographic questions administered in the first phase of the study and therefore 2, pupils were used in the final analysis. Assessment of psychiatric morbidity: The CIS-R was the main instrument used in the national psychiatric morbidity surveys in the UK [ 26 ] and has been used in several other similar surveys around the world. A computerized version has also been developed and found to be comparable with the regular interview [ 27 ]. Two screening questions in each section ask about the presence of the symptom during the past month and then there is a more detailed assessment of the presence, frequency, duration and severity of the symptom during the past seven days. Based on the above-mentioned characteristics of the symptoms each one of the 14 symptoms is rated with an individual score on a scale ranging from 0 to 4 except depressive ideas scored from 0 to 5. In the first phase of the study we used the screening questions of the several symptom sections of the CIS-R. The full interview was taken by those students selected for the second phase of the study. Additional questions enable the application of the International Classification of Diseases â€™ 10th edition ICD research diagnostic criteria for common mental disorders including depressive episode, phobic disorders, generalized anxiety disorder, panic disorder and obsessive-compulsive disorder using specially developed computerized algorithms. The psychometric properties of the Greek version of the CIS-R including its factor structure and internal consistency have been reported by Skapinakis et al. Assessment of depressive episode and depressive symptoms As mentioned above, there are two depression-related sections in the CIS-R: More detailed questions ask about the frequency and intensity of these symptoms. Additional questions throughout the remaining CIS-R sections enable the application of ICD diagnostic criteria for depressive episode. For the purposes of the present paper we defined a single variable for depressive episode, which includes all severities of depressive episodes according to ICD mild, moderate, severe. The reason was that we expected very low prevalence rates of the more severe types of the disorder, since our sample were active pupils able to attend school. Socioeconomic and sociodemographic variables Information about several sociodemographic and socioeconomic variables was obtained from the students in the first phase of the study. Students were also asked to subjectively rate their academic performance in school on a 4-point scale excellent, very good, good, fair. In Greece, where typical 16â€™18 years-old adolescents have not yet entered the labour market, neither have they completed their education, own educational level or occupation cannot be used as a measure of personal social position. Academic performance in school has been often used in the literature as a measure of the social position of the pupils in school [ 30 â€™ 32 ]. Further, adolescents were asked to rate their relationship with mother and father excellent, very good, good, fair, bad. The specific question asked was: Other variables We obtained information about the use of health services in the second phase of the study. A second similar question followed, asking about doctor consultations specifically for a psychological reason. Additionally, we have investigated the use of substances, such as alcohol, nicotine and cannabis. For the purposes of the present

paper we have defined frequent alcohol use as the consumption of hard liquor at least once weekly, smoking as smoking cigarettes daily and cannabis use as having tried cannabis at least once in their life. To take into account the potential effect of clustering of our data since adolescents were nested into 25 schools we first carried out a two-level logistic model level 1: We also performed the models with the survey commands of Stata using school as the stratum. Results were very similar with both models and therefore in the paper we present the results using the survey commands because their use is more widespread in the literature. In all analyses we have used probability weights to take into account the stratified random sampling procedure. The associations between health measures and sociodemographic and socioeconomic variables were investigated using logistic regression models. We used two dependent variables: For each dependent variable we have initially calculated odds ratios adjusted only for age and gender and then odds ratios adjusted additionally for all other variables. Comorbidity was investigated using odds ratios calculated from logistic regression models, where the comorbid condition was the dependent variable and depression either yes or no the independent variable. Using similar models we investigated the use of health services. For the purposes of the latter analysis we have created a variable for depression with three values: A detailed table of the sociodemographic characteristics of the whole sample in both phases of the study is given in Additional file 1: Due to the stratified sampling procedure there were more female than male students in the second phase. Having concurrent depressive symptoms only Table 1 Prevalence of depressive disorders in 16–18 years-old adolescents in Greece, by gender Total.

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In the total sample, self criticism, agitation, and loss of energy had the highest scores. In the male subgroup, loss of energy, self criticism, punishment feeling and agitation had the highest score while in the female subgroup, self criticism, agitation, and crying had the highest scores. The lowest scores, in the total sample and in both of the male and female subgroups, were for loss of interest in sex, suicidal thoughts or wishes, and self dislike. Female students had significantly higher scores than male students for the items sadness, punishment feelings, self criticism, crying, agitation, indecisiveness, loss of energy, changes in sleeping pattern, and concentration difficulty while male students had significantly higher scores than female students for the items loss of interest in sex, and loss of interest. According to the BDI factor analysis for the total sample, the first unrotated factor accounted for 41.2% of the variance. When we considered loadings greater than 0.5, Factor 1 represents the cognitive-affective dimension, while factor 2 represents items more related to a somatic nonspecific dimension. Principal component analysis with varimax rotation showed that the factors were related to the following items: Factor 1: self criticism, agitation, loss of energy, crying, and loss of interest. Factor 2: loss of interest in sex, and loss of interest. Among examined risk factors for depression, significant factors in bivariate analysis were: In Multivariate analysis Females were 1. First birth order students and those in between birth order between first and last were less likely to have depression than last birth order students. Students with history of psychiatric illness were 7. Families with history of chronic diseases were 2. The prevalence of depression was significantly higher among students with a history of loss of relative than among those without history of relative loss. Depressed students showed no significant differences from non-depressed students as regards number of brothers. The combined effect of the five most significant variables, i. They jointly contributed 15.2% of the variance. Discussion Many researchers believe that mood disorders in children and adolescents represent one of the most under diagnosed group of illness in psychiatry. This is due to several factors: Although it is not designed for diagnostic purposes, its epidemiologic utility has been evaluated in several studies, which concluded that it is a reliable and valid instrument for detecting depressive disorders in non-clinical populations. Comparable findings have been reported by others; the study of Minnesota high school students revealed that 39 percent suffer from mild to severe depression and nine percent of high school students are severely depressed. Instead, the biological, psychological, and social systems may be considered within a larger framework for explaining the etiology of depression. The sex differences found in BDI scores, pointing to significantly higher scores for female subjects 1. The interaction of genetics and environment are strongly implicated in the onset of MDD. Kandel et al reported that Adolescents with depression are also likely to have a family history of depression. In our study, it was found that Parental loss among adolescents less significant than the effect of relative loved one loss and this may be unique in this kind of cultures and may be due to the predominance of extended families and remarriage. Wells et al,<sup>35</sup> reported that loss of a parent or loved one is one of the important risk factor for developing depression among adolescents and this finding is in agreement with our finding. In agreement with another study, 19 high school students revealed that Serious illness or injury of family member is one of the most common risk factor for developing depression among adolescents. It is reported that siblings play a role in the development of depression, as problematic sibling relationships have been associated with greater depression, and a positive sibling relationship may mediate depression. The study of Minnesota high school students revealed that trouble with brother or sister is one of the most common risk factor for developing depression among adolescents. It is found in our study that their effect is minimal and this may be explained on the basis of that most of the adolescents are sharing the social circumstances that lead to dissolve its stigmatizing effect and also and more important that it is well accepted form the religious and culture point of view. Conclusively, since many different factors can lead to psychopathology for different individuals and the etiology of a given disorder is perhaps best understood by looking at the interaction or transaction between these multiple variables over time. Research suggests that women more frequently present

with somatic symptoms of depression i. In our study total sample, self criticism, agitation, and loss of energy had the highest scores. Similarly, Weiner, ,41 reported that early adolescents are more apt to exhibit the following triad of symptoms: This is accepted form the cultural point of view due to the authoritarian effect of society with its burden on people in general and on adolescent in particular. This authoritarian effect takes different patterns such as religion, family and school teachers. This also can explain the increase level of punishment feeling and somatizatoin level loss of energy and agitation among both sexes that allow less expression of feeling in appropriate way. The increase level of sadness and crying in female group than in male group could be explained by the fact that crying is more accepted among females than males as in males it means weakness of their personalities. This finding also reported in different studies. Conclusively, our results indicate a high rate of depression among high school students. Also findings provided gender differences in the prevalence and presentation of depressive symptoms. The findings suggest that the experience of a stressful life events increase the risk of depression. Assessment using screening is recommended. The increased risk for the onset of depression in adolescents reinforces the importance of early recognition and intervention. Acknowledgments The authors would sincerely like to thank Miss Randa, Psychologist at Al-Hada Armed Forces hospital, for her assistance in data collection. Thanks are also due to the schoolteachers involved in the study and to Dr. Beck Depression Inventory mean and SD scores according to sex.

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