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The prevalence and socio-demographic correlations of depression, anxiety and stress among a group of university students

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Abstract *Background* The mental health of university students is an area of increasing concern worldwide. The objective of this study is to examine the prevalence of depression, anxiety and stress among a group of Turkish university students. *Methods* Depression Anxiety and Stress Scale (DASS-42) completed anonymously in the students' respective classrooms by 1,617 students. *Results* Depression, anxiety and stress levels of moderate severity or above were found in 27.1, 47.1 and 27% of our respondents, respectively. Anxiety and stress scores were higher among female students. First- and second-year students had higher depression, anxiety and stress scores than the others. Students who were satisfied with their education had lower depression, anxiety and stress scores than those who were not satisfied. *Conclusions* The high prevalence of depression, anxiety and stress symptoms among university students is alarming. This shows the need for primary and secondary prevention measures, with the development of adequate and appropriate support services for this group.

Key words DASS-42 – depression – anxiety – stress – university students – Turkey

Introduction

Just as all young adults, undergraduate students need to cope with psychological and psychosocial changes

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that are connected to the development of an autonomous personal life. In addition, students have to cope with the academic and social demands that they encounter in university studies and in their preparation for professional careers. Therefore, the period of undergraduate education is a sensitive period in an individual's life span, and this period is regarded by many as important for developing systems and intervention methods that may prevent or reduce mental problems [13].

Evidence that suggests that university students are vulnerable to mental health problems has generated increased public concern in Western societies [27]. Previous studies suggest high rates of psychological morbidity, especially depression and anxiety, among university students all over the world [1, 19, 20, 28, 30, 32, 33].

Psychological morbidity in undergraduate students represents a neglected public health problem and holds major implications for campus health services and mental policy-making [22, 26, 28]. In terms of life quality, understanding the impact of this neglected public health phenomenon on one's educational attainment and prospective occupational success is very important.

In Turkey, epidemiological data about psychological morbidity among undergraduate students are not well-known. Although some recently performed studies suggest high rates of depression and anxiety [2, 7, 21], the sample sizes of these studies were rather small (259, 504 and 170, respectively), and other measurement methods (General Health Questionnaire & Beck Depression Inventory) instead of DASS were used.

The aim of our study was as follows:

1. To investigate the prevalence of elevated psychological distress among Turkish undergraduate students by using the DASS-42 instrument and compare the findings with international studies, especially with those that used the same instrument.

2. To describe differences in elevated psychological distress with respect to the demographic variables of age, gender, parents' economic situation, studied major and residency.

Materials and methods

■ Participants

Approval for the study was given by the institutional review committee. All participants were recruited directly in their respective classrooms during the second week of the academic year. Their teachers were asked to make 15 min of their course time available for completion of the questionnaires. Verbal informed consent was obtained, and students willing to participate filled out the questionnaires. Since students replied anonymously, it was clear that they would not face any repercussions if they decided not to participate. Due to this recruitment methodology, the response rate was not determined.

A total of 1,617 students at the Uludag University in Bursa, Turkey, filled out the Turkish version of 42-item Depression Anxiety and Stress Scale (DASS) and a questionnaire prepared by the authors concerning their socio-demographic details.

■ Instrument

The DASS is a self-administered instrument with well-established psychometric properties in clinical and community samples, and has been shown to differentiate between the three states of depression, anxiety and stress [3, 6, 8, 10, 17, 18]. The depression scale assesses dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest or involvement, anhedonia and inertia. The anxiety scale assesses autonomic arousal, skeletal muscle effects, situational anxiety and subjective experience on anxious effects. The stress scale is sensitive to levels of chronic non-specific arousal. The scale assesses difficulty relaxing, nervous arousal and being easily upset or agitated, irritability or over-reaction and impatience [10, 18]. The Turkish version of DASS was constructed by Uncu et al. [31], and used in a study of a non-clinical sample. The reliability coefficients (Cronbach's alpha) of the Turkish version of DASS-42 in our study were found for depression, anxiety and stress to be 89.1, 82.6 and 85.9%, respectively.

Statistical analyses were conducted with the SPSS version 11.5 for Windows (SPSS Inc., Chicago, IL, USA). Correlation, regression analyses, *t* tests and variance analyses were performed to compare differences in DASS scores between different student groups.

Results

The total number of participants was 1,617. Of these, 718 (44.4%) were male. The mean age of the participating male students was 20.7 years (SD = 1.7), and the mean age of the female students was 20.3 years (SD = 1.6). All of the participating students were single. Forty-one percent of the study group reported that all of their study expenses were covered by their families. Other responses were as follows: family earnings and scholarships or grants combined (49.6%), scholarships (3.2%), own earnings (4.5%) and family earnings, own earnings and scholarships combined (1.7%). According to the students, their families' economic situations were as follows: 29.2%

good, 64.3% moderate and 6.1% poor. Regarding their parents' educational situation, the distribution of the students was as follows: fathers' education—no school diploma 2.1%, primary school 27.8%, high school 33.7% and higher education 36.5%, and mothers' education—no school diploma 7.7%, primary school 41.6%, high school 31.1% and higher education 19.6%. Students reported a broad range of different majors: 230 (14.2%) studied medicine, 200 (12.4%) science (biology, physics, chemistry and mathematics), 148 (9.1%) theology, 410 (25.3%) political sciences and economics, 228 (14.1%) engineering, 103 (6.4%) veterinary medicine and 100 (6.2%) agriculture. Fifty-four percent of the participants were in their first or second years of their studies. None of the students reported previous psychiatric illness.

The mean depression, anxiety and stress scores for all, male and female students, respectively, are presented in Table 1, while Table 2 reports on the severity distribution of depression, anxiety and stress scores based on score ranges from the DASS manual.

Table 1 Mean depression, anxiety and stress scores in the present survey and published non-clinical studies

Study	Sample size	Subscale	Mean (SD)	Severity
Present study	1,617	Depression	10.03 (6.88)	Mild
		Anxiety	9.83 (5.94)	Mild
		Stress	14.92 (6.71)	Mild
Male	718	Depression	9.91 (7.09)	Mild
		Anxiety	9.37 (6.03)	Mild
		Stress	14.29 (6.82)	Normal
Female	899	Depression	10.13 (6.72)	Mild
		Anxiety	10.21 (5.84)	Mild
		Stress	15.41 (6.57)	Mild
Wong et al.	7,915	Depression	8.66 (7.54)	Normal
		Anxiety	9.36 (6.42)	Mild
		Stress	13.97 (8.15)	Normal
Taouk et al.	729	Depression	5.35 (6.42)	Normal
		Anxiety	6.54 (5.72)	Normal
		Stress	11.17 (7.07)	Normal
Lovibond and Lovibond	2,914	Depression	6.34 (6.97)	Normal
		Anxiety	4.70 (4.91)	Normal
		Stress	10.11 (7.91)	Normal
Crawford and Henry	1,771	Depression	5.55 (7.48)	Normal
		Anxiety	3.56 (5.39)	Normal
		Stress	9.27 (8.04)	Normal

Table 2 Severity distribution (%) of DASS scores among students

Subscale	Students	Normal	Mild	Moderate	Severe	Extremely severe
Depression	All	51.8	21.2	19.0	6.1	2.0
	Male	51.4	22.6	17.7	6.3	2.1
	Female	52.2	19.9	20.1	5.9	1.9
Anxiety	All	40.2	12.7	26.3	14.5	6.3
	Male	44.3	12.7	23.5	13.4	6.1
	Female	36.9	12.8	28.4	15.5	6.5
Stress	All	51.8	21.2	20.1	6.1	0.8
	Male	56.4	18.5	18.5	5.7	0.8
	Female	48.1	23.5	21.5	6.2	0.8

Table 3 Regression analysis for DASS subscales and socio-demographic characteristics of students

DASS subscales			
Model	Depression	Anxiety	Stress
Age	-0.001	0.004	0.040
Gender	-0.016	-0.052	-0.071*
Satisfaction	-0.166**	-0.073**	-0.094**
Study year	0.020*	0.063	-0.009
Study Major I	0.080	0.113**	0.005
Study Major II	0.037	0.021	-0.112**
Economic situation I	-0.056*	-0.015	-0.036
Economic situation II	0.088**	0.053	0.064*
Residency I	0.060	0.003	0.044
Residency II	-0.050	-0.125**	-0.060*
F	7.924**	6.205**	5.852**
R ²	0.06	0.05	0.04

* $P < 0.05$; ** $P < 0.01$

Age 1 = 17–19; 0 = 20–26

Gender 1 = Male; 0 = Female

Study Major I: 1 = Social and political sciences; 0 = Other

Study Major II: 1 = Basic sciences and engineering; 0 = Other

Satisfaction: 1 = Yes; 0 = No

Study year: 1 = First and second; 0 = Other

Economic situation I: 1 = Good; 0 = Other

Economic situation II: 1 = Poor; 0 = Other

Residency I: 1 = Village; 0 = Other

Residency II: 1 = City; 0 = Other

The mean scores of depression, anxiety and stress for all students were found to be at mild levels, while only male students' stress levels were found to be normal.

The severity distribution of depression, anxiety and stress revealed that 8.1% of all students had severe or extremely severe depression. This percentage was 20.8% for anxiety and 6.9% for stress.

Table 3 shows the results of regression analysis. In general, the variables, which are used in regression explained only 6% of depression, 5% of anxiety and 4% of stress.

Table 4 shows the relationship between socio-demographic characteristics of the students and the mean depression, anxiety and stress scores.

No statistically significant relationship was found between mean depression and anxiety scores and age, while the younger age group's (17–19) mean stress scores were higher than the older age group's (20–26).

Anxiety and stress scores were higher among female students while the difference between the mean depression scores among male and female students was not statistically significant.

Depression, anxiety and stress scores were higher among students who were studying social and political sciences than those who were studying basic sciences and engineering or medicine. The higher mean scores for depression and anxiety were statistically significant for students whose major was social and political sciences when they were compared with the mean scores of students whose major was basic sciences and engineering or medicine. The

difference between the mean stress scores of students whose major study was social and political sciences and medicine was not significant. The lowest mean scores for stress was for the basic sciences and engineering students, and the difference with the other two major study groups was found to be statistically significant. We performed chi square analyses in order to see whether differences regarding socio-demographic characteristics (age, study year, economic situation, residency) among students in three different major study groups (social and political sciences, basic sciences and engineering and medicine) exist. The results were as follows: students who were studying social and political sciences were younger than the students in other major study groups (55.7% of all students between 17 and 19); they composed 55.9% of the first- and second-year students and 62.6% of the village residents. We found no differences among different major study groups regarding the economic situations of their families (chi square = 4.271, $P = 0.371$) and being satisfied with their education (chi square = 2.514, $P = 0.642$). To determine whether age, study year and residency were mediators of the relationship between study major and depression, anxiety and stress we followed the three-step procedure recommended by Baron and Kenny [5]. According to this procedure, three regression equations should satisfy the tests of linkages of the mediation model. First the independent variable (i.e. study major) must affect the mediator (i.e. age, study year and residency separately). Second, the independent variable should be shown to affect the dependent variables (i.e. depression, anxiety and stress separately). Third, the mediator should be related to dependent variable with the independent variable included in the third equation. Sobel test indicates whether mediation is significant or not [23, 24]. Study major was not significantly related to age ($\beta = -0.168$; $P > 0.05$), was significantly related to depression ($\beta = 0.061$; $P < 0.05$) and age was not significantly related to depression ($\beta = -0.002$; $P > 0.05$) and Sobel test showed that total mediation of age was not significant ($z = 0.01$; $P > 0.05$). We concluded that age does not mediate the relationship between study major and depression. Similar results were obtained for anxiety and stress. Same procedures were repeated for the mediator affect of study year and residency. Sobel tests indicated no significant total mediating affect of study year and residency on the relationship between study major and depression, anxiety and stress (Study year: $z = 0.714$; $P > 0.05$ for depression; $z = 1.791$; $P > 0.05$ for anxiety; $z = 0.857$; $P > 0.05$ for stress. Residency: $z = 1.695$; $P > 0.05$ for depression; $z = 1.445$; $P > 0.05$ for anxiety; $z = 1.576$; $P > 0.05$ for stress).

Students who were satisfied with their education had lower depression, anxiety and stress scores than those who were not satisfied.

Table 4 Relationship between DASS and students' socio- demographic characteristics

	Depression	Anxiety	Stress
Age	Mean (SD)	Mean (SD)	Mean (SD)
17–19 (<i>n</i> = 481)	10.17 (6.98)	10.20 (6.11)	15.57 (6.54)
20–26 (<i>n</i> = 1136)	9.98 (6.84)	9.68 (5.86)	14.65 (6.78)
	$t = 0.503P = 0.615$	$t = 1.630P = 0.103$	$t = 2.531P = 0.011$
Gender			
Male (<i>n</i> = 718)	9.91 (7.09)	9.37 (6.04)	14.29 (6.83)
Female (<i>n</i> = 899)	10.13 (6.72)	10.21 (5.84)	15.41 (6.57)
	$t = -0.633P = 0.527$	$t = -2.828P = 0.005$	$t = -3.341P = 0.001$
Major study			
1. Social and political sciences (<i>n</i> = 856)	10.45 (7.03)	10.45 (6.19)	15.44 (6.34)
2. Basic sciences and engineering (<i>n</i> = 428)	9.70 (6.51)	9.15 (5.59)	13.57 (6.90)
3. Veterinary and human medicine (<i>n</i> = 333)	9.40 (6.92)	9.11 (5.56)	15.35 (6.12)
	$F(2, 1,616) = 3.477$ $P = 0.031$ $1 > 3$	$F(2, 1,616) = 10.005$ $P = 0.000$ $1 > 2 = 3$	$F(2, 1,616) = 12.061$ $P = 0.000$ $2 < 1 = 3$
Are you satisfied with your education?			
1. Yes (<i>n</i> = 1079)	9.08 (6.32)	9.36 (5.58)	14.38 (6.38)
2. No (<i>n</i> = 257)	11.96 (8.09)	10.26 (5.55)	15.74 (7.62)
3. Do not know (<i>n</i> = 281)	11.96 (7.03)	11.29 (6.45)	16.31 (6.88)
	$F(2, 1,616) = 32.646$ $P = 0.000$ $1 < 2 = 3$	$F(2, 1,616) = 12.753$ $P = 0.000$ $1 < 3$	$F(2, 1,616) = 11.600$ $P = 0.000$ $1 < 2 = 3$
Study year			
1 (<i>n</i> = 463)	10.35 (7.27)	10.55 (6.41)	15.51 (6.57)
2 (<i>n</i> = 411)	10.29 (6.72)	10.09 (5.90)	14.90 (6.65)
3 (<i>n</i> = 349)	9.76 (6.57)	9.69 (5.45)	15.10 (7.27)
4 (<i>n</i> = 311)	9.92 (6.75)	9.14 (5.61)	14.01 (5.97)
5 (<i>n</i> = 41)	6.78 (5.05)	7.17 (5.69)	12.32 (5.98)
6 (<i>n</i> = 42)	10.29 (8.27)	8.36 (6.07)	16.45 (8.70)
	$F(5, 1,616) = 2.292$ $P = 0.044$ $1 > 5; 2 > 5$	$F(5, 1,616) = 4.589$ $P = 0.000$ $1 > 4; 1 > 5; 2 > 5$	$F(5, 1,616) = 3.622$ $P = 0.003$ $1 > 4; 1 > 5$
Economic situation of the family			
1. Good (<i>n</i> = 477)	9.25 (6.82)	9.66 (6.28)	14.42 (6.64)
2. Moderate (<i>n</i> = 1041)	10.13 (6.84)	9.81 (5.76)	15.01 (6.76)
3. Poor (<i>n</i> = 99)	12.83 (6.91)	10.86 (5.97)	16.44 (6.36)
	$F(2, 1,616) = 11.509$ $P = 0.000$ $1 = 2 < 3$	$F(2, 1,616) = 1.676$ $P = 0.187$ –	$F(2, 1,616) = 3.972$ $P = 0.019$ $1 < 3$
Residency			
1. Village (<i>n</i> = 91)	12.23 (6.62)	10.95 (5.28)	16.33 (6.28)
2. Town (<i>n</i> = 454)	10.69 (7.01)	10.94 (6.18)	15.56 (6.49)
3. City (<i>n</i> = 1,072)	9.59 (6.79)	9.28 (5.81)	14.55 (6.81)
	$F(2, 1,616) = 9.067$ $P = 0.000$ $1 > 3; 2 > 3$	$F(2, 1,616) = 14.355$ $P = 0.000$ $1 > 3; 2 > 3$	$F(2, 1,616) = 5.683$ $P = 0.000$ $1 > 3; 2 > 3$

First- and second-year students had higher depression, anxiety and stress scores than third-, fourth- and fifth-year students.

Students from families with poor economic conditions had higher depression and stress scores than students from families with moderate or good economic conditions.

Students whose residential area was a village had higher depression, anxiety and stress scores than those with town or city residency.

Discussion

We found that our sample of students had higher mean depression, anxiety and stress scores (Table 1)

compared with previously published normative data [8, 18, 29, 33]. Although the DASS is not a diagnostic instrument, it is worth remembering that the rates of depression, anxiety and stress symptoms of moderate severity or above may require attention from health-care professionals. In our study, the distributions of students ($N = 1,617$) regarding depression, anxiety and stress symptoms of moderate severity or above were 27.1, 47.1 and 27.0%, respectively. Previous data on gender difference in depression, anxiety and stress scores from DASS were inconclusive [8, 17, 29].

We found that gender was correlated to anxiety and stress, but this correlation was weak. Female students' mean anxiety and stress scores were significantly higher compared to male students'. The same results were obtained from the study by Wong

et al. [33]. We found no significant difference between the mean depression scores of male and female students. Some previous studies that investigated mental distress among university or college students using other survey methods and rating scales found higher levels of depression among female students. A Nigerian study using the Mini International Neuropsychiatric Interview found depression to be two times more prevalent among female university students [1]. Another study using the Higher Education Stress Inventory and Major Depression Inventory showed that female students gave higher ratings than males for depression and stress [9]. However, there are also studies that found no differences according to gender in terms of depression or depressive mood [14]. Studies on samples of Turkish students using the General Health Questionnaire-12 and Beck Depression Inventory instruments found either higher depression rates among female students [21] or no gender differences [7].

Generally, the transition to adulthood represents a period with high risk for the onset of depression [25]. The term “emerging adulthood” has been proposed by Arnett [4] to describe the culturally constructed period of extended adolescence that occurs in industrialized countries when higher education is undertaken. In addition, newly faced social and intellectual challenges may cause emotional pressure, which may lead to an increased risk for depression, anxiety and stress. In the literature, many studies point to the elevated risk of depression, anxiety and stress among first-year undergraduates [12, 15, 19, 26, 33]. We also found a similar situation. First- and second-year students had higher scores for depression, anxiety and stress than those in the higher years. However, some previous studies among Turkish students found elevated scores for depression, anxiety and stress among senior students compared to freshmen [2, 7].

We found that the students who were studying social and political sciences had higher depression, anxiety and stress scores than those major study areas were basic sciences and engineering or medicine and these results were not due to mediator factors such as age, study year and residency, as explained in the results section. Some of the literature found higher scores of depression, anxiety and stress among medical students [11]. Another study found no difference regarding stress and depression among medical, graduate and law students [16]. Aktekin et al. [2] found the mean depression score among medical students to be higher than the mean depression score among economics and physical education students. Bostanci et al. [7] found no differences regarding depressive symptoms among students in the education, engineering, art and sciences and economics departments, although it is difficult to generalize these results because of methodological issues, limit interpretation and use of different measure instruments.

We found that students from poor families had higher depression and stress scores than those from wealthier families. No relationship was found for anxiety scores. Students with a rural background were significantly more likely to have elevated depression, anxiety and stress scores than students who were living in a town or a city. This difference can be explained by the economic situation; hence, 25.3% of the students with a rural background and 10.4% of the students with an urban background reported poor economic situations for their families.

Conclusions

The high rates of depression, anxiety and stress among university students have major implications, not only with psychological morbidity that will have adverse effects on students’ health, development, educational attainment and quality of life but also the deteriorating influence on their own families, institutions and even on other people’s lives. How long should the mental health of students, especially the alarming minor signs of depression, anxiety and stress, remain as a neglected public health problem in institutes of higher education? Students’ mental health is a global issue, and whether a developed or developing country, a traditional or a modern country, no community is immune against this disorder. The solution lies in being aware of it, intervening earlier and providing support with adequate and appropriate services.

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