

Rates of depression, anxiety, and stress in King Abdulaziz University freshmen, Jeddah, Saudi Arabia: A cross-sectional study

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Abstract

Objective This cross-sectional study aimed to determine the rates of depression, anxiety, and stress among first-year university students in Saudi Arabia.

Methods We distributed an online survey through to 861 first-year students, aged 17–25 years, at King Abdulaziz University. The survey used a validated Arabic short version of the Depression Anxiety and Stress Scales, and sociodemographic factors.

Results The prevalence of depression, anxiety, and stress was 80.4%, 71.8%, and 69.3%, respectively. A plurality showed extremely severe depression and anxiety, and severe stress symptoms. The frequency of exercise was inversely related to depression, anxiety, and stress. A total of 8.2% of students had visited a psychiatrist at some point in their lives, and 40.5% of students had suicidal thoughts.

Conclusions Programs to identify students suffering from mental illness and offer adequate care and support are essential.

Keywords Depression, Anxiety, Stress, Saudi Arabia, Students

Introduction

Depression is a commonly prevalent mental illness affecting more than 264 million people globally and is one of the major causes of disability.¹ People with depression suffer from a constant feeling of sadness and a loss of interest in previously pleasurable activities.² In contrast, anxiety causes feelings of tension, worry-related cognitions, and physical changes including increased blood pressure.³

University is a point of transition from being a teenager to an adult that includes considerable changes in several life domains, such as finance, housing, emotional, and social aspects. The transition period creates a burden that young adults may experience as stressful.⁴ University students are considered a high-risk group for developing mental disorders and their mental health is a major public health concern.^{5,6} Moreover, they are often subject to high expectations from their families to be academically successful and have a desire to be more successful than their peers. Such demands can trigger mental health problems including depression, anxiety, and stress.^{7,8} Many students become trapped in a vicious cycle as depression and anxiety affect the learning process by impairing memory and reducing concentration, which in turn will only reinforce pre-existing feelings of inadequacy, hopelessness, and low self-esteem.^{6,9} Depression and anxiety symptoms are widely prevalent in university students.⁵ Both are known to lower the quality of life and academic performance.¹⁰ More importantly, some students are more prone to developing mental disorders than others. For instance, students who are enrolled in demanding and challenging courses,¹¹ students with financial struggles,^{11,12} and students with rural backgrounds¹¹ are more vulnerable to mental illness.

Ibrahim et al conducted a systemic review on depression prevalence in university students, including 24 studies from 12 different countries—2 of them were within the middle-east: Egypt and Lebanon. The mean age of the students was 15–26. They found that depression was present in nearly one-third of the students with weighted mean prevalence of

30.6%—ranging from 10% to 84.6%. Sixteen of the included studies reported gender differences, with females being more prone to depression in a majority of them. Importantly, six studies found inverse relationship between year of study and rates of depression.⁵

In Saudi Arabia, a study conducted on preclinical medical and dental students in Umm Al-Qura University showed high levels of depression (69.9%), anxiety (66.4%), and stress (70.9%). A more alarming issue is that, based on the Depression Anxiety Stress Scales (DASS), the prevalence of students with severe to extremely severe symptoms of depression, anxiety, and stress, was 25.4%, 21.8%, and 34.1%, respectively.¹³

There is still stigma within the Saudi community about seeking help when it comes to mental health.¹⁴ Currently, awareness is much better compared to 10 years ago among developed countries, which helps doctors and teachers to correct erroneous concepts (e.g., mental illnesses are real, and negative emotions and thoughts need to be relieved because, with time, they can lead to physical harm and vice versa).^{15–17} Most research findings outline the need to address mental health problems in young adults, students in particular. There have been no studies in Saudi Arabia regarding the risk of depression, anxiety, and stress among first-year university students. Our study's goal is to provide necessary data as evidence to raise awareness among college students to improve their mental health and offer early treatment and detection. Furthermore, academic institutions need to provide sustainable mental health services to support university students to succeed in their academic years. Therefore, this study aims to determine the rates of depression, anxiety, and stress among first-year university students at King Abdulaziz University, and to determine the predisposing factors that trigger mental-health problems in students.

Materials and Methods

A descriptive cross-sectional study was conducted at King Abdulaziz University, Jeddah, Saudi Arabia. It was conducted from October 1, 2019, until January 30, 2020. The sample size

needed for this study was calculated using the Raosoft sample size calculator¹⁸ as 377 participants of an estimated population of 19,000. The study included 861 first-year (preparation year) King Abdulaziz University students, with 457 men (53.1%) and 404 women (46.9%), aged 17-25.

This study was approved by the Unit of Biomedical Ethics at King Abdulaziz University. All participants signed an online consent form to participate in the study. All of the students' information ensures collected confidentially.

The participants completed a self-reported questionnaire using the university Blackboard system. The questionnaire was distributed through secured online links sent by the University counseling center. The university identification number was used for verification, and only first-year university students were granted electronic access to the questionnaire. Demographic data such as gender, age, family income, smoking, residency, and weekly exercise level were included.

The Arabic short version of the Depression Anxiety Stress Scales (DASS-21) was used to measure symptoms of depression, anxiety, and stress during the past 2 weeks, with 21 questions classified into 3 sub-scales, each containing 7 items on a scale from 0 (Did not apply to me at all) to 3 (Applied to me very much or most of the time). It has been adapted and validated in Arabic.¹⁹ Based on the scoring instructions of the DASS scale, the scores of the seven questions for each subscale were summed and multiplied by 2 and then classified based on the severity of symptoms. For the depression subscale, scores between 0 and 9 were normal, 10-13 mild, 14-20 moderate, 21-27 severe, and above 28 extremely severe symptoms. For the anxiety subscale, scores between 0 and 7 were normal, 8-9 mild, 10-14 moderate, 15-19 severe, and above 20 extremely severe symptoms. For the stress subscale, scores between 0 and 14 were normal, 15-18 mild, 19-25 moderate, 26-33 severe, and above 34 extremely severe symptoms.¹⁹

Fifteen, Yes or No, questions were added regarding 12-month and lifelong prevalence of depression diagnosis, anxiety diagnosis, seeing a psychiatrist or a health worker because of mental health struggles, seeing a psychologist because of mental health struggles, prescribed medications for struggles with mental health, suicidal ideation, and suicidal attempts, and if they wanted to visit the academic consultation center at the King Abdulaziz University.

Data were entered and analyzed using the Statistical Package for the Social Sciences (SPSS) version 21. Frequencies and percentages were used to describe qualitative variables, where the chi-squared test was used to evaluate the differences between two qualitative variables. A p-value < 0.05 was considered significant.

Results

A total of 871 responses were collected, of which 10 were excluded because of the age criteria and 861 responses were included for the final analysis. The majority 81.1% had never smoked, 92.8% were living with their families, 37.0% had a high family monthly income, and 73.9% exercised once a week only. Table 1 shows the characteristics of the sample.

The prevalence of depression, anxiety, and stress symptoms among students was 80.4%, 71.8%, and 69.3%, respectively. Ranging from mild to extremely severe, a plurality of participants with depression and anxiety showed extremely

Table 1. **Characteristics of the sample.**

Characteristic		n (%)
Gender	Male	457 (53.1)
	Female	404 (46.9)
Family income	<10000 SR	304 (35.3)
	10000 - 150000 SR	238 (27.6)
	>15000 SR	319 (37)
Smoking status	Non-smoker	698 (81.1)
	Smoker	111 (12.9)
	Ex-smoker	52 (6)
Place of residence	Alone	35 (4.1)
	With family	799 (92.8)
	University dorm	27 (3.1)
Exercise	Once a week	636 (73.9)
	Two to three times a week	146 (17)
	Four or more times a week	79 (9.2)

Table 2. **Symptom severity of depression, anxiety, and stress.**

	Depression n (%)	Anxiety n (%)	Stress n (%)
Normal	169 (19.6)	242 (28.1)	264 (30.7)
Mild	84 (9.8)	56 (6.5)	98 (11.4)
Moderate	174 (20.2)	151 (17.5)	145 (16.8)
Severe	146 (17)	106 (12.3)	191 (22.2)
Extremely severe	288 (33.4)	306 (35.5)	163 (18.9)

severe symptoms, specifically, 33.4%, and 35.5%, respectively. For stress, a plurality of participants showed severe symptoms, specifically, 22.2% (Table 2).

There were no significant gender differences in depressive symptoms. However, female students had higher anxiety symptoms than male students (76.7%, vs. 67.6%, p-value = <0.001, chi-squared value = 27.852, and df = 4) and higher stress symptoms (71.4% vs. 67.1%, p-value = <0.001, chi-squared value = 24.011, and df = 4). Smokers and ex-smokers had higher symptoms of depression (smoker = 88.3%, and ex-smoker = 84.6%) and anxiety (smoker = 79.3%, and ex-smoker = 84.7%) compared to non-smokers (depression: 78.8%, anxiety: 69.7%, p-value = 0.026, chi-squared value = 17.440, and df = 8), while there were no significant differences in stress. The analysis showed a negative relationship between the frequency of exercise during the week and symptom levels for depression and anxiety. Students exercising 2-3 times per week showed significantly lower symptoms (depression = 71.2%, and anxiety = 64.4%), as well as students exercising 4 times and more per week (depression = 72.2%, and anxiety = 58.3%) compared to students exercising once a week only (depression = 83.5%, p-value = .007, chi-squared value = 21.063, and df = 8) (anxiety: 75.3%, p-value = .007, chi-squared value = 20.901, and df = 8) (Tables 3, 4, and 5).

Table 3. Distribution and significance of sociodemographics and depression scores.

Subgroups	Depression					P-Value
	Normal	Mild	Moderate	Severe	Extremely Severe	
Gender						
Male	79 (17.3%)	48 (10.5%)	100 (21.9%)	84 (18.4%)	146 (31.9%)	0.168
Female	90 (22.3%)	36 (8.9%)	74 (18.3%)	62 (15.3%)	142 (35.1%)	
Smoking Status						
Smoker	13 (11.7%)	8 (7.2%)	18 (16.2%)	19 (17.1%)	53 (47.7%)	0.022
Non-smoker	148 (21.2%)	72 (10.3%)	148 (21.2%)	117 (16.8%)	213 (30.5%)	
Ex-smoker	8 (15.4%)	4 (7.7%)	8 (15.4%)	10 (19.2%)	22 (42.3%)	
Family Monthly Income						
Less than 10 K Riyals	53 (17.4%)	39 (12.8%)	59 (19.4%)	53 (17.4%)	100 (32.9%)	0.342
Between 10 K and 15 K Riyals	45 (18.9%)	19 (8.0%)	44 (18.5%)	42 (17.6%)	88 (37.0%)	
More than 15 K Riyals	71 (22.3%)	26 (8.2%)	71 (22.3%)	51 (16.0%)	100 (31.3%)	
Living Status						
Alone	4 (11.4%)	2 (5.7%)	6 (17.1%)	13 (37.1%)	10 (28.6%)	0.124
With Family	159 (19.9%)	77 (9.6%)	163 (20.4%)	131 (16.4%)	269 (33.7%)	
Dorm/Out	6 (22.2%)	5 (18.5%)	5 (18.5%)	2 (7.4%)	9 (33.3%)	
Exercise						
Once a week	105 (16.5%)	63 (9.9%)	124 (19.5%)	115 (18.1%)	229 (36.0%)	0.008
Two to three times a week	42 (28.8%)	14 (9.6%)	34 (23.3%)	22 (15.1%)	34 (23.3%)	
More than four times a week	22 (27.8%)	7 (8.9%)	16 (20.3%)	9 (11.4%)	25 (31.6%)	

We also asked questions about visits to a psychiatrist, psychologist, or health-care worker because of mental health issues, students who used medication for their mental struggles, and students who had suicidal ideation or attempted suicide, during the last 12 months or at some point in their life, in relation to their DASS-21 scores.

A large percentage of students who had never before been diagnosed with depression or anxiety showed various symptoms of depression, anxiety, and stress. The majority had never seen a physician, psychiatrist, or a psychologist for mental health difficulties before. Moreover, the majority had never taken any medication for mental health difficulties before. Additionally, 40.5% of the students have had suicidal thoughts, and a plurality of them had extremely severe symptoms of depression. On the other hand, 17.5% of the students had ever attempted suicide before. Finally, 79% wanted to visit the university counselling center.

Discussion

Our study showed a high prevalence of depression, anxiety, and stress symptoms, specifically, in 80.4%, 71.8%, and 69.3% of participants, respectively, among first-year King Abdulaziz University students in Jeddah, Saudi Arabia. To our knowledge, there have been no local studies done in Saudi Arabia or in the Middle-East region among freshmen to compare with our results. However, compared to our results, research worldwide reported lower rates of depression, anxiety, and

stress among university students, such as in Okinawa (11.3%, 18.0%, and 5.7% respectively), Germany (24.6%, 33.6%, and 26.3% respectively), Thailand (35.6%, 43.3%, 19.0% respectively),⁴⁰ United states (33%, 40%, and 38% respectively),²⁰ and Malaysia (37.2%, 63%, and 23.7%, respectively).⁷

A plurality of the sample showed extremely severe symptoms of depression and anxiety (33.4% and 35.5%, respectively), whereas a plurality showed severe stress symptoms (22.2%). By comparison, a study in Egypt found that a plurality of students showed moderately severe symptoms of depression, anxiety, and stress (48.5%, 43.6%, and 30.1% respectively).²¹ A study in Mecca, Saudi Arabia found that a plurality of participants had severe to extremely severe symptoms of depression, anxiety, and stress (25.4%, 21.8%, and 34.1% respectively).¹³

There were no significant differences between genders in depression symptoms. However, female students had higher anxiety symptoms than male students (76.7% vs. 67.6%) and higher stress symptoms (71.4% vs. 67.1%). In a study of undergraduate students from 15 universities in China, female students had significantly higher anxiety symptoms than males, which was reported as 40% for males and 45% for females in the first and second years.²² Egyptian female medical students were at risk for any lifetime disorder, any 12-month disorder, and the persistence of symptoms.²¹ Males were found to be more prone to depression than females (53.9% vs. 46.1%), whereas females were more vulnerable than males to anxiety (55.2% vs. 44.8%).²²

Table 4. Distribution and significance of sociodemographics and anxiety scores.

Subgroups	Anxiety					P-Value
	Normal	Mild	Moderate	Severe	Extremely Severe	
Gender						
Male	148 (32.4%)	34 (7.4%)	92 (20.1%)	56 (12.3%)	127 (27.8%)	<0.0001
Female	94 (23.3%)	22 (5.4%)	59 (14.6%)	50 (12.4%)	179 (44.3%)	
Smoking Status						
Smoker	23 (20.7%)	8 (7.2%)	23 (20.7%)	10 (9.0%)	47 (42.3%)	0.026
Non-smoker	211 (30.2%)	44 (6.3%)	112 (16.0%)	92 (13.2%)	239 (34.2%)	
Ex-smoker	8 (15.4%)	4 (7.7%)	16 (30.8%)	4 (7.7%)	20 (38.5%)	
Family Monthly Income						
Less than 10 K Riyals	83 (27.3%)	12 (3.9%)	52 (17.1%)	34 (11.2%)	123 (40.5%)	0.076
Between 10 K and 15 K Riyals	62 (26.1%)	17 (7.1%)	40 (16.8%)	39 (16.4%)	80 (33.6%)	
More than 15 K Riyals	97 (30.4%)	27 (8.5%)	59 (18.5%)	33 (10.3%)	103 (32.3%)	
Living Status						
Alone	11 (31.4%)	1 (2.9%)	7 (20.0%)	4 (11.4%)	12 (34.3%)	0.417
With Family	221 (27.7%)	55 (6.9%)	139 (17.4%)	101 (12.6%)	283 (35.4%)	
Dorm/Out	10 (37.0%)	0 (0.0%)	5 (18.5%)	1 (3.7%)	11 (40.7%)	
Exercise						
Once a week	157 (24.7%)	44 (6.9%)	107 (16.8%)	83 (13.1%)	245 (38.5%)	0.007
Two to three times a week	52 (35.6%)	8 (5.5%)	28 (19.2%)	18 (12.3%)	40 (27.4%)	
More than four times a week	33 (41.8%)	4 (5.1%)	16 (20.3%)	5 (6.3%)	21 (26.6%)	

We demonstrated a positive relation between smoking and the severity of depression and anxiety. Several studies have demonstrated such a correlation and that the risk of psychiatric illnesses including depression and anxiety increases with smoking.²³⁻²⁶ However, a study in Syria found that smoking does not cause significant psychiatric symptoms.²⁷ Although using the same tool to evaluate psychiatric symptoms (DASS-21), this difference may be due to an unbalanced sample distribution.

Results showed that an increase in the frequency of exercise per week is associated with a reduced risk of psychological distress. Exercise is known to be an effective intervention to help reduce the symptoms of depression and anxiety,²⁸ which raises the question of whether exercise may be an effective first-line intervention option. A landmark meta-analysis of randomized controlled trials found that current literature is insufficient to answer this question and emphasized the need to conduct adequate quality studies to demonstrate this effect.²⁹

In comparison to the results of our study, multiple surveys published in 2018 done with first-year college students in 19 colleges across 8 countries including Australia, Germany, Northern Ireland, Spain, South Africa, the United States, Mexico, and Belgium, found that major depressive disorder (MDD) was the most common of the disorders surveyed across all countries combined (21.2% lifetime prevalence; 18.5% 12-month prevalence) followed by generalized anxiety disorder (18.6% lifetime prevalence–16.7%

12-month prevalence).³⁰ Recently, the Saudi National Mental Health Survey (SNMHS) results were published, showing a lifetime prevalence of depression and generalized anxiety disorder (GAD) of 6.0% and 1.9%, respectively.³¹ In our survey, we asked about anxiety disorder diagnoses in general, while the prevalence data in the SNMHS were specific to GAD. This in addition to the surprising fact provided by SNMHS that more educated Saudis were more prone to have mental illness, and the increased risk for our sample population might explain the difference between our result and that of the SNMHS.

Around 21% of our participants wanted to visit the academic consular office and 8.2% had visited a psychiatrist regarding their mental issues. In comparison, another study in Saudi Arabia found that faith healing setting visitors had a high rate of being diagnosed with mental illness and a small portion reported a positive history of psychiatric disorder, while more than 50% of participants had not sought medical help regarding their concerns.³² From 13,984 of first-year university students among different countries, only 24.6% would definitely seek mental therapy.³³ Similarly, in Riyadh, 25.2% were willing to ask for a psychiatric consultation if they experienced a mental illness, and the main reason for not visiting a psychiatrist was feeling ashamed.³⁴ Apparently, there are many people with mental disorders who are not seeking help or willing to visit mental health professionals because they feel embarrassed to express their emotions. People who had already sought mental health treatment were in a minority.

Table 5. Distribution and significance of sociodemographics and stress scores.

Subgroups	Stress					P-Value
	Normal	Mild	Moderate	Severe	Extremely Severe	
Gender						
Male	148 (32.4%)	58 (12.7%)	93 (20.4%)	95 (20.8%)	63 (13.8%)	<0.0001
Female	116 (28.7%)	40 (9.9%)	52 (12.9%)	96 (23.8%)	100 (24.8%)	
Smoking Status						
Smoker	23 (20.7%)	11 (9.9%)	20 (18.0%)	26 (23.4%)	31 (27.9%)	0.177
Non-smoker	226 (32.4%)	82 (11.7%)	114 (16.3%)	155 (22.2%)	121 (17.3%)	
Ex-smoker	15 (28.8%)	5 (9.6%)	11 (21.2%)	10 (19.2%)	11 (21.2%)	
Family Monthly Income						
Less than 10 K Riyals	88 (28.9%)	36 (11.8%)	54 (17.8%)	65 (21.4%)	61 (20.1%)	0.741
Between 10 K and 15 K Riyals	65 (27.3%)	30 (12.6%)	40 (16.8%)	56 (23.5%)	47 (19.7%)	
More than 15 K Riyals	111 (34.8%)	32 (10.0%)	51 (16.0%)	70 (21.9%)	55 (17.2%)	
Living Status						
Alone	9 (25.7%)	4 (11.4%)	5 (14.3%)	12 (34.3%)	5 (14.3%)	0.653
With Family	245 (30.7%)	91 (11.4%)	138 (17.3%)	174 (21.8%)	151 (18.9%)	
Dorm/Out	10 (37.0%)	3 (11.1%)	2 (7.4%)	5 (18.5%)	7 (25.9%)	
Exercise						
Once a week	177 (27.8%)	72 (11.3%)	105 (16.5%)	148 (23.3%)	134 (21.1%)	0.047
Two to three times a week	56 (38.4%)	15 (10.3%)	29 (19.9%)	28 (19.2%)	18 (12.3%)	
More than four times a week	31 (39.2%)	11 (13.9%)	11 (13.9%)	15 (19.0%)	11 (13.9%)	

There is a widely accepted belief in society that mentally ill people are dangerous and hiring them will lessen working network functionality.³⁵

Almost 800,000 people end their life by attempting suicide every year worldwide, among males and females aged between 15 and 29 years. Furthermore, suicide was the second leading cause of death in 2016.³⁶ Surprisingly, 40.5% of the students had ever thought of suicide and 17.5% had attempted suicide. A study assessing repeated suicidal attempts among youth in Saudi Arabia illustrated that 26.1% had recurrent suicide attempts between 10 and 24 years old and 51% had family problems.³⁷ Although being a Muslim is thought to be a protective factor against suicide acceptability, society still suffers from stigmatizing mental illnesses.³⁸

Our findings differ from those in first-year Canadian university undergraduate students, wherein 14% of students admitted having suicidal thoughts and 1.6% had attempted suicide.³⁹ These results justify proper Canadian academic support and improved mental health awareness toward seeking help from professionals when it is needed.

We used the DASS-21 to measure the prevalence of depression, anxiety, and stress, along with brief sociodemographic factors associated with them in a specific high-risk group. Further studies including much larger samples from different places and with different risk levels are needed to detect the exact extent of these issues, and to detect the nature of the relationship between the mental illnesses and sociodemographic factors.

Furthermore, DASS-21 is not a diagnostic tool, thus it might yield an overestimated prevalence rate. Also, it is difficult to establish if our sample is representative of the population. Our research might have the risk of selection bias as the students who are more likely to experience mental illness could be more likely to fill the questionnaire.

Conclusion

College students are often viewed as a privileged population, but they are not immune from suffering and disability associated with mental illness. Youth mental health has a high impact and a significant role in academic performance, especially among the junior years, as they are yet to adapt to the new and challenging environment. In addition, our study highlighted that a significant number of students are at high risk for mental struggles. We suggest establishing programs to identify students who are in distress and offer adequate care and support to help them overcome mental illness. Increasing the number of mental health facilities and raising awareness will increase assessment of suicidal risk and would facilitate an effective response to the elevated suicide rates.

Data availability statement

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

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