ORIGINAL ARTICLE

Rates of Depression, Anxiety, and Stress Among First-Year University Students from Jeddah, Saudi Arabia, During the Year 2020

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Abstract

Introduction: Psychological distress is a major health concern among students, first-year university students in particular. Depression and anxiety are serious disorders that impair daily functioning. This study aimed to assess the frequency of depression, anxiety, and stress among first-year university students in Jeddah, Saudi Arabia.

Methods: A descriptive cross-sectional study was conducted on 929 first-year students from a public university in Jeddah, Saudi Arabia. The data were gathered through an anonymous, self-reported questionnaire sent to all first-year students. The questionnaire comprised three sections: sociodemographic data, the Depression Anxiety Stress Scale-21 (DASS-21), questions on suicidality risk, and previous professional consultations for mental health issues. Data analysis was performed using IBM SPSS version 23.

Results: The overall prevalence of symptoms of depression, anxiety, and stress indicators based on the DASS-21 scale was 76%, 69.5%, and 67.4% (n = 929), respectively. The levels of anxiety and stress were significantly higher in women students. Moreover, lack of exercise was significantly linked to increased symptoms of depression, anxiety, and stress.

Conclusion: A substantial proportion of first-year university students from Jeddah, Saudi Arabia, experienced symptoms of stress, anxiety, and depression. Lack of exercise is a predictor of stress, anxiety, and depression.

Keywords

Depression; Anxiety; Stress; University students; Psychological distress; Saudi Arabia

Introduction

Psychological distress is a serious health issue among students, particularly first-year university students, because of the huge transition and decision-making processes they undergo[1]. Depression and anxiety are serious disorders that interfere with daily functioning and productivity[2]. Furthermore, specific factors such as age and female sex may increase the chances of stress, anxiety, and depression, which could be associated with biological factors, academic pressure, and financial difficulties[3].

A previous study on 712 university students in Saudi Arabia reported that most participants showed moderate signs of depression (53.6%), anxiety (65.7%), and stress (34.3%)[3]. Another study found that 53% of Australian university students experienced mental distress[4]. Additionally, a Turkish study of university students revealed that 27.1%, 47.1%, and 27% of the participants reported depression, anxiety, and stress, respectively[5]. Similarly, 30% of undergraduate students in Canada experience psychological issues[6]. Depression was reported in 53.43% of undergraduate students in Pakistan[7]. Furthermore, a 2008 American study found that more than one in three undergraduates reported, "being so depressed it was difficult to work" at least once in the past year, and 1 in 10 reported "seriously contemplated attempting suicide" in the past year[8]. A study conducted among 374 university students at Ohio University indicated that the prevalence of depression, anxiety, and stress was 33%, 40%, and 38%, respectively[9]. Moreover, Asian countries have reported higher rates of depression, anxiety, and stress than other countries[2].

Academic activities have been continued through online education since the suspension of educational institutions on March 8, 2020, due to the COVID-19 pandemic in Saudi Arabia. Online education remains a challenge for universities in both developed and developing countries[10]. Whether students cope well with the shift in education delivery and whether proper technical, financial, and emotional support is available to them under these circumstances needs to be examined, as the role of these institutions should not be limited to educational content delivery[11].

Mental illness is a rising health concern in modern society. Regular physical activity can serve as a simple and efficient means of alleviating symptoms of depression and anxiety[12]. However, the level of physical activity in Saudi Arabia is concerning. In a national multistage survey of citizens aged ≥15 years, Mokdad et al. Reported low levels of physical activity in Saudis and a slow rate of improvement over the past decade[13]. This should be considered in addition to the various factors that affect mental health trends in Saudi Arabia.

Although numerous studies have assessed the prevalence of depression, anxiety, and stress symptoms among students in Saudi Arabia, first-year university students in Saudi Arabia have not previously been analyzed as a specific population with specific attributes. The factors that influence this population should be studied. For instance, at a Saudi Arabian university, a student's specialization choice is solely based on their first-year GPA. Furthermore, this is a highly competitive setting considering the number of students accepted annually.

Developing a good understanding of young adults' mental health problems and their correlates will aid in the development of early detection programs and, subsequently, timely interventions to help students face different stressors and adapt to the new environment. This study aimed to determine the prevalence of depression, anxiety, and stress symptoms among first-year students in Jeddah, Saudi Arabia.

Methodology

This descriptive cross-sectional study was conducted among first-year university students between October and November 2020. According to the registries, 14602 first-year students were enrolled for the academic year 2020–2021.

The sampling frame included all first-year women and men students aged 17–25 as the target population. Considering the fact that no similar studies in Saudi Arabia have been conducted previously and assuming that at least 50% of the students have a factor of interest, the calculated sample size was 375 to estimate the expected proportion with 5% absolute precision and 95% confidence. However, 929 questionnaires were completed, yielding a response rate of 6%.

Non-probability convenience sampling was used, in which self-administered questionnaires were sent to all students through the university's electronic system (Blackboard). The questionnaire written in Arabic comprised three main sections: sociodemographic

data, the Depression Anxiety Stress Scale-21 (DASS-21), questions on suicidality risk, and previous professional consultations for mental health issues. Sociodemographic data obtained included age, sex, family monthly income, living arrangements, and weekly exercise rate. Mental distress was assessed using the validated Arabic version of the DASS-21, a 21-item self-report scale that measures characteristic attitudes and symptoms of depression, anxiety, and stress. The DASS-21, a shortened version of Lovibond and Lovibond DASS-42, has been widely accepted as a simple and reliable screening instrument for severity assessment rather than a diagnostic tool[14, 15]. The students were asked to rate the severity of their symptoms over the past week. Each question was scored on a 4-point Likert scale (0 = did not apply to me at all, 1 = applied to me to some extent or some of the time, 2 = applied to me to a significant extent or a fair part of the time, and 3 = applied to me very much or most of the time). To fit the original 42-items scores from each subscale, they were summed and multiplied by two. Subscale scores range from 0 to 42 with higher scores indicating a greater degree of distress[16]. Additional questions assessed suicidality risk, whether the participants had previously received a diagnosis of depression or anxiety, or if they had consulted a psychiatrist or psychologist regarding their mental health difficulties.

Prior approval was obtained from the Institutional Review Board of the institution, and the procedures were performed in accordance with the Helsinki Declaration of 1975, as revised in 2000. All participants were notified about the study objectives and response confidentiality, and consent was obtained.

Data were analyzed using IBM SPSS version 23 (IBM Corp., Armonk, N.Y., USA) and visually presented using GraphPad Prism version 8 (GraphPad Software, Inc., San Diego, CA, USA). Simple descriptive statistics were used to define the characteristics of the study variables, using counts and percentages for categorical and nominal variables, whereas continuous variables were presented as means and standard deviations. Chi-square tests were used to establish how stress, anxiety, and depression were related to demographic data. A p-value <0.05 was the criterion to reject the null hypothesis.

Results

Table 1 summarizes the demographic characteristics of the 929 participants. Most participants were women (56.6%, n = 403), aged 17–25 years (99.1%, n = 921), non-smokers (85.5%, n = 794), residing with family (97.6%, n = 907), and did not perform any exercise weekly (53.3%, n = 495). Regarding household income, nearly 50% were earning less than 10,000 SR per month (41.8%, n = 388).

We found that the overall prevalence of symptoms of depression, anxiety, and stress among the 929 students was 76%, 69.5%, and 67.4%, respectively.

Tables 2, 3, and 4 show the frequency of stress-, anxiety-, and depression-associated statuses and

Table 1. Demographic characteristics of the participants

Demographic Characteristics of the Participants		N	%
Total		929	100.0
Sex	Male	403	43.4
	Female	526	56.6
Age (years)	< 17	2	0.2
	17–25	921	99.1
	≥ 26	6	0.6
Total household income (SR)	< 10,000	388	41.8
	10,00015,000	247	26.6
	> 15,000	294	31.6
Smoker	Yes	87	9.4
	No	794	85.5
	Previously	48	5.2
Housing	Alone	13	1.4
	With family	907	97.6
	University/outdoor housing	9	1.0
Rate of weekly exercise	No exercise	495	53.3
	Once a week	201	21.6
	Two to three times a week	149	16.0
	Four times or more	84	9.0

Table 2. Breakdown of descriptive categories for stress, anxiety, and depression

Variables	N	Min	Max	Mean	SD
Stress	929	0	42	20.81	10.8
Anxiety	929	0	42	14.37	10.4
Depression	929	0	42	19.32	11.8
			Count	%	
Total			929	100.0	
Stress	Normal		303	32.6	
	Mild		119	12.8	
	Moderate		162	17.4	
	Severe		196	21.1	
	Extremely Severe		149	16.0	
Anxiety	Normal		283	30.5	
	Mild		63	6.8	
	Moderate		177	19.1	
	Severe		113	12.2	
	Extremely Severe		293	31.5	
Depression	Normal		223	24.0	
	Mild		105	11.3	
	Moderate		189	20.3	
	Severe		131	14.1	
	Extremely Severe		281	30.2	

Table 3. Relationships between demographic characteristics and stress severity

Demographic Characteristics		Total	Stress					p-value
			Normal	Mild	Moderate	Severe	Extremely Severe	
Total		929	303(32.6%)	119(12.8%)	162(17.4%)	196(21.1%)	149(16.0%)	-
Sex	Male	403	165(40.9%)	48(11.9%)	61(15.1%)	85(21.1%)	44(10.9%)	<0.001[a]
	Female	526	138(26.2%)	71(13.5%)	101(19.2%)	111(21.1%)	105(20.0%)	
Age (years)	< 17	2	0(0.0%)	0(0.0%)	2(100.0%)	0(0.0%)	0(0.0%)	0.072
	17–25	921	303(32.9%)	117(12.7%)	158(17.2%)	195(21.2%)	148(16.1%)	
	≥ 26	6	0(0.0%)	2(33.3%)	2(33.3%)	1(16.7%)	1(16.7%)	
Total household income (SR)	< 10,000	388	122(31.4%)	55(14.2%)	62(16.0%)	89(22.9%)	60(15.5%)	0.576
	10,000–15,000	247	86(34.8%)	33(13.4%)	45(18.2%)	41(16.6%)	42(17.0%)	
	> 15,000	294	95(32.3%)	31(10.5%)	55(18.7%)	66(22.4%)	47(16.0%)	
Smoker	Yes	87	26(29.9%)	9(10.3%)	17(19.5%)	22(25.3%)	13(14.9%)	0.801
	No	794	265(33.4%)	101(12.7%)	138(17.4%)	163(20.5%)	127(16.0%)	
	Previously	48	12(25.0%)	9(18.8%)	7(14.6%)	11(22.9%)	9(18.8%)	
Housing	Alone	13	6(46.2%)	2(15.4%)	2(15.4%)	1(7.7%)	2(15.4%)	0.203
	With family	907	290(32.0%)	117(12.9%)	159(17.5%)	194(21.4%)	147(16.2%)	
	University/outdoor housing	9	7(77.8%)	0(0.0%)	1(11.1%)	1(11.1%)	0(0.0%)	
Rate of weekly exercise	No exercise	495	138(27.9%)	71(14.3%)	88(17.8%)	105(21.2%)	93(18.8%)	0.027[a]
	Once a week	201	67(33.3%)	22(10.9%)	39(19.4%)	41(20.4%)	32(15.9%)	
	Two to three times a week	149	65(43.6%)	17(11.4%)	24(16.1%)	27(18.1%)	16(10.7%)	
	Four times or more	84	33(39.3%)	9(10.7%)	11(13.1%)	23(27.4%)	8(9.5%)	

[a] *significant using Chi-Square Test @ <0.05 level.*

severity in the patients, respectively. Table 2 shows the mean values for stress, anxiety, and depression. Approximately one-third of the participants had normal stress levels (32.6%, n = 303). In contrast, an equal distribution of participants with normal (30.5%, n = 283) and extremely severe symptoms of anxiety (31.5%, n = 293) was observed. Approximately 30.2% participants had extremely severe symptoms of depression (n = 281), while 24.0% were in the normal range (n = 223). Tables 3, 4, and 5 show the association of different severity levels of stress, anxiety, and depressive symptoms with sociodemographic factors. The results of a chi-square test revealed significant differences in the severity levels of stress and anxiety symptoms between men and women. More specifically, a significantly higher proportions of men (40.9%, n = 165) had normal levels of stress compared with the remaining stress categories than those of women (26.2%, n = 138). Regarding anxiety symptoms, a significantly higher number of men had normal levels (38.2%, n = 154), whereas a significantly higher number of women had extremely severe symptoms of anxiety (38.6%, n = 203), compared with other degrees of anxiety. Figures 1 and 2 show the distribution of participants in terms of stress and anxiety levels by sex. Significant differences were observed among participants for stress (p = 0.027), anxiety symptoms (p = 0.007), and depression symptom levels (p = 0.027) relative to the frequency of weekly exercise. More specifically, significantly higher number of participants had normal stress levels regardless of whether they exercised once (33.3%, n = 67), twice to thrice (43.6%, n = 65), at least four times weekly (39.3%, n = 33), or not at all (27.9%, n = 138). A significantly higher number of participants who exercised once a week (29.9%, n = 60) or not at all (35.8%, n = 17) had extremely severe levels of anxiety, whereas a significantly higher proportion of those who exercised two to three times a week (38.3%, n = 57) or at least four times (38.1%, n = 32) had normal

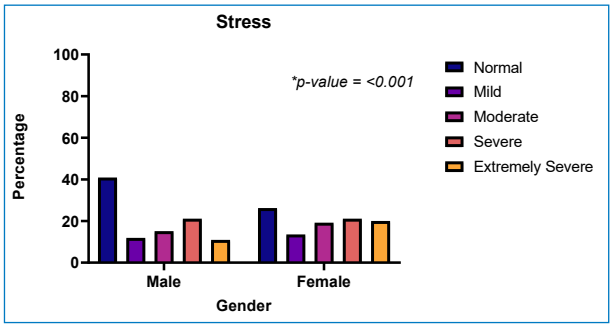

Figure 1. Stress *vs.* Gender.

Table 4. Relationships between demographic characteristics and anxiety severity

Demographic Characteristics		Total	Anxiety					p-value
			Normal	Mild	Moderate	Severe	Extremely Severe	
Total		929	283(30.5%)	63(6.8%)	177(19.1%)	113(12.2%)	293(31.5%)	-
Sex	Male	403	154(38.2%)	28(6.9%)	83(20.6%)	48(11.9%)	90(22.3%)	<0.001[a]
	Female	526	129(24.5%)	35(6.7%)	94(17.9%)	65(12.4%)	203(38.6%)	
Age (years)	< 17	2	0(0.0%)	0(0.0%)	1(50.0%)	0(0.0%)	1(50.0%)	0.752
	17–25	921	282(30.6%)	63(6.8%)	174(18.9%)	113(12.3%)	289(31.4%)	
	≥26	6	1(16.7%)	0(0.0%)	2(33.3%)	0(0.0%)	3(50.0%)	
Total household income (SR)	< 10,000 SR	388	110(28.4%)	30(7.7%)	70(18.0%)	45(11.6%)	133(34.3%)	0.478
	10,000–15,000 SR	247	87(35.2%)	12(4.9%)	47(19.0%)	33(13.4%)	68(27.5%)	
	> 15,000 SR	294	86(29.3%)	21(7.1%)	60(20.4%)	35(11.9%)	92(31.3%)	
Smoker	Yes	87	27(31.0%)	7(8.0%)	16(18.4%)	10(11.5%)	27(31.0%)	0.969
	No	794	245(30.9%)	52(6.5%)	152(19.1%)	95(12.0%)	250(31.5%)	
	Previously	48	11(22.9%)	4(8.3%)	9(18.8%)	8(16.7%)	16(33.3%)	
Housing	Alone	13	4(30.8%)	1(7.7%)	1(7.7%)	2(15.4%)	5(38.5%)	0.509
	With family	907	273(30.1%)	62(6.8%)	175(19.3%)	110(12.1%)	287(31.6%)	
	University/outdoor housing	9	6(66.7%)	0(0.0%)	1(11.1%)	1(11.1%)	1(11.1%)	
Rate of weekly exercise	No exercise	495	142(28.7%)	31(6.3%)	97(19.6%)	48(9.7%)	177(35.8%)	0.007[a]
	Once a week	201	52(25.9%)	18(9.0%)	44(21.9%)	27(13.4%)	60(29.9%)	
	Two to three times a week	149	57(38.3%)	10(6.7%)	21(14.1%)	28(18.8%)	33(22.1%)	
	Four times or more	84	32(38.1%)	4(4.8%)	15(17.9%)	10(11.9%)	23(27.4%)	

[a]-*significant using chi-square Test @<0.05 level.*

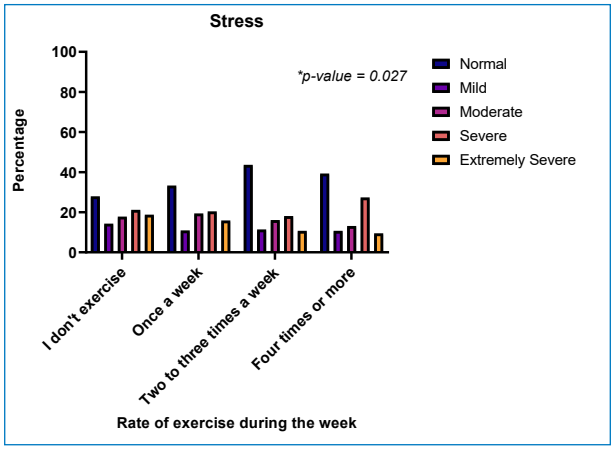

Figure 2. Stress *vs.* Rate of exercise during the week.

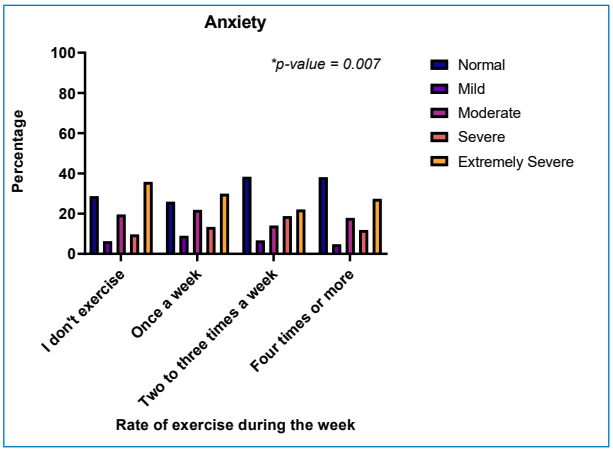

Figure 4. Anxiety *vs.* Rate of exercise during the week.

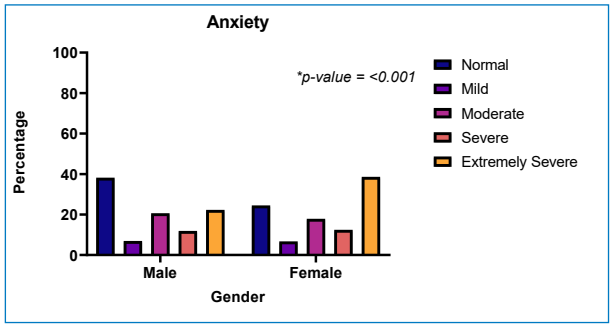

Figure 3. Anxiety *vs.* Gender.

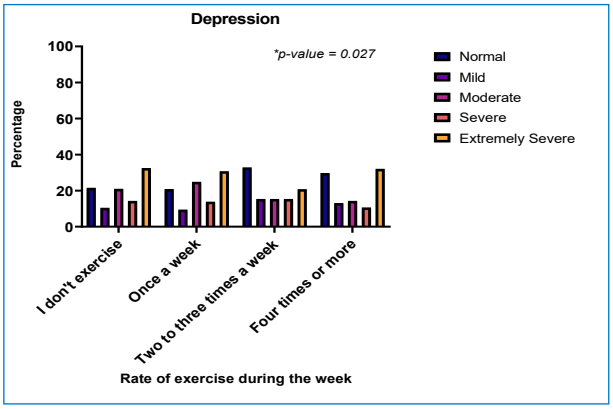

Figure 5. Depression *vs.* Rate of exercise during the week.

Table 5. Relationships between demographic characteristics and depression severity

Demographic Characteristics		Total	Depression				p-value
			Normal	Mild	Moderate	Severe	Extremely Severe	
Total		929	223(24.0%)	105(11.3%)	189(20.3%)	131(14.1%)	281(30.2%)	-
Sex	Male	403	105(26.1%)	46(11.4%)	88(21.8%)	57(14.1%)	107(26.6%)	0.263
	Female	526	118(22.4%)	59(11.2%)	101(19.2%)	74(14.1%)	174(33.1%)	
Age (years)	< 17	2	0(0.0%)	1(50.0%)	0(0.0%)	1(50.0%)	0(0.0%)	0.518
	17–25	921	222(24.1%)	103(11.2%)	187(20.3%)	129(14.0%)	280(30.4%)	
	≥ 26	6	1(16.7%)	1(16.7%)	2(33.3%)	1(16.7%)	1(16.7%)	
Total household income (SR)	< 10,000	388	85(21.9%)	35(9.0%)	82(21.1%)	64(16.5%)	122(31.4%)	0.274
	10,000– 15,000	247	67(27.1%)	27(10.9%)	51(20.6%)	31(12.6%)	71(28.7%)	
	> 15,000	294	71(24.1%)	43(14.6%)	56(19.0%)	36(12.2%)	88(29.9%)	
Smoker	Yes	87	20(23.0%)	5(5.7%)	21(24.1%)	16(18.4%)	25(28.7%)	0.105
	No	794	194(24.4%)	94(11.8%)	162(20.4%)	102(12.8%)	242(30.5%)	
	Previously	48	9(18.8%)	6(12.5%)	6(12.5%)	13(27.1%)	14(29.2%)	
Housing	Alone	13	5(38.5%)	2(15.4%)	3(23.1%)	0(0.0%)	3(23.1%)	0.284
	With family	907	213(23.5%)	102(11.2%)	184(20.3%)	131(14.4%)	277(30.5%)	
	University/outdoor housing	9	5(55.6%)	1(11.1%)	2(22.2%)	0(0.0%)	1(11.1%)	
Rate of weekly exercise	No exercise	495	107(21.6%)	52(10.5%)	104(21.0%)	71(14.3%)	161(32.5%)	0.027[a]
	Once a week	201	42(20.9%)	19(9.5%)	50(24.9%)	28(13.9%)	62(30.8%)	
	Two to three times a week	149	49(32.9%)	23(15.4%)	23(15.4%)	23(15.4%)	31(20.8%)	
	Four times or more	84	25(29.8%)	11(13.1%)	12(14.3%)	9(10.7%)	27(32.1%)	

[a]-significant using chi-square test @ <0.05 level.

levels. Furthermore, significantly higher proportions of patients who exercised once (30.8%, n = 62), at least four times (32.1%, n = 27), or not at all (32.5%, n = 161) had extremely severe symptoms of depression. Figures 3, 4, and 5 show the distribution of the stress, anxiety, and depression levels of the participants according to their weekly exercise rates.

Discussion

This study aimed to estimate the prevalence of symptoms of depression, anxiety, and stress among first-year university students in Jeddah, Saudi Arabia, and identify their correlates. Our results were consistent with several studies showing an elevated frequency of depression, anxiety, and stress symptoms, taking into consideration the differences in the measurement scales used and the characteristics of the populations studied[3,17–20]. A study conducted in Greece at Aristotle University of Thessaloniki using DASS21 assessed students during the 2-year ongoing pandemic in November 2020 and in November 2021 and concluded that a significant increase in all scales was observed in November 202[21].

Other studies reported reduced levels of depression, anxiety, and stress[15,22–26]. These could be attributed to multiple factors, including the effects of the COVID-19 pandemic on students. A large multi-center study including 82 universities conducted in France during the pandemic showed an elevated prevalence of suicidal ideation and severe distress, depression, anxiety, and stress among quarantined students[27]. Yang et al. evaluated the impact of different stressors on college students' health during the COVID-19 pandemic, including academic workload, separation from school, and fear of contagion. All these stressors were found to be negatively associated with students' mental and physical health[28].

Another factor that should not be overlooked in the mental health of first-year students is the multiple changes that occur during the first year. In China, a study reported that mental health issues increase in the first two years of college, which can be caused by adjustment disorders, such as the environment. Moreover, the curriculum becomes more specialized during the second year, which is considered a new element of stress for students[29].

Moreover, women had considerably higher stress levels than men. This is consistent with the findings of

Al Bahhawi et al.[3], Shamsudden et al.[15], and Kavvadas et al.[21], who reported higher stress scores among women students. This is also applicable for anxiety rate; the exact reason is unclear. Previous studies conducted in China hypothesized that the increased prevalence of stress and anxiety among girls is attributed to psychological and social challenges. Compared to boys, adolescent girls tend to have low self-esteem caused by poor body image and academic adjustment[30]. A study conducted on undergraduate and graduate students at a university in Minnesota also concluded that minority groups, including women, reported lower mental health scores during and before the pandemic, which could be explained by many factors, including prejudice and injustice toward these groups[31].

Further studies are warranted to understand the higher incidence of psychological stress and anxiety observed among women.

Stress is a multifaceted problem affected by several factors[32], including a shift in the academic environment and expectations between high school and university, lack of social support and loneliness[33], social media use[34], increased competitiveness, perception of stressors, and the use of emotional and avoidance coping[35]. Furthermore, the stressors related to online education and the ongoing COVID-19 pandemic should be considered.

Moreover, lack of exercise was strongly associated with higher stress levels. Exercise can serve as an effective coping strategy to reduce physiological responses to stress and facilitate the development of a more balanced response to different life stressors. As Van Kim et al.[36] reported in a national cross-sectional study that included 14,804 students from 95 different colleges, students who followed the recommendations for vigorous physical exercise experienced lower levels of stress and were less likely to suffer from mental health impairments than students who did not follow them. Baghurst et al.[37] assessed the effectiveness of different stress reduction interventions, including physical activity, cardiovascular exercise, and stress management. At the end of the semester, the physical activity and stress management groups reported substantially lower levels of stress, test anxiety, and burnout.

Consistent with the findings of a previous study, our findings suggest that decreased physical activity is associated with elevated levels of anxiety and depression. Lun et al.[18] conducted a study on undergraduate students from different universities in Hong Kong and found that those who exercised regularly experienced depressive symptoms less often than those who did not, although no association was established between exercise and anxiety.

In contrast, numerous studies have found no association between exercise and mental health. Tran et al.[38] claimed that their study of French university students showed no association between physical inactivity and mental health disorders. A study on medical university students in Egypt showed no significant association between stress, anxiety, depression, or exercise[39]. These contradictions warrant further studies to validate the relationship between exercise and mental health.

Limitations

This study had several limitations. The scale that we used, the DASS-21, is a screening method only, i.e., it can only evaluate the number of first-year students who are prone to or at risk of depression or anxiety. Moreover, this is a self-reporting technique that can reduce reliability.

Conclusion

This study showed that a substantial proportion of first-year students at a Saudi Arabian university experienced stress, anxiety, and depression symptoms. Stress and anxiety were more common in women than in men. Potential reasons include perceived gender discrimination in universities and other domains. Lack of exercise is also a predictor of stress, anxiety, and depression among students. This study was a preliminary investigation. Further studies should be conducted on first-year university students at the national level to assess the prevalence of symptoms of depression, anxiety, and stress among this population and to establish how these mental health issues would affect their performance. The risk factors that lead to mental health issues in students, including social, cultural, and economic factors, should be studied. Universities are encouraged to provide screening and counseling for mental health problems and promote strategies to improve them.

Conflict of Interest

The authors declared that there is no conflict of interest that is related to this study and this article.

Disclosure

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Ethical Approval

The study was approved by the Ethics Committee of the KAUH in Jeddah, Kingdom of Saudi Arabia, also known as the Institutional Review Board of Hospitals.

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