



Assessing mental health among students in the UAE: A cross-sectional study utilizing the DASS-21 scale

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ABSTRACT

Background: The escalating worldwide concerns for mental health, significantly amplified by the COVID-19 pandemic, necessitates understanding the impact on vulnerable populations, such as university students. This study aims to investigate the prevalence and implications of depression, anxiety, and stress among university students in the United Arab Emirates (UAE) using the Depression, Anxiety, and Stress Scale-21 Items (DASS-21). **Methods:** This study utilized convenience sampling to investigate the mental health of undergraduates in UAE universities using a bilingual DASS-21 questionnaire via Google Forms. Analysis was conducted using SPSS version 29.0, employing descriptive statistics, Chi-squared tests, Mann-Whitney tests, Kruskal-Wallis tests, and Multinomial Logistic Regression to analyze relationships between sociodemographic variables and mental health scores.

Results: The study examined 332 students, with most female participants (81 %, n = 269) and individuals aged 18–20 (89.8 %, n = 298). It revealed higher mean DASS scores among females: Depression (M = 15.80, p = 0.030), Anxiety (M = 17.63, p < 0.001), and Stress (M = 22.61, p < 0.001). Fourth-year students exhibited the highest DASS scores for depression (M = 30.33, p = 0.002), anxiety (M = 21.33, p = 0.002), and stress (M = 27.00, p = 0.005). Younger participants aged 18–20 had an odds ratio (OR) of 4.925 for depression, indicating they were approximately five times more likely to experience depression.

Conclusions: This study reveals gender, age, and academic-year variations in depression, anxiety, and stress among UAE university students. Specifically, our findings indicate higher levels of anxiety and stress among females and reveal academic-year and age-related patterns in mental health conditions. University support services in the UAE should better address student needs, including counseling focused on high school to university transition challenges.

1. Introduction

Mental health plays a pivotal role in individuals' quality of life and overall well-being, as underscored by the World Health Organization's (WHO) characterization of mental health ("Mental health," n.d). Three leading mental health afflictions worldwide are depression, anxiety, and stress, which have profound implications for individuals' well-being

("Mental disorders," n.d). Alarmingly, the WHO reports a rise of over 25 % in common conditions like depression and anxiety since 2020, affecting nearly a billion people globally ("COVID-19 pandemic triggers 25% increase in prevalence of anxiety and depression worldwide, n.d; Santomauro et al., 2021). Responding to this disturbing trend, the WHO Action Plan on Mental Health (2013–2020) advocates for a coordinated, evidence-based approach to improve global mental health (Saxena et al.,

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2014).Fig. 1..

Depression, prevalent in approximately 5 % of the global adult population, is primarily expressed through persistent sadness, emptiness, and reduced enjoyment in activities (“**Depressive disorder (depression)**”, n.d; Ormel et al., 2019). It ranks amongst the top in contributions to global disability, primarily affecting an individual’s functionality, and is exceeded by diseases such as cardiac and respiratory diseases (Cuijpers et al., 2012; Reddy, 2010). Anxiety is characterized by pervasive, undirected worry unrelated to specific recent stressors. This disorder can manifest through symptoms like restlessness, fatigue, difficulty concentrating, irritability, and muscle tension, which can hinder routine activities and personal relationships (Leonard and Abramovitch, 2019).

Although a common physiological response, stress becomes harmful when it is chronic or inadequately managed. Chronic stress can instigate various physical and psychological illnesses, including but not limited to heart disease, hypertension, diabetes, depression, and anxiety disorders (Schneiderman et al., 2005). University students are a significant demographic group that regularly experiences these mental health disorders, with this prevalence exacerbated by the challenging transition from secondary school to higher education, academic pressures, social adaptation, and management of newfound independence (Mofatteh, 2020; Pidgeon et al., 2014; Wynaden et al., 2013). Evidence from global studies indicates that a range from 10 % to 85 % of university students exhibit depressive symptoms, approximately 25 % experience anxiety disorders, and a significant percentage report experiencing chronic stress (Bandelow and Michaelis, 2015; Faisal et al., 2022; Gao et al., 2020; Salari et al., 2020; Sun et al., 2021).

These disorders are commonly managed through pharmacological and non-pharmacological interventions such as exercise, yoga, and meditation, which have all shown efficacy in alleviating depression, anxiety, and stress symptoms (D’Alessio et al., 2020; Evans et al., 2020; Listunova et al., 2018). Despite the widespread acceptance of pharmacological treatment, searching for the “optimal” antidepressant remains

underway.

Recent surges in mental health distress are attributable to factors like academic pressure, relational challenges, financial strain, and the impact of the COVID-19 pandemic. The pandemic has amplified depression, anxiety, and stress levels globally through social isolation, fear of infection, financial instability, and uncertainty about the future. The shift to remote learning and separation from peers has compounded stress, anxiety, and depression in university students, pointing toward an impending mental health crisis (Gogoi et al., 2022). Another amplifier to this problem is the overuse of social media and smart devices, although significant heterogeneity exists in the literature (Hegazi et al., 2022; Mheidly et al., 2020; Shannon et al., 2022).

International studies conducted in regions including Hong Kong, China, Malaysia, the Middle East, and the United Arab Emirates (UAE) corroborate a high prevalence of depression, anxiety, and stress among university students (Alsaif et al., 2022; Ghanim et al., 2022; Shek et al., 2022; Zhang et al., 2021). The management of these disorders can often rely on a range of psychological assessment tools, such as the Depression, Anxiety, and Stress Scale-21 Items (DASS-21), Beck Depression Inventory (BDI), State-Trait Anxiety Inventory (STAI), Generalized Anxiety Disorder 7-item (GAD-7) scale, Patient Health Questionnaire (PHQ-9), and Perceived Stress Scale (PSS) (Gloster et al., 2008; Peters et al., 2021; Schneiderman et al., 2005; Serra et al., 2015).

Our study aims to enhance the understanding of student mental health in the UAE, an environment marked by its unique cultural, social, and educational environment. Specifically, we focus on the transition from structured school systems to the more autonomous university setting, a change that significantly impacts student mental health, yet remains underexplored in the UAE. The use of the DASS-21 is significant in our research, as this tool is commonly used internationally but has not been extensively applied in the UAE for studying student mental health. The pandemic further highlights the necessity of robust mental health support, especially for vulnerable groups like university students, and the need for innovative, accessible mental health solutions for future

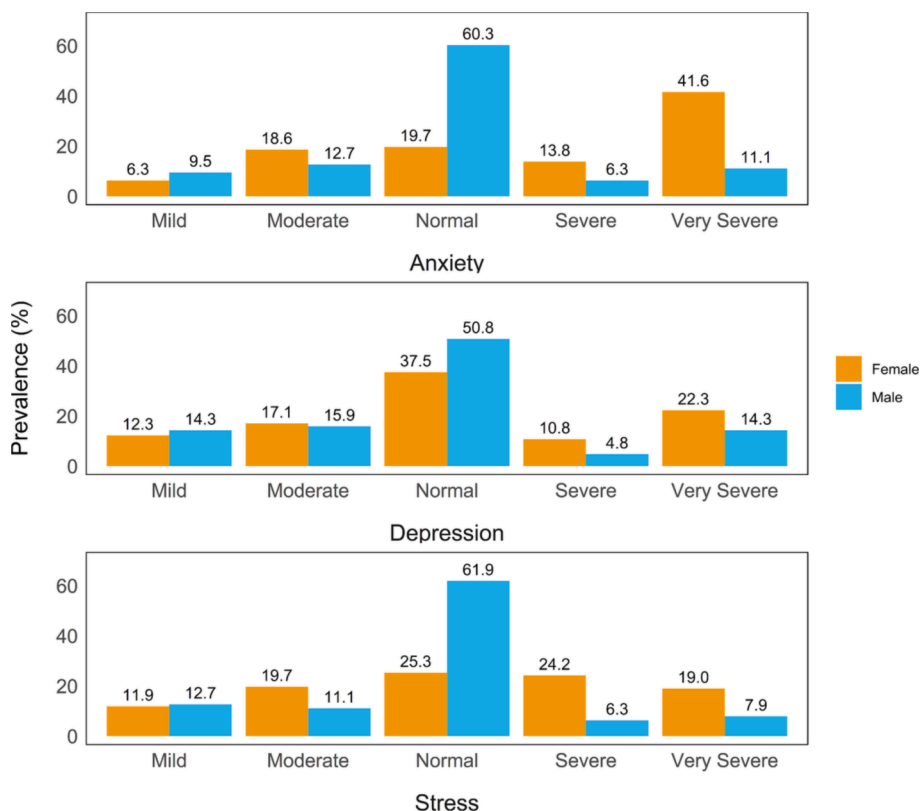


Fig. 1. Prevalence of DASS based on gender.

global crises. Our research responds to the growing global interest in mental health by investigating the prevalence and implications of mental health disorders among university students in the UAE, using the DASS-21 as our primary assessment tool, thereby aiming to contribute new insights into how university students in the UAE navigate mental health challenges.

2. Materials and method

2.1. Ethical considerations

This research study strictly adhered to established ethical guidelines, such as the Declaration of Helsinki, to protect participants' rights and privacy. The research proposal was submitted to the Research Ethics Committee of Ajman University for ethical approval before the commencement of the study; approval was obtained on "12 June 2023" with reference number "P-H-S-2023-6-12".

The questionnaire was electronically distributed with an informed consent process enacted. Each participant was required to provide their informed consent digitally before participating in the study. Additionally, all participants were briefed about the study's objectives, procedures, and significance. Participants were ensured of their right to withdraw from the study at any stage without any negative repercussions. All data were anonymized to maintain confidentiality. If a participant chose to withdraw from the study after data collection, their data was immediately discarded and not included in the final analysis.

2.2. Inclusion and Exclusion criteria

Our inclusion criteria encompassed individuals aged 18 or above who were currently attending a university for the first time. Exclusion criteria applied to those aged below 18 and individuals with cognitive dysfunction.

2.3. Study setting and participant demographics

The cross-sectional study adopted a non-random sampling method, specifically convenience sampling, to engage with the intended sample group: undergraduate students in the UAE. Information was gathered from various tertiary institutions encompassing Ajman University, Gulf Medical University, University of Sharjah, United Arab Emirates University, American University of Sharjah, City University Ajman, and Zayed University, among other educational establishments within the country. This strategy does not offer an equal probability of selection for all participants but allows for efficient data collection, given its accessibility and ease of implementation. The required sample size for this study was determined based on common parameters: a population proportion of 50 %, a confidence level of 95 %, and a margin of error of 5 %. This calculation suggested a sample size of 385.

2.4. Measurement instrumentation

Google Forms was utilized as an electronic platform to gather demographic data and other relevant information from the student participants. This was conducted using both the English and Arabic translations of DASS-21, an instrument whose Arabic version has been developed and validated by Ali AM et al. in 2017 (Ali et al., 2017).

Intrinsically, the DASS-21 comprises twenty-one questions, divided evenly into three self-report scales, each encompassing seven items. Each of these items is structured to evaluate depression, anxiety, and stress. The questions in the DASS-21 are presented in a four-point Likert scale format, where participants assess the extent to which each statement applies to them based on their experiences over the preceding week. The grading of the responses ranges from "0", an indication of the statement is entirely inapplicable, through "1" and "2", suggesting a degree of applicability, to "3", where the statement was highly or

altogether applicable.

The sum of these responses is then calculated using the Lovibond scoring to generate a final score representing the participant's mental health status. This score situates each participant on a continuum that ranges from "Normal" to "Extremely Severe," as outlined elsewhere (Lovibond, 1995).

2.5. Data analysis

The Statistical Package for the Social Sciences (SPSS), specifically version 29.0 (SPSS Inc., Chicago, IL, USA), was employed to analyze the gathered data. Initial descriptive statistical methods were used to delineate the participants' sociodemographic attributes and corresponding DASS-21 responses. These descriptions involved the determination of frequencies (n), percentages (%), means, and standard deviations (SD). The final values for each subscale of the DASS-21 were determined by aggregating the relevant items' DASS-21 scores, subsequently doubling them to align with the DASS-42 scale values.

Following the descriptive analysis, inferential statistical techniques were deployed to scrutinize the relationship between the sociodemographic characteristics (independent variables) and the DASS-21 scores (dependent variables). Specifically, the Chi-squared test (χ^2) was used to examine the correlation between categorical variables. The Mann-Whitney test (U) and the Kruskal-Wallis test (H) were employed to compare the medians of two or more independent groups. The year-over-year analysis was performed using a pairwise comparison (Mann-Whitney test) for the consecutive academic years to evaluate the gains in DASS scores. To supplement these techniques, Multinomial Logistic Regression was incorporated to facilitate the estimation of odds ratios. Prior to conducting this analysis, crucial assumptions for these tests, encompassing the Absence of Multicollinearity, Ordinality, and Independence, were scrutinized and confirmed to uphold reliability. These tests were conducted with a 95 % confidence interval (CI) and a significance level (p) set at < 0.05 .

3. Results

3.1. Demographic characteristics

Table 1 comprehensively summarizes the demographic composition of the study's participants. The sample consists of 332 individuals (52 participants short of the ideal), of whom 81.0 % ($n = 269$) are females, and the remainder, 19.0 % ($n = 63$), are males. This unbalanced gender distribution indicates a evident female majority. 89.8 % ($n = 298$) of the sample falls within the age bracket of 18–20 years, representing a substantial majority. The age group of 21–24 comprises 9.0 % ($n = 30$) of the subjects, while those aged 25–35 account for a mere 1.2 % ($n = 4$).

First-year students constitute the majority, making up 61.7 % ($n = 205$) of the study cohort. Second-year students follow, representing 30.1 % ($n = 100$). The representation decreases considerably as we move higher in the academic years: third-year students account for only 5.1 %

Table 1
Demographic characteristics of the participants ($n = 332$).

Variable	Group	N (%)
Gender	Female	269 (81.0)
	Male	63 (19.0)
Age	18–20	298 (89.8)
	21–24	30 (9.0)
	25–35	4 (1.2)
		205 (61.7)
Study year	First Year	205 (61.7)
	Second Year	100 (30.1)
	Third Year	17 (5.1)
	Fourth Year	6 (1.8)
	Fifth Year	4 (1.2)
Universities	Ajman University	238 (71.7)
	Others	94 (28.3)

($n = 17$), while fourth and fifth-year students form an even smaller fraction at 1.8 % ($n = 6$) and 1.2 % ($n = 4$), respectively. Finally, the institutional affiliation of the participants is examined. A sizable majority, 71.7 % ($n = 238$), are enrolled at Ajman University. In contrast, students from other universities across the UAE comprise the remaining 28.3 % ($n = 94$) of the sample.

3.2. DASS prevalence

3.2.1. Gender and age-based variability in DASS

For depression, females had the following distributions: non-depressive 37.5 % (30.4 % total), mild 12.3 % (9.9 % total), moderate 17.1 % (13.9 % total), severe 10.8 % (8.7 % total), and very severe 22.3 % (18.1 % total). Males showed: normal 50.8 % (9.6 % total), mild 14.3 % (2.7 % total), moderate 15.9 % (3.0 % total), severe 4.8 % (0.9 % total), and very severe 14.3 % (2.7 % total). All categories in both genders lacked statistical significance. Regarding anxiety, only the categories of normal and very severe showed statistically significant differences between genders ($p < 0.001$). Females had 19.7 % normal and 41.6 % very severe, while males displayed 60.3 % normal and 11.1 % very severe.

For stress, significant gender differences were noted in the normal ($p < 0.001$), severe ($p = 0.002$), and very severe ($p = 0.036$) categories. Females had 25.3 % normal, 24.2 % severe, and 19.0 % very severe, while males had 61.9 % normal, 6.3 % severe, and 7.9 % very severe. When assessing age groups (18–20, 21–24, 25–35), the depression and

stress levels did not reach statistical significance. For anxiety, the 25–35 age group showed a significant difference in the normal category ($p = 0.036$), with 26.8 % in the 18–20 age group and 75.0 % in the 25–35 age group. (Table 2, Figure).

3.2.2. DASS prevalence across universities and academic years

Comparing mental health among students from Ajman University and those from other universities, both depression and anxiety showed patterns worth noting. For depression, both groups showed a similar distribution, with 42.4 % of Ajman University students categorized as having normal depression levels, representing 30.4 % of the total population studied. This was not statistically different from other universities, where the proportion was 34 % normal depression levels. Similar trends were observed for other levels of depression severity, all of which were statistically insignificant.

However, anxiety levels did manifest significant disparities. Among Ajman University students, 30.7 %, or 22.0 % of the total population, were classified as normal, a figure that was significantly different from the 19.1 % observed at other universities ($p = 0.036$). The very severe category of anxiety also revealed a significant difference, where 30.7 % of Ajman students were categorized, contrasting with 48.9 % at other universities ($p = 0.002$).

Stress levels, however, did not demonstrate any significant differences between students from Ajman University and those from other universities. When the data was examined by year of study, first-year students showed statistically significant higher rates of normal

Table 2
DASS severity stratified by gender and age ($n = 332$).

Variable		Gender		p		
		Female	Male			
		N (%)	% (T)*	N (%)	% (T)*	
Depression	Normal	101 (37.5)	30.4	32 (50.8)	9.6	0.057
	Mild	33 (12.3)	9.9	9 (14.3)	2.7	0.689
	Moderate	46 (17.1)	13.9	10 (15.9)	3.0	0.841
	Severe	29 (10.8)	8.7	3 (4.8)	0.9	0.134
	Very Severe	60 (22.3)	18.1	9 (14.3)	2.7	0.162
Anxiety	Normal	53 (19.7)	19.7	38 (60.3)	60.3	< 0.001
	Mild	17 (6.3)	6.3	6 (9.5)	9.5	0.368
	Moderate	50 (18.6)	18.6	8 (12.7)	12.7	0.271
	Severe	37 (13.8)	13.8	4 (6.3)	6.3	0.110
	Very Severe	112 (41.6)	41.6	7 (11.1)	11.1	< 0.001
Stress	Normal	68 (25.3)	25.3	39 (61.9)	61.9	< 0.001
	Mild	32 (11.9)	11.9	8 (12.7)	12.7	0.841
	Moderate	53 (19.7)	19.7	7 (11.1)	11.1	0.110
	Severe	65 (24.2)	24.2	4 (6.3)	6.3	0.002
	Very Severe	51 (19.0)	19.0	5 (7.9)	7.9	0.036

Variable		Age								
		18–20			21–24			25–35		
		N (%)	% (T)*	p	N (%)	% (T)	p	N (%)	% (T)*	p
Depression	Normal	122 (40.9)	36.7	0.317	8 (26.7)	2.4	0.110	3 (75.0)	0.9	0.162
	Mild	38 (12.8)	11.4	0.841	4 (13.3)	1.2	0.920	0 (0.0)	–	–
	Moderate	51 (17.1)	15.4	0.689	5 (16.7)	1.5	1.00	0 (0.0)	–	–
	Severe	29 (9.7)	8.7	0.841	3 (10.0)	0.9	0.920	0 (0.0)	–	–
	Very Severe	58 (19.5)	17.5	0.072	10 (33.3)	3.0	0.072	1 (25.0)	0.3	0.841
Anxiety	Normal	80 (26.8)	24.1	0.484	8 (26.7)	2.4	0.920	3 (75.0)	0.9	0.036
	Mild	22 (7.4)	6.6	0.317	1 (3.3)	0.3	0.424	0 (0.0)	–	–
	Moderate	55 (18.5)	16.6	0.162	3 (10.0)	0.9	0.271	0 (0.0)	–	–
	Severe	36 (12.1)	10.8	0.689	4 (13.3)	1.2	0.841	1 (25.0)	0.3	0.424
	Very Severe	105 (35.2)	31.6	0.484	14 (46.7)	4.2	0.194	0 (0.0)	–	–
Stress	Normal	96 (32.2)	28.9	1.00	9 (30.0)	2.7	0.764	2 (50.0)	0.6	0.424
	Mild	39 (13.1)	11.7	0.089	0 (0.0)	–	–	1 (25.0)	0.3	0.424
	Moderate	52 (17.4)	15.7	0.368	7 (23.3)	2.1	0.424	1 (25.0)	0.3	0.689
	Severe	62 (20.8)	18.7	1.00	7 (23.3)	2.1	0.689	0 (0.0)	–	–
	Very Severe	49 (16.4)	14.8	0.549	7 (23.3)	2.1	0.317	0 (0.0)	–	–

Chi-squared test (χ^2) was used, with $p \leq 0.05$ as the significance threshold. The significant values are in bold.

*The percentages provided represent proportions of the total sample.

depression and stress levels, with *p*-values of 0.021 and 0.002, respectively. Second-year students exhibited a noticeable increase in the very severe anxiety category, with 45 % falling into this classification (*p* = 0.021), as well as significant levels of normal stress (21 %; *p* = 0.004). Fourth-year students exhibited a pronounced increase in very severe depression levels, with 83.3 % of students falling into this category, a difference that was highly significant (*p* < 0.001) (Table 3 and Fig. 2).

3.3. DASS scores

Table 4 showcases mean scores and standard deviations (SD) for depression, anxiety, and stress among a student population, broken down by gender, age, academic year, and university affiliation.

Table 3
DASS severity stratified by university and study year (n = 332).

Variable		University					
		Ajman University			Others		<i>p</i>
		N (%)	% (T)*	N (%)	% (T)*		
Depression	Normal	101 (42.4)	30.4	32 (34.0)	9.6	0.162	
	Mild	31 (13.0)	9.3	11 (11.7)	3.3	0.764	
	Moderate	39 (16.4)	11.7	17 (18.1)	5.1	0.689	
	Severe	21 (8.8)	6.3	11 (11.7)	3.3	0.424	
	Very Severe	46 (19.3)	13.9	23 (24.5)	6.9	0.317	
Anxiety	Normal	73 (30.7)	22.0	18 (19.1)	5.4	0.036	
	Mild	20 (8.4)	6.0	3 (3.2)	0.9	0.089	
	Moderate	42 (17.6)	12.7	16 (17.0)	4.8	0.920	
	Severe	30 (12.6)	9.0	11 (11.7)	3.3	0.841	
	Very Severe	73 (30.7)	22.0	46 (48.9)	13.9	0.002	
Stress	Normal	84 (35.3)	25.3	23 (24.5)	6.9	0.057	
	Mild	31 (13.0)	9.3	9 (9.6)	2.7	0.368	
	Moderate	38 (16.0)	11.4	22 (23.4)	6.6	0.110	
	Severe	49 (20.6)	14.8	20 (21.3)	6.0	0.920	
	Very Severe	36 (15.1)	10.8	20 (21.3)	6.0	0.194	

Variable		Study year														
		First Year			Second Year			Third Year			Fourth Year			Fifth Year		
		N (%)	% (T)*	<i>p</i>	N (%)	% (T)*	<i>p</i>	N (%)	% (T)*	<i>p</i>	N (%)	% (T)*	<i>p</i>	N (%)	% (T)*	<i>p</i>
Depression	Normal	92 (44.9)	27.7	0.021	34 (34.0)	10.2	0.134	5 (29.4)	1.5	0.368	0 (0.0)	–	–	2 (50.0)	0.6	0.689
	Mild	27 (13.2)	8.1	0.689	12 (12.0)	3.6	0.841	3 (17.6)	0.9	0.549	0 (0.0)	–	–	0 (0.0)	–	–
	Moderate	31 (15.1)	9.3	0.271	20 (20.0)	6.0	0.317	2 (11.8)	0.6	0.549	1 (16.7)	0.3	1.00	2 (50.0)	0.6	0.072
	Severe	17 (8.3)	5.1	0.271	13 (13.0)	3.9	0.162	2 (11.8)	0.6	0.764	0 (0.0)	–	–	0 (0.0)	–	–
	Very Severe	38 (18.5)	11.4	0.194	21 (21.0)	6.3	0.920	5 (29.4)	1.5	0.368	5 (83.3)	1.5	< 0.001	0 (0.0)	–	–
Anxiety	Normal	66 (32.2)	19.9	0.012	16 (16.0)	4.8	0.002	5 (29.4)	1.5	0.841	1 (16.7)	0.3	0.549	3 (75.0)	0.9	0.036
	Mild	18 (8.8)	5.4	0.089	5 (5.0)	1.5	0.368	0 (0.0)	–	–	0 (0.0)	–	–	0 (0.0)	–	–
	Moderate	37 (18.0)	11.1	0.689	20 (20.0)	6.0	0.424	1 (5.9)	0.3	0.194	0 (0.0)	–	–	0 (0.0)	–	–
	Severe	23 (11.2)	6.9	0.424	14 (14.0)	4.2	0.549	2 (11.8)	0.6	0.920	2 (33.3)	0.6	0.110	0 (0.0)	–	–
	Very Severe	61 (29.8)	18.4	0.004	45 (45.0)	13.6	0.021	9 (52.9)	2.7	0.134	3 (50.0)	0.9	0.484	1 (25.0)	0.3	0.617
Stress	Normal	79 (38.5)	23.8	0.002	21 (21.0)	6.3	0.004	2 (11.8)	0.6	0.057	2 (33.3)	0.6	0.920	3 (75.0)	0.9	0.072
	Mild	29 (14.1)	8.7	0.134	11 (11.0)	3.3	0.689	0 (0.0)	–	–	0 (0.0)	–	–	0 (0.0)	–	–
	Moderate	28 (13.7)	8.4	0.007	23 (23.0)	6.9	0.134	8 (47.1)	2.4	0.001	1 (16.7)	0.3	0.920	0 (0.0)	–	–
	Severe	42 (20.5)	12.7	0.841	22 (22.0)	6.6	0.689	4 (23.5)	1.2	0.764	0 (0.0)	–	–	1 (25.0)	0.3	0.841
	Very Severe	27 (13.2)	8.1	0.021	23 (23.0)	6.9	0.046	3 (17.6)	0.9	0.920	3 (50.0)	0.9	0.028	0 (0.0)	–	–

Chi-squared test (χ^2) was used, with *p* ≤ 0.05 as the significance threshold. The significant values are in bold.

*The percentages provided represent proportions of the total sample.

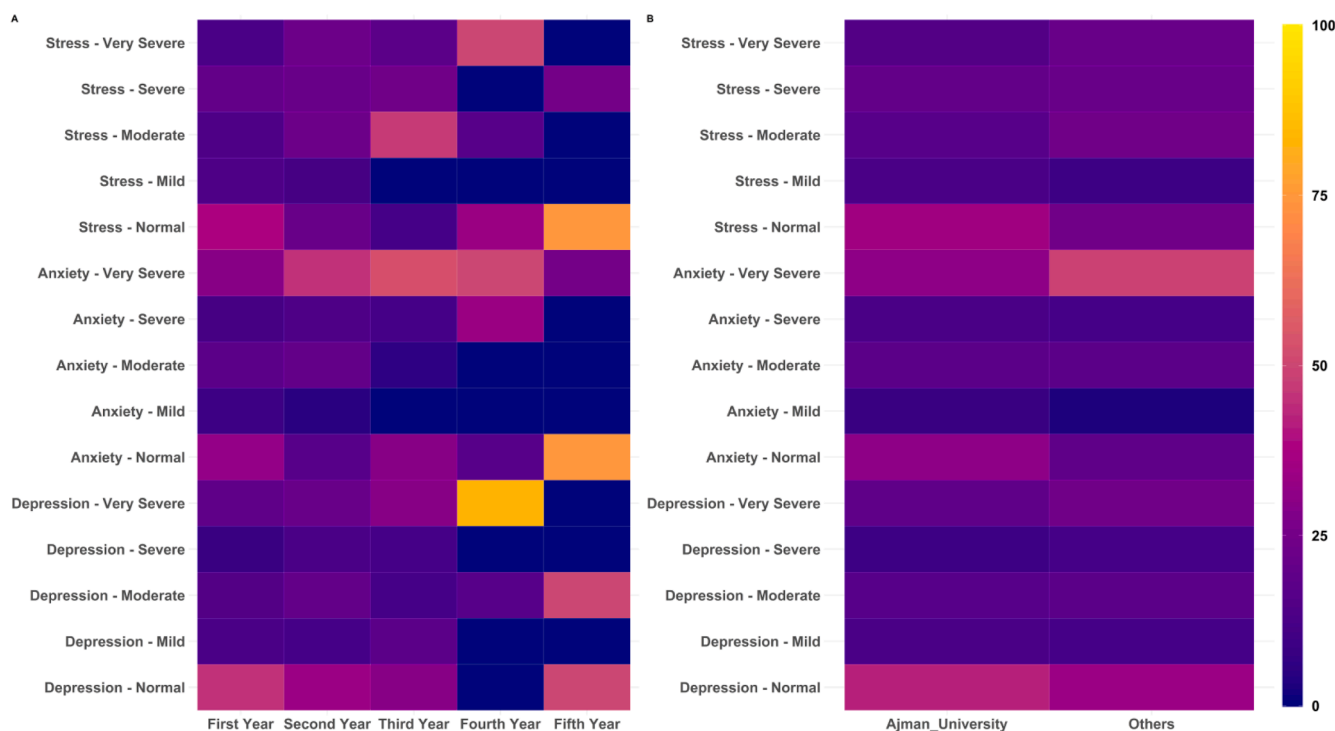


Fig. 2. Severity of DASS scores stratified by university affiliation and academic year.

Table 4
Mean DASS score of the participants (n = 332).

Variable		Depression		Anxiety		Stress	
		Mean ± SD	<i>p</i>	Mean ± SD	<i>p</i>	Mean ± SD	<i>p</i>
Gender	Female	15.80 ± 12.62	0.030	17.63 ± 11.16	< 0.001	22.61 ± 10.85	< 0.001
	Male	12.13 ± 11.95		7.65 ± 9.52		14.54 ± 9.97	
Age	18–20	14.83 ± 12.51	0.423	15.62 ± 11.38	0.153	21.02 ± 11.05	0.371
	21–24	18.07 ± 13.02		18.07 ± 13.15		22.47 ± 12.43	
	25–35	13.50 ± 13.80		6.50 ± 6.61		15.00 ± 5.77	
Study year	First year	13.77 ± 12.66	0.002	14.02 ± 11.31	0.002	19.54 ± 11.06	0.005
	Second year	16.70 ± 12.04		18.28 ± 10.60		23.64 ± 11.04	
	Third year	18.12 ± 11.88		20.82 ± 13.80		24.47 ± 7.80	
	Fourth year	30.33 ± 7.94		21.33 ± 13.60		27.00 ± 12.57	
	Fifth year	8.00 ± 9.24		10.00 ± 17.44		12.50 ± 11.47	
University	Ajman university	14.36 ± 12.58	0.050	14.46 ± 11.44	< 0.001	20.39 ± 11.10	0.063
	Others	16.98 ± 12.39		18.96 ± 11.21		22.81 ± 11.09	

The mean score is after multiplication by 2. The Mann–Whitney test (*U*) and the Kruskal–Wallis test (*H*) were used with a significance level of $p \leq 0.05$. The significant values are in bold.

university perspective, students in the 'Others' category had marginally higher scores across all DASS categories compared to those from Ajman University. Statistical significance was noted for Anxiety and Depression ($p < 0.001$ and $p = 0.050$, respectively). The stratification based on the academic year and university is illustrated in Figs. 3 and 4.

3.4. Year-over-year analysis

Table 5 provides a year-over-year analysis of DASS scores, examining age groups and academic years. Depression scores showed no statistical significance among age groups: for ages 18–20 (Mean Rank = 162.36, $p = 0.196$) and ages 21–24 (Mean Rank = 185.78, $p = 0.196$); as well as between ages 21–24 (Mean Rank = 17.84, $p = 0.555$) and 25–35 (Mean Rank = 14.75, $p = 0.555$). However, significant changes emerged across academic years, specifically between the first year (Mean Rank = 144.58, $p = 0.017$) and the second year (Mean Rank = 170.27, $p = 0.017$).

In anxiety, again no significant differences were observed across age groups: 18–20 (Mean Rank = 140.77, $p = 0.341$) vs. 21–24 (Mean Rank = 178.08, $p = 0.341$), and 21–24 ($p = 0.091$) vs. 25–35 ($p = 0.091$). A statistically significant difference was noted between the first academic year (Mean Rank = 140.77, $p < 0.001$) and the second academic year ($M = 178.08$, $p < 0.001$). For stress, the scores remained statistically similar across both age groups and academic years, with the exception of the first year (Mean Rank = 142.25, $p = 0.002$) and the second year ($M = 175.05$, $p = 0.002$), where a significant difference was observed.

3.5. Multinomial logistic regression

Table 6 summarizes the results of the multinomial logistic regression where participants aged 21–24 exhibit a distinct susceptibility to depression (OR = 6.436, $p = 0.024$, CI = 1.280–32.352). Sophomores show an elevated vulnerability to stress (OR = 4.219, $p = 0.041$, CI = 1.061–16.784), while juniors are also notably susceptible to this

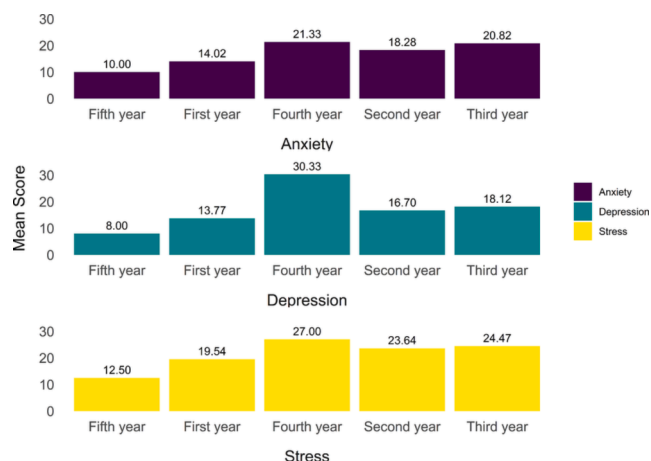


Fig. 3. Mean DASS score of the participants stratified by academic year.

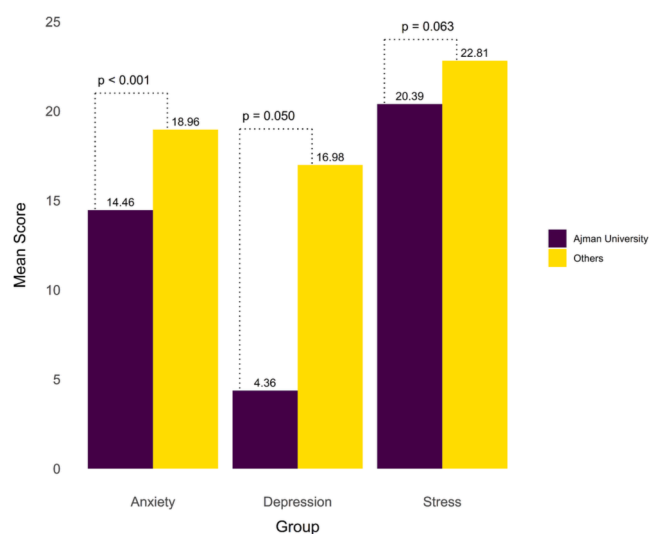


Fig. 4. Mean DASS score of the participants stratified by university.

condition (OR = 9.878, $p = 0.021$, CI = 1.405–69.446). In terms of gender disparities, females manifest a significantly lower susceptibility to anxiety (OR = 0.151, $p < 0.001$, CI = 0.079–0.286) as well as to stress (OR = 0.189, $p < 0.001$, CI = 0.100–0.355).

4. Discussion

Empirical insights into the prevalence and distribution of depression,

Table 5
Pairwise comparison of DASS score across ages and academic years (n = 332).

Mental State	Age				Study year							
	18–20 vs. 21–24		21–24 vs. 25–35		First year vs. Second year		Second year vs. Third year		Third year vs. Fourth year		Fourth year vs. Fifth year	
	Mean Rank	p	Mean Rank	p	Mean Rank	p	Mean Rank	p	Mean Rank	p	Mean Rank	p
Depression	162.36 /	0.196	17.84/	0.555	144.58 /	0.017	58.32 /	0.598	10.35 /	0.049	7.50 /	0.010
	185.78		14.75		170.27		63.00		16.67		2.50	
Anxiety	162.92 /	0.341	18.55 / 9.63	0.091	140.77 /	< 0.001	58.09 /	0.479	11.94 /	0.944	6.58 /	0.162
	180.20		178.08		64.38		12.17		3.88			
Stress	163.19 /	0.430	18.30 /	0.198	142.25 /	0.002	58.80 /	0.874	11.56 /	0.596	6.75 /	0.109
	177.50		11.50		175.05		60.21		13.25		3.63	

The Mann–Whitney test (U) was used with a significance level of 0.05. The significant values are in bold.

anxiety, and stress among university students in the United Arab Emirates, provided by our current investigation, highlight several important aspects of mental health in this unique cultural and educational context. The transition from a structured high school environment to a more autonomous university setting in the UAE emerges as a key factor influencing student mental health. This change often entails a rapid adaptation to new levels of personal and academic responsibility, which can be particularly stressful.

Variations in the prevalence of anxiety and stress based on gender are observed, despite a lack of statistical significance in rates of depression across genders. The data indicate that elevated levels of anxiety and stress are more likely to be experienced by females. This observation is corroborated by similar studies and could be reflective of the cultural dynamics in the UAE, including the balancing of traditional roles and modern academic pressures (Ali et al., 2019; Shukla et al., 2023). These gender-specific findings align with global trends, where higher emotional distress is often reported by females (Bahrami and Yousefi, 2011; McLean et al., 2011). Additional investigations into the contributing variables, which may range from beliefs about uncontrollability of worry to biological factors such as hormonal fluctuations, should be conducted (Bahrami and Yousefi, 2011; Hantsoo and Epperson, 2017).

Patterns in anxiety levels dependent on age are also revealed by our analysis. Lower levels of anxiety in the “normal” category are statistically exhibited by the age group of 25–35, while a consistent prevalence across younger cohorts is maintained. This observation partially aligns

Table 6
Multinomial logistic regression of DASS (n = 332).

Variable	Group	OR	p	CI 95 %
Depression	18–20	4.925	0.055	0.967–25.081
	21–24	6.436	0.024	1.280–32.352
	Study year 1	0.273	0.121	0.053–1.408
	Study year 2	0.413	0.288	0.081–2.114
	Study year 3	0.455	0.412	0.069–2.987
	Female vs. Male	0.641	0.137	0.357–1.152
Anxiety	Ajman University	1.065	0.827	0.608–1.864
	18–20	3.099	0.13	0.716–13.404
	21–24	2.967	0.12	0.753–11.694
	Study year 1	1.153	0.85	0.265–5.026
	Study year 2	2.88	0.161	0.657–12.617
	Study year 3	1.307	0.761	0.234–7.299
Stress	Female vs. Male	0.151	< 0.001	0.079–0.286
	Ajman University	0.82	0.563	0.419–1.607
	18–20	1.396	0.634	0.353–5.525
	21–24	1.278	0.702	0.364–4.488
	Study year 1	1.768	0.418	0.445–7.023
	Study year 2	4.219	0.041	1.061–16.784
Stress	Study year 3	9.878	0.021	1.405–69.446
	Female vs. Male	0.189	< 0.001	0.100–0.355
	Ajman University	0.78	0.433	0.418–1.453

with existing literature. For instance, one study posits that individuals in the age range of 18–25 experience elevated levels of anxiety (Goodwin et al., 2020), possibly due to the transition pressures and adapting to new social and academic environments (Cage et al., 2021; Worsley et al., 2021). Contrarily, other research suggests that increasing age is inversely correlated with symptoms indicative of Generalized Anxiety Disorder, particularly in individuals diagnosed with depressive disorders (Flint et al., 2010). Similar conclusions are echoed in additional research (Jorm, 2000).

Significant disparities in anxiety levels between students from Ajman University and those from other institutions are shown in a cross-university comparison, particularly in all categories except 'very severe' anxiety. Also evident are academic year-specific variations in stress and depression. Lower levels of stress and depression are statistically demonstrated by first-year students, a phenomenon that might be ascribed to the initial 'honeymoon phase' of university life (Cheng et al., 2014). Conversely, significantly elevated rates of depression are manifested by fourth-year students. These rates may be reflective of academic workload and academic workload and uncertainties surrounding job and career prospects (Chi et al., 2023; Mofatteh, 2020) However, the existing literature presents a dichotomous perspective on which academic years are most associated with increased levels of these disorders. Some studies suggest one phase of academic life, while other research offers contradictory evidence (AlJaber, 2020; McLean et al., 2022; Mirza et al., 2021; Siripongpan et al., n.d.).

In terms of susceptibility to mental health conditions, assessment via multinomial logistic regression models corroborates some aspects of existing literature while deviating in others. Enhanced vulnerability to depression during late adolescence to young adulthood is aligned with previous research highlighting this life stage as fraught with potential stressors (Kwong et al., 2019). Additionally, the regression analysis supported the previous claims that elevated stress susceptibility among sophomores and juniors is pointed towards, which deviates from studies emphasizing first-year stress and aligns with theories positing an accumulative effect of academic pressure and responsibilities.

4.1. Limitations and future directions

While this study provides valuable data, it has limitations. The use of a cross-sectional design precludes causal interpretations, and self-reported data is subject to various biases. Additionally, the gender imbalance in our sample limits the generalizability of our findings to the entire student population. Future research should aim to delve deeper into the factors contributing to the trends observed, as well as the institutional differences in anxiety prevalence. Longitudinal studies could offer more definitive insights into the causality and evolution of these mental health conditions over time.

5. Conclusion

The current study offers insights into the mental health landscape among university students in the United Arab Emirates, revealing complex interplays between factors like gender, age, academic year, and institutional affiliation. Females were more likely to experience elevated levels of anxiety and stress, while age and academic year correlated with varying levels of anxiety and depression. Notably, the study identifies academic-year-specific and institutional variances, enriching our understanding of how mental health manifests in higher education settings. Practically, university support services in the UAE could benefit from being more attuned to the of their students. This might include offering counseling that is mindful of the specific challenges faced by students transitioning from high school to university.

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Ethical approval

The study was conducted per the Declaration of Helsinki and approved by the Research Ethics Committee of Ajman University.

Informed consent statement

Written informed consent was obtained from each participant before participation.

Data Availability Statement

All data are contained within the article.

CRediT authorship contribution statement

Samer O. Alalalmeh: Formal analysis. **Omar E. Hegazi:** Formal analysis, Methodology, Writing – original draft, Writing – review & editing. **Moyad Shahwan:** Conceptualization, Data curation, Writing – review & editing, Supervision. **Nageeb Hassan:** Writing – review & editing, Supervision. **Ghala Rashid Humaid Alnuaimi:** Methodology, Writing – original draft. **Raghd F. Alaila:** Writing – original draft, Writing – review & editing. **Ammar Jairoun:** Data curation, Writing – review & editing. **Yomna Tariq Hamdi:** Data curation. **Mina Thamer Abdullah:** Writing – review & editing. **Roaa Mohammed Abdullah:** Methodology. **Samer H. Zyoud:** Formal analysis, Methodology, Methodology, Writing – original draft, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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