



Severity of depression, anxiety, and stress among undergraduate health science students in Abha, Saudi Arabia

Abstract

Background and aims: The medical education process is perceived to be challenging and stressful, posing a danger to the lives of university students, leading to physical, psychosocial health issues and low academic achievement. This study aims to determine the level of depression, anxiety, and stress, and associated factors among undergraduate health science students in Abha, Saudi Arabia. **Methods:** A cross-sectional, descriptive study was conducted at health science departments in Al-Ghad International Colleges (GIC) and King Khalid University (KKU). A pretested self-administered questionnaire was completed by a convenient sample of 350 students. The Scale 21 (DASS-21) inventory of Depression, Anxiety, and Stress was used. **Results:** There were 60% female and 40% male students in the study. Most students reported mild to extremely severe symptoms of depression (47.2%), anxiety (56%), and stress (39.1%). KKU students displayed more depression (52%) than GIC students (42.3%) with a statistically significant difference ($p=0.026$). The findings showed that the relationship between depression and anxiety ($r=0.781$, $p<0.01$), depression and stress ($r=0.693$, $p<0.01$), stress and anxiety ($r=0.794$, $p<0.01$) was positive. A study found that depression, anxiety, and stress scores were significantly higher among female and second-year and below students. **Conclusions:** It can be inferred that among health science students, depression, anxiety, and stress are prevalent. It is critical to improve mental health among undergraduate students. The results suggest that psychological problem assessment and therapy services for undergraduate students should be implemented. We suggest more research studies to get a better understanding of the experience of students with psychological problems based on the study outcomes.

Keywords: Psychological concerns. Psychosocial issues. Medical education.

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INTRODUCTION

Students of undergraduate health science are a special category of individuals who spend four years of study to cover the curriculum plan and eight to 12 months of compulsory internship to obtain the best practical experience in this time. For students to effectively achieve their goals, those four years will be overwhelming. The medical education process is now considered to be a very challenging situation and university students face a great deal of academic, personal, and social stress during their academic literacy.[1,2]

University students are exposed to multiple forms of depression, anxiety, and stress during the first year, which is being primarily linked to academic and emotional causes, whereas patient care and physical factors are more evident in subsequent years. In general, long working hours, a tough learning climate, lack of leisure activities, lack of support from peers, staying away from home or family, uncertain future, academic failure, health issues, financial problems, and marital disputes are common reasons for anxiety and stress

in medical schools.[3] Concerning the source of stressors, the top four stressors in our region were: studying for the examination, thinking about the future, financial expenses, and waiting for results/grades.[4]

Psychological disorders (depression, anxiety, and stress) are more common and are very severe issues for university students. Several studies have identified a higher prevalence of psychological problems among university students, such as stress, anxiety, and depression than in the general population and age-matched peers in later years of training.[5-7] Few researchers have clarified the problem by introducing medical students to particular academic obstacles that make them more prone to stress and anxiety than students in other fields.[8] Three recent studies from Egypt, Oman, and Saudi have shown a high rate of stress, anxiety, and depression among university students in Arab countries.[9-11]

As a significant developing public health issue, mental health among university undergraduate students is critical. Mental health is considered a basic aspect of human health,

according to the World Health Organization (WHO), and an action plan for 2013-2020 has been released to support the prevention, care, and resolution of mental health disorders.[12] Globally, university students are increasingly vulnerable to stress, anxiety, and depression, growing psychological morbidity and impacting their academic performance.[13] Also, stress, anxiety, and depression are correlated with many risk factors, such as age,[14] gender, which can be due to biological factors, specifically being female,[15,16] academic pressure arising from factors, including examinations and study load, and accommodation problems,[17] and financial pressures.[18]

Globally, studies from around the world documented a high prevalence of depression, anxiety, and stress ranging from 20% to 60% among university students.[11,14,19] However, in Arab countries, epidemiological research about psychological problems in medical students is uncommon. For example, the prevalence of depression, anxiety, and stress in Jordan was 62.2%, 65.3%, and 54.2% respectively,[16] while in an Egyptian sample of university students, the prevalence of depression, anxiety, and stress was 60.8%, 64.3%, and 62.4% respectively.[11] A study conducted at King Faisal University, Al-Ahsa in Saudi Arabia reported the prevalence of depression and anxiety as 24.4% and 18% respectively,[20] while a Jazan University study showed that 30% of students suffered from problems related to psychological distress.[21]

In the southern region of Saudi Arabia, there is limited evidence relating to mental health problems among undergraduate students. There are no reported studies that investigate the relationship between stress, anxiety, and depression among university health science students, and researchers have paid little attention to factors associated with mental health problems. The objective of this research is to investigate the prevalence of depression, anxiety, and stress, and to identify their associated factors.

Objectives

1. To determine the level of depression, anxiety, and stress among Al-Ghad International Colleges (GIC) and King Khalid University (KKU) undergraduate students.
2. To examine the effect of certain risk factors as demographic, academic, behavioural, and medical on depression, anxiety, and stress among undergraduates of two groups.

Hypothesis

1. There will be a difference in the level of depression, anxiety, and stress among GIC and KKU undergraduate students.
2. Nursing students will have a high level of depression, anxiety, and stress than non-nursing students.
3. There will be a significant effect of certain sociodemographic risk factors as age group, gender, college/university, department, study year, monthly income, and an apartment on the level of depression, anxiety, and stress among undergraduates of two groups.
4. There will be a significant effect of certain academic, behavioural, and medical risk factors on the level of depression, anxiety, and stress among undergraduates of the two groups.

METHODS

Study design and setting

A descriptive, cross-sectional approach was used. The study was held at GIC and KKU in Abha city, Saudi Arabia (KSA). Data was obtained from students during the first semester of the 2019/2020 academic year.

Population

The research population was undergraduate students who studied at two educational institutions. Inclusion criteria for participants were all students who registered in the first semester of the 2019/2020 academic year and regular enrolled. Students with known mental illness were excluded. The current research included students from all levels of bachelor degrees in nursing science, medical imaging technology, clinical laboratory science, emergency medical service, public health, and anaesthetics. A convenience sample was used to select study participants.

The instrument of data collection

A self-administered questionnaire was used as a data collection method in this study. The instrument consisted of three parts: 1) Sociodemographic variables: age group, gender, university/college, study year, faculty/department, monthly income, and apartment. 2) Background and students' records: academic performance, social status, mental and chronic disorders, coffee drinking, and physical activity. 3) Depression, Anxiety and Stress Scale (Arabic DASS-21). The Arabic DASS-21 consists of 21-items on three scales: depression (DASS-D), anxiety (DASS-A), and stress (DASS-S) using a four-point Likert scale of zero to three.[22] For each scale, the potential range is from zero to 21, with higher scores implying more depression, anxiety, and stress. The Arabic version of DASS-21 was used in the current study after authorisation was obtained from the developer. The Arabic version of the DAS-21 scale was used in Jordan and showed an excellent Cronbach's alpha value of 0.94 with a very good validity.[23] In this study, the Cronbach's for the whole scale was 0.93. Overall, the internal consistency of DASS-21 is good to outstanding, with excellent convergent validity and reasonable discriminative validity.

Data collection procedures

Data collection was carried out during December and January 2019. Among 1000 students in the two study settings, the sample size was calculated to be 278; in an attempt to avoid the attrition rate, 400 questionnaires were sent. With 350 returned questionnaires, the response rate was 87.5%. The introductory letter explicitly indicated that filling the questionnaire is approval of participation. After their lecture in class, the questionnaire was administered to the eligible students and collected immediately to avoid them consulting each other. From each university, a total of 175 questionnaires were returned completely.

Ethical consideration

Ethical approvals were obtained from KKU (ECM#2019-106)-(HAPO-06-B-001) and GIC (GIC-ECM#04 No. 2

[15-12-2019]) before the data collection. The students were fully informed about the nature of the study by using the student datasheet. Participation was obtained from each student before data collection through voluntary and verbal consent. The anonymity of all participants was retained as the questionnaire did not mention any names.

Statistical analysis

The Statistical Package for Social Sciences (SPSS) version 22 was used to analyse data. Descriptive statistics were used to describe sociodemographic characteristics and the prevalence of depression, anxiety, and stress. Based on the prescribed cut-off ratings, the symptoms of depression, anxiety, and stress were grouped into five categories: normal, mild, moderate, severe, and extremely severe. To examine correlations between independent variables with depression, anxiety, and stress, Pearson's chi-squared, student's t-test, and one-way analysis of variance (ANOVA) were used.

RESULTS

Characteristics of study participants

Sociodemographic characteristics of the study sample were presented in Table 1. More than half of students (51.7%) belonged to the age category of fewer than 22 years. The majority of the students were females ($n=210$, 60%), second year and below ($n=152$, 43.5%), with very good academic performance ($n=149$, 42.6%). Majority of students belonged to nursing department ($n=204$, 58.3%) while 146 (41.7%) were from other departments. The majority of the study sample ($n=275$, 78.5%) lived with the family. Data suggested that there was a statistically significant difference in frequency distribution among various demographic variables between GIC and KKU students, such as age ($p=0.042$), study year ($p=0.036$), department ($p<0.001$), and apartment ($p<0.001$).

Prevalence of depression, anxiety, and stress

Data showed that 57.7% (mean±standard deviation [SD]; 4.81 ± 4.68) of GIC students had a normal level of depression compared with 48% (mean±SD; 6.02 ± 5.45) of KKU students, followed by a moderate level of depression (22.3% and 18.3% respectively) with statistical significance ($p=0.026$). Prevalence of normal level of anxiety was more among KKU (45.7% [mean±SD; 5.56 ± 5.04]) compared with 42.2% (mean±SD; 5.73 ± 4.99), followed by extremely severe anxiety (22.9% and 20.6% respectively). No statistically significant difference was observed between the two groups of students ($p=0.749$) regarding anxiety level. The majority of students in two groups of GIC (64%) and KKU (57.8%) showed a normal level of stress with mean±SD of 6.20 ± 5.06 and 6.77 ± 5.56 respectively, followed by mild stress (12.6%) among GIC and moderate stress (15.4%) among KKU students. No statistical significance was observed between the two groups of students regarding stress level ($p=0.321$). This study found the overall prevalence of depression, anxiety, and stress among study groups of students to be 47.2%, 56%, and 39.1% respectively, as presented in Table 2.

Sociodemographic risk factors of depression, anxiety, and stress

Table 3 depicted the association of the sociodemographic factors with depression, anxiety, and stress; significant associations have been reported between the presence of depression and gender ($p<0.001$), and students' department ($p=0.019$). Anxiety was significantly associated with gender ($p<0.001$) and study year ($p=0.016$), while stress was significantly associated only with gender ($p<0.001$). Females were found to be more prone to depression, anxiety, and stress than males (69.1%, 68.9%, 74.5% vs. 30.9%, 31.1%, 25.5% respectively). Nursing students were more vulnerable to depression, anxiety, and stress than students from other departments (64.8%, 61.2%, 62.8% vs. 35.2%, 38.8%, 37.2% respectively), and statistically significant with the level of depression ($p=0.019$). Students studied in KKU were more vulnerable to get depressed and distressed than their peers from GIC (55.2% vs. 44.8%) and (54% vs. 46%) respectively.

Academic, medical, and behavioural risk factors of depression, anxiety, and stress

Significant associations have been reported between depression and academic performance ($p=0.05$), students suffering from mental illness ($p=0.003$), students suffering from chronic illness ($p=0.002$), and practicing physical activity ($p<0.001$). Anxiety was significantly associated with students suffering from chronic illness ($p=0.001$), drinking coffee ($p=0.009$), and practicing physical activity ($p=0.001$). Stress was significantly associated with students suffering from mental and chronic illnesses ($p=0.049$ and $p<0.001$ respectively), and practicing physical activity ($p<0.001$), as shown in Table 4.

DISCUSSION

The present study addressed the level of depression, anxiety, and stress among health science undergraduate students in the southern region of Saudi Arabia. Besides, the effect of certain risk factors as demographic, academic, behavioural, and medical on depression, anxiety, and stress among the studied group were also examined. The sociodemographic factors that were examined in this study were age, gender, study year, specialty, family monthly income, and apartment. Since psychological disorders are common among health science students and have a negative impact on their outcomes,[16] it is essential to address them for purposes of early detection and treatment.

In this study, among the 350 students, the results showed that there was considerable prevalence of depression, anxiety, and stress among studied participants which is in line with other previous studies conducted in many different countries. [1,5,7,11,20] In comparison to depression and stress, anxiety was more prevalent. These results are congruent with the work of Almhdawi *et al.*[16] A comparison between GIC students and KKU students revealed that GIC students had more normal levels of depression and stress, while KKU students showed more normal levels of anxiety. Thus, based on our findings, we can say that there are differences in the level of stress, anxiety, and depression among a group of students in

Table 1: Demographics characteristics of the study group (N=350)

Variables	Study group			χ^2 test p value
	GIC students (n=175)	KKU students (n=175)	Total (N=350)	
	Frequency (%)	Frequency (%)	Frequency (%)	
Age				
<22 years	81 (46.3)	100 (57.1)	181 (51.7)	4.131
≥22 years	94 (53.7)	75 (42.9)	169 (48.3)	0.042*
Gender				
Male	70 (40)	70 (40)	140 (40)	0.001
Female	105 (60)	105 (60)	210 (60)	0.543
Study year				
≤2nd year	82 (46.9)	70 (40)	152 (43.5)	6.646
3rd year	34 (19.4)	55 (31.4)	89 (25.4)	0.036*
≥4th year	59 (33.7)	50 (28.6)	109 (31.1)	
Department				
Nursing	59 (33.7)	145 (82.9)	204 (58.3)	86.912
Non-nursing (EMS, MIT, Labs)	116 (66.3)	30 (17.1)	146 (41.7)	<0.001*
Academic performance				
Excellent	60 (34.3)	63 (36.0)	123 (35.1)	7.535
Very good	67 (38.3)	82 (46.8)	149 (42.6)	0.057
Good	42 (24)	29 (16.6)	71 (20.3)	
Poor	6 (3.4)	1 (0.6)	7 (2)	
Monthly income in SAR				
<8000 SAR	51 (29.1)	67 (38.3)	118 (33.7)	4.303
8000-15000 SAR	68 (38.9)	52 (29.7)	120 (34.3)	0.116
>15000 SAR	56 (32)	56 (32)	112 (32)	
Apartment				
On-campus	5 (2.9)	4 (2.3)	9 (2.6)	19.586
Off-campus	49 (28)	17 (9.7)	66 (18.9)	<0.001*
With family	121 (69.1)	154 (88)	275 (78.5)	

*Significant (p<0.05)

GIC: Al-Ghad International Colleges, KKU: King Khalid University, EMS: Emergency medical service, MIT: Medical imaging technology, Labs: Clinical laboratory science, SAR: Saudi Arabian Riyal

two institutions. Therefore, our first hypothesis is accepted.

The prevalence of depression, anxiety, and stress was 47.8 %, 56.0%, and 39.1% respectively. This prevalence was higher compared with other studies, for instance, Yaacob *et al.*[24] have shown that the prevalence of depression, anxiety, and stress was 41%, 68.9%, and 34.2% respectively among undergraduate medical students. On another hand, the prevalence was lower when compared with Iqbal *et al.*[25] that reported the prevalence was for depression (51.3%), anxiety (66.9%), and stress (53%). The prevalence of stress, anxiety, and depression was 62.4%, 64.3%, and 60.8% respectively among studied medical students in Egypt.[11] A recent study at Jazan University in the southwestern Saudi Arabia found that about one-third of undergraduate students are psychologically distressed.[21] The higher prevalence rate of psychological problems in this study could be due to increased responsibilities where the students have to simultaneously balance their personal and professional life.

Generally, these psychological health problems are alarming among undergraduate health science students.

Regarding demographic variables, our study showed that depression, anxiety, and stress scores were significantly higher by two to three times among female students than male students. Similar findings have been reported earlier in previous literature.[11] Alsalameh *et al.*[26] studied depression among medical students in Saudi Arabia and found that female students experience depression more than male students. Albert[27] studied why is depression more prevalent in women? The findings indicated that female students are more sensitive in their interpersonal relationships and hormonal changes. Furthermore, female health science students have to interact with male patients and colleagues in healthcare institutions which might increase anxiety and stress in a conservative community.[27] In opposite, Amr *et al.*[20] reported that depression and anxiety scores were lower among female Saudi university

Table 2: Distribution of depression, anxiety, and stress among study group (N=350)

Variables	Study group		
	GIC students (n=175)	KKU students (n=175)	Total (N=350)
	Frequency (%)	Frequency (%)	Frequency (%)
Depression			
Normal (0-4)	101 (57.7)	84 (48)	185 (52.8)
Mild (5-6)	15 (8.6)	18 (10.3)	33 (9.4)
Moderate (7-10)	39 (22.3)	32 (18.3)	71 (20.3)
Severe (11-13)	11 (6.3)	26 (14.8)	37 (10.6)
Extremely severe (+14)	9 (5.1)	15 (8.6)	24 (6.9)
Depression score (mean±SD)	4.81±4.68	6.02±5.45	5.41±5.11
	t-test (-2.241), p value (0.026)*		
Anxiety			
Normal (0-3)	74 (42.2)	80 (45.7)	154 (44)
Mild (4-5)	22 (12.6)	19 (10.9)	41 (11.7)
Moderate (6-7)	18 (10.3)	20 (11.4)	38 (10.9)
Severe (8-9)	25 (14.3)	16 (9.1)	41 (11.7)
Extremely severe (+10)	36 (20.6)	40 (22.9)	76 (21.7)
Anxiety score (mean±SD)	5.73±4.99	5.56±5.04	5.65±5.01
	t-test (0.320), p value (0.749)		
Stress			
Normal (0-7)	112 (64)	101 (57.8)	213 (60.9)
Mild (8-9)	22 (12.6)	17 (9.7)	39 (11.1)
Moderate (10-12)	19 (10.8)	27 (15.4)	46 (13.1)
Severe (13-16)	14 (8)	17 (9.7)	31 (8.9)
Extremely severe (+17)	8 (4.6)	13 (7.4)	21 (6)
Stress score (mean±SD)	6.20±5.06	6.77±5.56	6.48±5.33
	t-test (-0.994), p value (0.321)		

*Significant (p<0.05)

GIC: Al-Ghad International Colleges, KKU: King Khalid University, SD: Standard deviation

students. A supportive result for this claim has been found in Beiter *et al.*[8]

The prevalence of depression, anxiety, and stress was higher in the first years, then, it settles down, and finally, in the last years, it raises again. However, the differences were not significant. Radeef and Faisal[28] have found that psychological problems are more prevalent among students who are younger. Young students in the first years might face problems in new accommodation away from their homes and families, socialising issues due to dealing with new students, staff, and friends, and starting studying in English. Furthermore, study background is mainly in Arabic during their school study. While in advanced years of study, stress might raise again from transitioning from theoretical learning in the campus to clinical settings. On the contrary, Cheung *et al.*[29] have reported that depression, anxiety, and stress among nursing students increase proportionately throughout the academic years.

The majority of the students that participated in this study were nursing students (58.3%). The higher rate of

depression, anxiety, and stress among those students can be explained by several possible factors. Health science students have to study a wide range of basic, medical, and nursing science courses, and to go through extensive training for a long period. Transition to study in English might be a burden on students, especially in the first years. Furthermore, nursing students undergo a large number of regular examinations. These attributes require students to sacrifice their time, social relations, and personal activities which leave them anxious and under stress. Thus, based on these findings, we can say that nursing students have a high level of stress, anxiety, and depression than other disciplines' students. Therefore, our second hypothesis is accepted.

Students have reported that the main causes of depression, anxiety, and stress are study, social relations, and financial burden. Several authors have found that strict lecturers and clinic regulations are remarkable causes of depression, anxiety, and stress among health science students.[24] In the same line of thoughts, Al-Shloul and Bdair[4] have found that the plausible stressors that health science students usually complain of were studying for an

Table 3: Sociodemographic risk factors of depression, anxiety, and stress among studied group of students (N=350)

Variables	Depression			Anxiety			Stress		
	Absent	Present	χ^2 test	Absent	Present	χ^2 test	Absent	Present	χ^2 test
	n (%)	n (%)	p value	n (%)	n (%)	p value	n (%)	n (%)	p value
Age group									
<22 years	87 (47)	94 (57)	3.453	80 (51.9)	151 (51.5)	0.006	111 (52.1)	70 (51.1)	0.035
≥22 years	98 (53.0)	71 (43.0)	0.063	74 (48.1)	95 (48.5)	0.938	102 (47.9)	67 (48.9)	0.852
Gender									
Male	89 (48.1)	51 (30.9)	10.749	79 (51.3)	61 (31.1)	14.628	105 (49.3)	35 (25.5)	19.592
Female	96 (51.9)	114 (69.1)	0.001*	75 (48.7)	135 (68.9)	<0.001*	108 (50.7)	102 (74.5)	<0.001*
College/university									
GIC	101 (54.6)	74 (44.8)	3.314	74 (48.1)	151 (51.5)	0.417	112 (52.6)	63 (46)	1.451
KKU	84 (45.4)	91 (55.2)	0.069	80 (51.9)	95 (48.5)	0.518	101 (47.4)	74 (54)	0.228
Study year									
≤2nd year	84 (45.4)	68 (41.2)	1.570	80 (51.9)	72 (36.7)	8.256	102 (47.9)	50 (36.5)	4.472
3rd year	42 (22.7)	47 (28.5)	0.456	32 (20.8)	57 (29.1)	0.016*	49 (23)	40 (29.2)	0.107
≥4th year	59 (31.9)	50 (30.3)		42 (27.3)	67 (34.2)		62 (29.1)	47 (34.3)	
Students' department									
Nursing	97 (52.4)	107 (64.8)	5.530	84 (54.5)	120 (61.2)	1.582	118 (55.4)	86 (62.8)	1.865
Non-nursing	88 (47.6)	58 (35.2)	0.019*	70 (45.5)	76 (38.8)	0.208	95 (44.6)	51 (37.2)	0.172
Monthly income in SAR									
<8000 SAR	65 (35.1)	53 (32.1)	0.434	52 (33.8)	66 (33.7)	0.217	77 (36.2)	41 (30)	1.643
8000-15000 SAR	61 (33)	59 (35.8)	0.805	51 (33.1)	69 (35.2)	0.897	72 (33.8)	48 (35)	0.440
>15000 SAR	59 (31.9)	53 (32.1)		51 (33.1)	61 (31.1)		64 (30)	48 (35)	
Apartment									
On-campus	6 (3.2)	3 (1.8)	2.334	5 (3.2)	4 (2)	1.624	6 (2.8)	3 (2.2)	0.220
Off-campus	30 (16.2)	36 (21.8)	0.311	25 (16.2)	41 (20.9)	0.444	39 (18.3)	27 (19.7)	0.896
With family	149 (80.6)	126 (76.4)		124 (80.6)	151 (77.1)		168 (78.9)	107 (78.1)	

*Significant (p<0.05)

GIC: Al-Ghad International Colleges, KKU: King Khalid University, SAR: Saudi Arabian Riyal

examination, thinking about the future, financial expenses, and waiting for courses grades. More sources of stress and anxiety include academic demands, busy working schedules, time management, financial constraints, peer competition, long hours, and feelings of loneliness due to loss of social time.[30-32] These stressors put health science students at more risk to develop psychological health problems. The third hypothesis that indicated there is a significant effect of certain sociodemographic risk factors on depression, anxiety, and stress among undergraduates was also accepted.

The academic, medical, and behavioural attributes are associated with depression, anxiety, and stress. The results show that about one-third of excellent students complain of depression, anxiety, and stress. This could be explained in light of excellent students are under study pressure to achieve and maintain a high academic performance. Students suffering from chronic illness have more depression, anxiety, and stress than healthy students (p=0.002, p=0.001, and p<0.001 respectively). Students who are practicing physical activity show less depression, anxiety, and stress than students who

are not. Anxiety was significantly associated with students drinking coffee (p=0.009). The fourth hypothesis is accepted as findings show that there is a significant effect of certain academic, behavioural, and medical attributes on the level of depression, anxiety, and stress among undergraduate students.

Health science students deal with a huge amount of knowledge and they are required to master a lot of nursing competencies with frequent examinations over an extended time duty under strict regulations of professionalism. Health science students are more prone to psychological problems due to imbalance in study life, sleep deprivation, and loss of social and recreational activities.[31] These factors of study environment and personal life over several years bear high levels of psychological, emotional, and physical burden on them.

Limitations and strengths

This study has several limitations. First, the sample may not be representative of all undergraduate health science students because the data were collected only from two academic

Table 4: Academic, medical, and behavioural risk factors of depression, anxiety, and stress among studied group of students (N=350)

Variables	Depression			Anxiety			Stress		
	Absent	Present	χ^2 test	Absent	Present	χ^2 test	Absent	Present	χ^2 test
	n (%)	n (%)	p value	n (%)	n (%)	p value	n (%)	n (%)	p value
Academic performance									
Excellent	77 (41.6)	46 (27.9)	7.696	60 (39)	63 (32.1)	4.975	78 (36.6)	45 (32.8)	1.529
Very good	72 (38.9)	77 (46.7)	0.053	68 (44.1)	81 (41.3)	0.174	88 (41.3)	61 (44.6)	0.676
Good	32 (17.3)	39 (23.6)		24 (15.6)	47 (24)		44 (20.7)	27 (19.7)	
Poor	4 (2.2)	3 (1.8)		2 (1.3)	5 (2.6)		3 (1.4)	4 (2.9)	
Student employment - social status									
Study only	139 (75.1)	136 (82.5)	4.965	118 (76.7)	157 (80.1)	3.960	163 (76.5)	112 (81.8)	2.185
Study and work	27 (14.6)	22 (13.3)	0.174	20 (13)	29 (14.8)	0.266	34 (16)	15 (10.9)	0.535
Study, work, and married	5 (2.7)	2 (1.2)		5 (3.2)	2 (1)		5 (2.3)	2 (1.5)	
Study, work, married, and have children	14 (7.6)	5 (3)		11 (7.1)	8 (4.1)		11 (5.2)	8 (5.8)	
Student suffering from mental illness									
No	183 (98.9)	153 (92.7)	8.707	150 (97.4)	186 (94.9)	1.409	208 (79.7)	128 (93.4)	3.870
Yes	2 (1.1)	12 (7.3)	0.003*	4 (2.6)	10 (5.1)	0.235	5 (2.3)	9 (6.6)	0.049*
Student suffering from chronic illness									
No	179 (96.8)	145 (87.9)	9.996	151 (98.1)	173 (88.3)	12.011	206 (96.7)	118 (86.1)	13.577
Yes	6 (3.2)	20 (12.1)	0.002*	3 (1.9)	23 (11.7)	0.001*	7 (3.3)	19 (13.9)	<0.001*
Drinking coffee									
No	56 (30.2)	52 (31.5)	0.891	59 (38.3)	49 (25)	9.426	72 (33.8)	36 (26.3)	4.708
1-2 cups	98 (53)	80 (48.5)	0.641	75 (48.7)	103 (52.6)	0.009*	109 (51.2)	69 (50.3)	0.095
≥3 cups	31 (16.8)	33 (20)		20 (13)	44 (22.4)		32 (15)	32 (23.4)	
Practicing physical activity									
No	72 (38.9)	65 (39.4)	16.413	60 (39)	112 (57.1)	11.407	87 (40.8)	85 (62)	14.991
Yes	113 (61.1)	100 (60.6)	<0.001*	94 (61)	84 (42.9)	0.001*	126 (59.2)	52 (38)	<0.001*

*Significant (p<0.05)

institutions. Second, the results of this study are based on data collection through a self-administered instrument; therefore, some bias is possibly reported. Third, the cross-sectional design used for this study does not interpret the causal inference relationships. A strength lies in studying multi-dimensions of psychological disorders as important phenomenon in particular as the literature on this topic in the study setting is scarce. Another strength is a representative sample in terms of size and diversity.

Conclusion

In conclusion, depression, anxiety, and stress are prevalent among health science students. These psychological disorders have a negative impact on students' well-being, relationships, and their ability to study effectively. Therefore, it is important to establish interventional programmes that regularly screen, detect, monitor, and provide the students at risk with the appropriate interventions at an early stage and to enhance students' overall wellbeing and academic performance.

Recommendations

At the institution's level, certain actions should be taken to reduce depression, anxiety, and stress among health science students such as offering adequate services to handle students' psychological problems. The stakeholders are invited to establish campus activities to help students to relieve their stress and anxiety, and a specialised clinic to follow-up on the students' mental health. Based on the findings of this study, the authors recommend further longitudinal studies and qualitative studies to get a better understanding of students' experience with psychological problems.

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AUTHOR CONTRIBUTIONS

All authors were involved in the development of the proposal and research conception. All of the authors have contributed significantly in data acquisition. **MNA** (ORCID ID: <https://orcid.org/0000-0001-9448-9369>) was involved in data analysis and interpretation. **MNA** and **IAB** (ORCID ID: <https://orcid.org/0000-0002-0429-7265>) wrote the first draft of the manuscript with the inputs and comments from **MMA** (ORCID ID: <https://orcid.org/0000-0003-2597-0428>). All of the authors have contributed significantly and agree with the contents of the final approval of manuscript text.

REFERENCES

- Manpreet K, Maheshwari SK. Depression, anxiety and stress among postgraduate nursing students. *Int J Ther Appl*. 2015;21:12-8.
- Papazisis G, Nicolaou P, Tsiga E, Christoforou T, Sapountzirepia D. Religious and spiritual beliefs, self-esteem, anxiety, and depression among nursing students. *Nurs Health Sci*. 2014;16:232-8.
- Elias H, Ping WS, Abdullah MC. Stress and academic achievement among undergraduate students in Universiti Putra Malaysia. *Procedia Soc Beh Sci*. 2011;29:646-55.
- Al-Shloul MN, Bdair IAA. Assessing sources of stress and coping strategies among Al-Ghad College Students-Abha/KSA. *Int J Public Health Clin Sci*. 2020;6(6):62-77.
- Rathnayake S, Ekanayaka J. Depression, anxiety, and stress among undergraduate nursing students in a public university in Sri Lanka. *Int J Caring Sci*. 2016;9:1020-32.
- Teh CK, Ngo CW, binti Zulkifli RA, Vellasamy R, Suresh K. Depression, anxiety and stress among undergraduate students: a cross sectional study. *Open J Epidemiology*. 2015;5:260-8.
- Vasugi S, Norlizah CH. Depression, anxiety and stress among postgraduate students in faculty of education of a public university in Malaysia. *Mal J Med Health Sci*. 2019;15(suppl1):90-5.
- Beiter R, Nash R, McCrady M, Rhoades D, Linscomb M, Clarahan M, *et al.* The prevalence and correlates of depression, anxiety, and stress in a sample of college students. *J Affect Disord*. 2015;173:90-6.
- Al Bahhawi T, Albasheer OB, Makeen AM, Arishi AM, Hakami OM, Maashi SM, *et al.* Depression, anxiety, and stress and their association with khat use: a cross-sectional study among Jazan University students, Saudi Arabia. *Neuropsychiatr Dis Treat*. 2018;14:2755-61.
- Jahan F, Siddiqui MA, Mitwally M, Al Zubidi NSJ, Al Zubidi HSJ. Perception of stress, anxiety, depression and coping strategies among medical students at Oman Medical College. *Middle East J Family Med*. 2016;14:16–23.
- Wahed WYA, Hassan SK. Prevalence and associated factors of stress, anxiety and depression among medical Fayoum University students. *Alexandria J Med*. 2017;53:77-84.
- World Health Organization. Mental health action plan 2013-2020. Geneva: World Health Organization; 2013.
- Tosevski DL, Milovancevic MP, Gajic SD. Personality and psychopathology of university students. *Curr Opin Psychiatry*. 2010;23:48-52.
- Shamsuddin K, Fadzil F, Ismail WSW, Shah SA, Omar K, Muhammad NA, *et al.* Correlates of depression, anxiety and stress among Malaysian university students. *Asian J Psychiatr*. 2013;6:318-23.
- Bangasser DA, Curtis A, Reyes BA, Bethea TT, Parastatidis I, Ischiropoulos H, *et al.* Sex differences in corticotropin-releasing factor receptor signaling and trafficking: potential role in female vulnerability to stress-related psychopathology. *Mol Psychiatry*. 2010;15:896-904.
- Almhdawi KA, Kanaan SF, Khader Y, Al-Hourani Z, Almomani F, Nazzal M. Study-related mental health symptoms and their correlates among allied health professions students. *Work*. 2018;61:391-401.
- Kumaraswamy N. Academic stress, anxiety and depression among college students: a brief review. *Int Rev Soc Sci Humanit*. 2013;5:135-43.
- Kruisselbrink Flatt A. A suffering generation: six factors contributing to the mental health crisis in North American higher education. *Coll Q*. 2013;16:1-17.
- Lovell GP, Nash K, Sharman R, Lane BR. A cross-sectional investigation of depressive, anxiety, and stress symptoms and health-behavior participation in Australian university students. *Nurs Health Sci*. 2015;17:134-42.
- Amr M, Amin TT, Saddichha S, Al Malki S, Al Samail M, Al Qahtani N, *et al.* Depression and anxiety among Saudi university students: prevalence and correlates. *Arab J Psychiatr*. 2013;44:1-14.
- Hakami RM. Prevalence of psychological distress among undergraduate students at Jazan University: a cross-sectional study. *Saudi J Med Med Sci*. 2018;6(2):82-8.
- Lovibond SH, Lovibond PF. *Manual for the depression anxiety stress scales*. 2nd ed. Sydney: Psychology Foundation; 1995.
- Hamaideh SH. Alexithymia among Jordanian university students: its prevalence and correlates with depression, anxiety, stress, and demographics. *Perspect Psychiatr Care*. 2017;54:274-80.
- Yaacob M, Harun NA, Ramli F, Razak HA, Sajuni NA. Depression, anxiety and stress among dental undergraduate students: prevalence, stressors and relieving factors. *Int Med J Malaysia*. 2018;17:123-9.
- Iqbal S, Gupta S, Venkatarao E. Stress, anxiety and depression among medical undergraduate students and their socio-demographic correlates. *Indian J Med Res*. 2015;141:354-7.
- Alsalamah NS, Alkhalifah AK, Alkhalidi NK, Alkulaib AA. Depression among medical students in Saudi Arabia. *Egyptian J Hosp Med*. 2017;68:974-81.
- Albert PR. Why is depression more prevalent in women? *J Psychiatry Neurosci*. 2015;40:219-21.
- Radeef AS, Faisal GG. Depression, anxiety and stress with possible sources of stressors among undergraduate medical students in Malaysia. *Brunei Int Med J*. 2016;12:18-25.
- Cheung T, Wong SY, Wong KY, Law LY, Ng K, Tong MT, *et al.* Depression, anxiety and symptoms of stress among baccalaureate nursing students in Hong Kong: a cross-sectional study. *Int J of Environ Res Public Health*. 2016;13:779-803.
- Hoe DC, Wah CK, Rian CA, Eliza Au E, Goud BK, Kamath U. Stress manifestations of medical students and its relation with gender and life style changes. *Int Med J Stud Res*. 2012;2:37-45.
- Muzafar Y, Khan HH, Ashraf H, Hussain W, Sajid H, Tahir M, *et al.* Burnout and its associated factors in medical students of Lahore, Pakistan. *Cureus*. 2015;7(11):e390-e401.
- Shendarkar AT, Patil V. A study of stressors in medical college students (hostelities) in northern Maharashtra. *J Indian Acad Forensic Med*. 2013;35:227-9.

Alshloul MN, Bdair IA, Alalyani MM. Severity of depression, anxiety, and stress among undergraduate health sciences students in Abha, Saudi Arabia. *Open J Psychiatry Allied Sci*. 2021 Mar 26. Epub ahead of print.

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