

GENDER DIFFERENCES IN SCORES OF ANXIETY AND DEPRESSION AMONG PHYSICAL THERAPY STUDENTS OF SAUDI ARABIA: A CROSS-SECTIONAL STUDY

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ABSTRACT

Purpose: The current study aimed to determine the prevalence of depression and anxiety disorders among physical therapy students and to identify any gender differences.

Methods: This study used a cross-sectional approach to investigate physical therapy students and collected data via the Beck Depression Inventory and Beck Anxiety Inventory as well as demographic and social information. Data collection occurred during the middle of the 2016/17 academic year, beginning in the second week of the academic term, and finishing in the fifth week. Data analysis was performed using descriptive statistics and chi-square tests.

Results: Among the 215 students included in this study, the prevalence of anxiety and depression was 33% and 34% respectively. In addition, gender differences showed that female students were more likely to experience severe and moderate anxiety levels compared to male students.

Conclusions: Physical therapy students reported alarming levels of anxiety and depression. Gender differences also existed with regard to anxiety and other factors. The presence of mental health concerns potentially compromises the academic achievement and quality of life for students. Urgent intervention is required to avoid or at least reduce such high levels of anxiety and depression among university students.

KEYWORDS: Depression, Anxiety, Physical Therapy, Students, Health Education.

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INTRODUCTION

Research has identified the presence of stress and depressive symptoms among students from several medical and health schools, such as nursing and dentistry [1]. Applied medical sciences students, in comparison to their medical school counterparts, had higher rates of loneliness, anxiety, and depression [2].

A significant proportion of health profession students suffer from depression [3]. In particular, high levels of depression, anxiety and stress

have been evident among medical and dental students in Saudi Arabia [4]. However, the literature reveals a paucity of studies about Saudi Arabian students outside of medical and dental schools. One study, which was done in Turkey, found that 18.9% of students from a physical therapy school experienced high levels of depression [5]. However, this study is the only investigation examining a specific applied medical science.

Physical therapy represents one of the most important health care professionals. Students

aspiring to become licenced physical therapists in Saudi Arabia need to complete a bachelor degree in Physical Therapy and Rehabilitation Science. The majority of physical therapy programs in Saudi Arabia consist of one foundational year followed by three years that teach students all physical therapy courses, including basic science as well as theoretical, practical, and clinical physical therapy courses. Moreover, Saudi physical therapists need to complete 12 months of clinical training, known as an internship, in the fifth year. Due to the length and intensity of this program, mental health issues represent a possible concern.

Among mental health issues, the presence of anxiety and depression may affect the learning process due to their influences on cognitive functions. College students comprise a particularly susceptible population to mental health issues due the intensive and extensive theoretical and practical contents as well as the competition among students. International studies have revealed the detrimental consequences of mental health issues for college students[6].

In particular, mental distress during medical school causes personal suffering, as evidenced among physicians[7], subsequently affecting medical services provided to patients. The findings from studies on physicians and their implications can similarly apply to other health professions.

To this date, the literature has neglected to investigate the psychological wellbeing of physical therapy students. Therefore, the current study aimed to determine the prevalence and levels of depression and anxiety among students studying physical therapy. In addition, this investigation sought to identify the existence of gender differences in depression and anxiety.

METHODS

This investigation involves a descriptive cross-sectional study conducted on Saudi students taking an undergraduate physical therapy program in Saudi governmental universities. The ethical approval was granted. All students have provided consent to participate in this study.

Participants: All Saudi students enrolled in the physical therapy program at the time of the

study, with the exception of interns, were eligible to participate in the investigation. The Physical Therapy program is taught in 14 Saudi universities overall the country. The sample size was calculated using the formula for estimation of a proportion[8]:

$$N = [4(Z_{crit})^2 P(1-p)] \div D^2$$

Where,

N = Number of participants

Zcrit = the standard normal deviate, corresponding to a significance criterion of 0.05 (95), = 1.960

D = Amount of error we will tolerate = +/- 5%

P = Pre-study estimate of the prevalence of depression among health allied students, 18.9% as reported in a previous Saudi study[5].

N = 226 Physical therapy students were to be included in the study.

The questionnaires were sent to volunteers who took the lead for data collection in five governmental universities. The selected five universities are the largest universities in the five major regions [North, South, East, West, and Middle regions] in Saudi Arabia. Students were requested to respond in a confidential manner. Fifty students were randomly selected from each of the five universities. However, 250 questionnaires were distributed and 215 were returned (86% response rate). Data collection occurred during the middle of the 2017/18 academic term, beginning in the second week of the academic term and finishing in the fifth week. The timing of the data collection aimed to avoid the examination period so that examination related stress refrained from impacting student responses. All Saudi Universities operate on a single-gender basis, where males and females attend separate campuses. The majority of students in the study have Saudi ethnicity and cultural background. In addition, Saudi university students usually receive a monthly financial reward of \$267 USD as well as exemptions from paying university tuition. The probability of enrolment in Physical Therapy programs throughout Saudi Universities remains similar regardless of gender or marital status. Prior to the commencement of data collection, the questionnaire was pre-tested on 20 students. The students who took part in the pre-test were excluded from the study.

Evaluation Measures: Participants received evaluation forms for Beck’s Depression Inventory (BDI) and Beck’s Anxiety Inventory (BAI). Developed in 1972, the BDI represents a standard measure for assessing depression[9, 10].In 1996, the BDI underwent revision in response to the American Psychiatric Association’s publication of the Diagnostic and Statistical Manual of Mental Disorders Fourth Edition (DSM-IV), which changed many of the diagnostic criteria for Major Depressive Disorders. The BDI involves a 21-question multiple-choice self-report inventory that measures the severity of depression. In the latest edition of the BDI, each answer is scored on a scale value of 0 to 3, with the total score ranging between 0 and 63. Based on the test’s assessment criteria, higher scores totals indicate more severe depressive symptoms. The BDI classifies scores into three levels of depression: mild, moderate, and severe[11]. This assessment tool obtains significant usage because of its strong specificity and sensitivity in the ability to detect depression among university students as well as its high reliability and validity[12].

In this study, anxiety symptoms were assessed using Beck’s Anxiety Inventory (BAI), developed in 1988[9,10] designed for an age range of 17–80 years, BAI consists of 21 questions concerning the subject’srecent feelings, expressed as common symptoms of anxiety. The total score ranges between 0-63, with higher scores indicating more severe levels of anxiety. As in the case of the BDI, the test ranks anxiety levels into three categories: mild, moderate, and severe [11].

In addition to these two assessments, the study collected other information, such as demographic data, year of study, English language level, satisfaction, grade point average (GPA), and monthly stipend provided from the Saudi government for financial support, health status, and smoking status.

Statistical Analysis: The descriptive statistics, which involve counts and percentage, were calculated. In particular, a chi-square test assessed any differences between male and female students as well as other factors that contributed to depression and anxiety. When

80% of the cells showed an expected count of less than five, Fisher’s exact test replaced the chi-square test. All statistical analyses were performed using IBM SPSS version 21 (Chicago, IL, USA).

RESULTS

Table 1: Descriptive characteristics of the participants.

Variables	Column1	N (%)
Age (Years)	19 or younger	10 (4.7)
	20	39 (18.1)
	21	54 (25.1)
	22	59 (27.4)
	23	33 (15.3)
	24	9 (4.2)
	25 or older	11 (5.1)
Gender	Female	134 (62.3)
	Male	81 (37.7)
Marital Status	Married	10 (4.7)
	Single	205 (95.3)
Year of study	First	19 (8.8)
	Second	24 (11.2)
	Third	53 (24.7)
	Fourth	63 (29.3)
	Fifth	36 (16.7)
	Sixth	20 (9.3)
English Language level	Poor	16 (7.4)
	Good	80 (37.2)
	Very good	80 (37.2)
	Excellent	39 (18.1)
Satisfaction	No	43 (20.0)
	Yes	172 (80.0)
GPA	Poor	13 (6.0)
	Good	64 (29.8)
	Very good	84 (39.1)
	Excellent	54 (25.1)
Stipend (Monthly payment from the University)	No	46 (21.4)
	Yes	169 (78.6)
Health Status	No	54 (25.1)
	Maybe	106 (49.3)
	Yes	55 (25.6)
Anxiety	Mild	144 (67.0)
	Moderate	46 (21.4)
	Severe	25 (11.6)
Depression	Mild	142 (66.0)
	Moderate	43 (20.0)
	Severe	30 (14.0)
Smoking Status	No	182 (84.7)
	Yes	33 (15.3)
Total		215 (100.0)

Table 2: Inferential analysis of Anxiety and other factors.

Column1	Column2	Column3	Column4	Column5	Column6	Column7
Variables		Anxiety N (%)			Total N (%)	P-value
		Mild	Moderate	Severe		
Age (Years)	≤19	6 (4.2%)	2 (4.3%)	2 (8.0%)	10 (4.7%)	0.331
	20	25 (17.4%)	8 (17.4%)	6 (24.0%)	39 (18.1%)	
	21	35 (24.3%)	15 (32.6%)	4 (16.0%)	54 (25.1%)	
	22	44 (30.6%)	8 (17.4%)	7 (28.0%)	59 (27.4%)	
	23	23 (16.0%)	7 (15.2%)	3 (12.0%)	33 (15.3%)	
	24	3 (2.1%)	3 (6.5%)	3 (12.0%)	9 (4.2%)	
	≥25	8 (5.6%)	3 (6.5%)	0 (0.0%)	11 (5.1%)	
Gender	Female	82 (56.9%)	31 (67.4%)	21 (84.0%)	134 (62.3%)	0.023*
	Male	62 (43.1%)	15 (32.6%)	4 (16.0%)	81 (37.7%)	
Marital Status	Married	6 (4.2%)	2 (4.3%)	2 (8.0%)	10 (4.7%)	0.613
	Single	138 (95.8%)	44 (95.7%)	23 (92.0%)	205 (95.3%)	
Year of Study	First	11 (7.6%)	4 (8.7%)	4 (16.0%)	19 (8.8%)	0.546
	Second	17 (11.8%)	4 (8.7%)	3 (12.0%)	24 (11.2%)	
	Third	37 (25.7%)	13 (28.3%)	3 (12.0%)	53 (24.7%)	
	Forth	46 (31.9%)	9 (19.6%)	8 (32.0%)	63 (29.3%)	
	Fifth	22 (15.3%)	10 (21.7%)	4 (16.0%)	36 (16.7%)	
	Sixth	11 (7.6%)	6 (13.0%)	3 (12.0%)	20 (9.3%)	
English Language Level	Poor	11 (7.6%)	4 (8.7%)	1 (4.0%)	16 (7.4%)	0.132
	Good	51 (35.4%)	24 (52.2%)	5 (20.0%)	80 (37.2%)	
	Very Good	54 (37.5%)	13 (28.3%)	13 (52.0%)	80 (37.2%)	
	Excellent	28 (19.4%)	5 (10.9%)	6 (24.0%)	39 (18.1%)	
Satisfaction	No	20 (13.9%)	12 (26.1%)	11 (44.0%)	43 (20.0%)	0.001*
	Yes	124 (86.1%)	34 (73.9%)	14 (56.0%)	172 (80.0%)	
GPA	Poor	6 (4.2%)	5 (10.9%)	2 (8.0%)	13 (6.0%)	0.365
	Good	38 (26.4%)	17 (37.0%)	9 (36.0%)	64 (29.8%)	
	Very Good	62 (43.1%)	14 (30.4%)	8 (32.0%)	84 (39.1%)	
	Excellent	38 (26.4%)	10 (21.7%)	6 (24.0%)	54 (25.1%)	
Stipend (Monthly payment from the University)	No	27 (18.8%)	12 (26.1%)	7 (28.0%)	46 (21.4%)	0.397
	Yes	117 (81.3%)	34 (73.9%)	18 (72.0%)	169 (78.6%)	
Health Status	No	28 (19.4%)	18 (39.1%)	8 (32.0%)	54 (25.1%)	0.051
	May be	73 (50.7%)	20 (43.5%)	13 (52.0%)	106 (49.3%)	
	Yes	43 (29.9%)	8 (17.4%)	4 (16.0%)	55 (25.6%)	
Depression	Mild	121 (84.0%)	16 (34.8%)	5 (20.0%)	142 (66.0%)	0.000*
	Moderate	16 (11.1%)	18 (39.1%)	9 (36.0%)	43 (20.0%)	
	Severe	7 (4.9%)	12 (26.1%)	11 (44.0%)	30 (14.0%)	
Smoking Status	No	125 (86.8%)	37 (80.4%)	20 (80.0%)	182 (84.7%)	0.458
	Yes	19 (13.2%)	9 (19.6%)	5 (20.0%)	33 (15.3%)	

*Significance level set $p \leq 0.05$

A total of 215 students were included in this study. The majority of students were aged 21 or 22, studying in their third or fourth year, female, single, and possessing good or very good English levels. The findings revealed that 20% of Saudi physical therapy students were not satisfied with their potential career choice. However, the majority of students obtained a good or very good GPA (30% and 39% respectively). In addition, 21% of this sample did not receive the monthly stipend payment. Regarding health status, 25% of the sample considered them-

selves as unhealthy, 49% reported doubt about their health status, and 15% of these students were smokers (Table 1).

Anxiety and depression findings revealed that 33% of this sample showed moderate and severe anxiety while 34% of the students stated that their depression fluctuated between moderate and severe (Table 1). The mean (SD) of anxiety was 17.2 (12.7) and the median (range) was 15.0 (0-59). For depression, the mean (SD) was 16.2 (12.0) and median (range) was 14.0 (0-63).

The relationship between gender and depression differed significantly among the different anxiety levels. Among the students with severe anxiety, a greater number were female and experienced severe depression. Similarly, students with moderate anxiety had a greater likelihood of being female and experiencing moderate depression (Table 2).

The variables of age, year of study, and anxiety differed significantly across the depression

levels. Students with severe depression were more likely to be 21 years old, studying in their third year, and experiencing moderate to severe anxiety. Students with moderate depression were more likely to be 22 or 23 years old, studying in their fourth or fifth years, and experiencing a moderate anxiety level (Table 3).

Table 3: Inferential analysis of Depression and other factors.

Column1	Column2	Column3	Column4	Column5	Column6	Column7
Variables		Depression			Total N (%)	P-value
		Mild	Moderate	Severe		
Age (Years)	≤19	4 (2.8%)	4 (9.3%)	2 (6.7%)	10 (4.7%)	0.020*
	20	28 (19.7%)	8 (18.6%)	3 (10.0%)	39 (18.1%)	
	21	38 (26.8%)	5 (11.6%)	11 (36.7%)	54 (25.1%)	
	22	42 (29.6%)	10 (23.3%)	7 (23.3%)	59 (27.4%)	
	23	22 (15.5%)	9 (20.9%)	2 (6.7%)	33 (15.3%)	
	24	2 (1.4%)	4 (9.3%)	3 (10.0%)	9 (4.2%)	
	≥25	6 (4.2%)	3 (7.0%)	2 (6.7%)	11 (5.1%)	
Gender	Female	85 (59.9%)	28 (65.1%)	21 (70.0%)	134 (62.3%)	0.532
	Male	57 (40.1%)	15 (34.9%)	9 (30.0%)	81 (37.7%)	
Marital Status	Married	7 (4.9%)	3 (7.0%)	0 (0.0%)	10 (4.7%)	0.481
	Single	135 (95.1%)	40 (93.0%)	30 (100.0%)	205 (95.3%)	
Year of study	First	10 (7.0%)	6 (14.0%)	3 (10.0%)	19 (8.8%)	0.036*
	Second	18 (12.7%)	3 (7.0%)	3 (10.0%)	24 (11.2%)	
	Third	39 (27.5%)	5 (11.6%)	9 (30.0%)	53 (24.7%)	
	Fourth	47 (33.1%)	11 (25.6%)	5 (16.7%)	63 (29.3%)	
	Fifth	20 (14.1%)	11 (25.6%)	5 (16.7%)	36 (16.7%)	
	Sixth	8 (5.6%)	7 (16.3%)	5 (16.7%)	20 (9.3%)	
English Language Level	Poor	7 (4.9%)	5 (11.6%)	4 (13.3%)	16 (7.4%)	0.015*
	Good	52 (36.6%)	19 (44.2%)	9 (30.0%)	80 (37.2%)	
	Very Good	63 (44.4%)	7 (16.3%)	10 (33.3%)	80 (37.2%)	
	Excellent	20 (14.1%)	12 (27.9%)	7 (23.3%)	39 (18.1%)	
Satisfaction	No	14 (9.9%)	14 (32.6%)	15 (50.0%)	43 (20.0%)	0.000*
	Yes	128 (90.1%)	29 (67.4%)	15 (50.0%)	172 (80.0%)	
GPA	Poor	5 (3.5%)	6 (14.0%)	2 (6.7%)	13 (6.0%)	0.001*
	Good	31 (21.8%)	18 (41.9%)	15 (50.0%)	64 (29.8%)	
	Very Good	65 (45.8%)	13 (30.2%)	6 (20.0%)	84 (39.1%)	
	Excellent	41 (28.9%)	6 (14.0%)	7 (23.3%)	54 (25.1%)	
Stipend (Monthly payment from the University)	No	24 (16.9%)	17 (39.5%)	5 (16.7%)	46 (21.4%)	0.005*
	Yes	118 (83.1%)	26 (60.5%)	25 (83.3%)	169 (78.6%)	
Health Status	No	32 (22.5%)	13 (30.2%)	9 (30.0%)	54 (25.1%)	0.765
	May be	72 (50.7%)	21 (48.8%)	13 (43.3%)	106 (49.3%)	
	Yes	38 (26.8%)	9 (20.9%)	8 (26.7%)	55 (25.6%)	
Anxiety	Mild	121 (85.2%)	16 (37.2%)	7 (23.3%)	144 (67.0%)	0.000*
	Moderate	16 (11.3%)	18 (41.9%)	12 (40.0%)	46 (21.4%)	
	Severe	5 (3.5%)	9 (20.9%)	11 (36.7%)	25 (11.6%)	
Smoking Status	No	125 (88.0%)	35 (81.4%)	22 (73.3%)	182 (84.7%)	0.103
	Yes	17 (12.0%)	8 (18.6%)	8 (26.7%)	33 (15.3%)	

* Significance level set $p \leq 0.05$

The factors of GPA, stipend, health status, smoking, and anxiety differed significantly for male and female students. Female students had a higher likelihood of having an excellent GPA, receiving stipend payments, experiencing an unhealthy status, refraining from smoking, and experiencing moderate to severe anxiety. On the other hand, male students were more likely to have a good or very good GPA, not receive stipend payments, and have good health status, smoke, and experience mild anxiety (Table 4).

Table 4: Inferential analysis based on Gender differences.

Column1	Column2	Column3	Column4	Column5	Column6
Variables	Gender	Total		N (%)	P-value
		Female N (%)	Male N (%)		
Age (Years)	≤19	7 (5.2%)	3 (3.7%)	10 (4.7%)	0.006*
	20	28 (20.9%)	11 (13.6%)	39(18.1%)	
	21	42 (31.3%)	12 (14.8%)	54 (25.1%)	
	22	33 (24.6%)	26 (32.1%)	59 (27.4%)	
	23	15 (11.2%)	18 (22.2%)	33 (15.3%)	
	24	6 (4.5%)	3 (3.7%)	9 (4.2%)	
	≥25	3 (2.2%)	8 (9.9%)	11 (5.1%)	
Marital status	Married	8 (6.0%)	2 (2.5%)	10 (4.7%)	0.326
	Single	126 (94.0%)	79 (97.5%)	205(95.3%)	
English Language Level	Poor	7 (5.2%)	9 (11.1%)	16 (7.4%)	0.445
	Good	52 (38.8%)	28 (34.6%)	80 (37.2%)	
	Very Good	51 (38.1%)	29 (35.8%)	80 (37.2%)	
	Excellent	24 (17.9%)	15 (18.5%)	39 (18.10%)	
Satisfaction	No	23 (17.20%)	20 (24.70%)	43 (20.0%)	0.181
	Yes	111 (82.8%)	61 (75.3%)	172 (80.0%)	
GPA	Poor	6 (4.5%)	7 (8.6%)	13 (6.0%)	0.007*
	Good	35 (26.1%)	29 (35.8%)	64 (29.8%)	
	Very Good	49 (36.6%)	35 (43.2%)	84 (39.1%)	
	Excellent	44 (32.8%)	10 (12.3%)	54 (25.1%)	
Stipend (Monthly payment from	No	19 (14.2%)	27 (33.3%)	46 (21.4%)	0.001*
	Yes	115 (85.8%)	54 (66.7%)	169(78.6%)	
Health Status	No	41 (30.6%)	13 (16.0%)	54 (25.1%)	0.002*
	May be	69 (51.5%)	37 (45.7%)	106(49.3%)	
	Yes	24 (17.9%)	31 (38.3%)	55 (25.6%)	
Depression	Mild	85 (63.4%)	57 (70.4%)	142(66.0%)	0.532
	Moderate	28 (20.9%)	15 (18.5%)	43 (20.0%)	
	Severe	21 (15.7%)	9 (11.1%)	30 (14.0%)	
Smoking	No	124 (92.5%)	58 (71.6%)	182(84.7%)	0.000*
	Yes	10 (7.5%)	23 (28.4%)	33 (15.3%)	
Anxiety	Mild	82 (61.2%)	62 (76.5%)	144(67.0%)	0.026*
	Moderate	31 (23.1%)	15 (18.5%)	46 (21.4%)	
	Severe	21 (15.7%)	4 (4.9%)	25 (11.6%)	
Year of Study	First	12 (9.0%)	7 (8.6%)	19 (8.8%)	0.474
	Second	11 (8.2%)	13 (16.0%)	24 (11.2%)	
	Third	37 (27.6%)	16 (19.8%)	53 (24.7%)	
	Forth	41 (30.6%)	22 (27.2%)	63 (29.3%)	
	Fifth	21 (15.7%)	15 (18.5%)	36 (16.7%)	
	Sixth	12 (9.0%)	8 (9.9%)	20 (9.3%)	

* Significance level set $p \leq 0.05$

DISCUSSION

This study aimed to determine the prevalence of depression and anxiety as well as identify differences between male and female physical therapy students with respect to depression and anxiety. This study represents the first investigation that examines the presence of depression and anxiety among students who study physical therapy programs in an Arabic country. Unfortunately, the results demonstrated higher levels of both anxiety and depression among Saudi physical therapy students in comparison to the levels revealed in previously published results of students in different countries. In addition, this study found gender differences with respect to anxiety and other variables such as GPA, stipend, health status, and smoking.

The prevalence of both depression and anxiety in physical therapy students displays consistency with previous results documenting higher levels of these disorders among physical therapy students in Turkey [5]. The mean anxiety levels among Saudi students are significantly higher than those among Turkish students. On the BAI, the mean score of Saudi students more than doubled the mean score of Turkish students (17 vs. 8). The maximum value of Saudi students reached 59 while the maximum value of their Turkish counter parts reached 33. This substantially large difference in BAI scores among the physical therapy students of these two countries may result from internal factors, environmental variables, or a combination of both factors. For example, some students may have been raised in stressful and anxiety-provoking circumstances, such as abusive or chaotic environments. Studies found that high levels of anxiety affect academic performance, self-esteem, and social relationships [13].

The significantly high mean and recorded maximum values of anxiety among Saudi students highlight the necessity for interventions to prevent future physical therapists or health care professionals from experiencing mental disorders.

Among the general population, women have a higher lifetime risk of anxiety in comparison to men [14]. The results of this investigation concur with a previous study that found a signi-

-ficant correlation between female students and higher anxiety levels [5]. The current study also confirmed previous findings that the female sex may represent a risk factor for increased anxiety among physical therapy students [5]; however, this finding requires confirmation from a prospective cohort study.

In the present study, physical therapy students showed high levels of depression in comparison to their counterparts in the Turkish study [5]. While Saudi students' BDI scores displayed a mean of 16 with a maximum value of 63, Turkish students had a mean of 8 with maximum value of only 27. These extremely high levels of depression among Saudi students exceed the levels among the general population as found in the literature; for example, Nyenhuis et al. found that the general Saudi population displayed a mean BDI score of 6.8 [15]. A scarcity of literature exists regarding the prevalence of depression and anxiety among Physical Therapy students. While this limitation has impeded an accurate comparison between this study and existing literature; several studies have investigated students in other healthcare fields, such as medicine and nursing. In the current study, the percentage of students with anxiety and depression (34%) was higher than previously reported results among medical students in other Arabic countries: Lebanon (28%) [16], Saudi Arabia (16.2%) [17], and Egypt (26.6%) [18]. In addition, international studies revealed even lower prevalence rates for depression: Los Angeles (25%) [19], Texas (12%) [20], Pakistan (19.5%) [21], and Nigeria (23%) [22]. However, a few studies have found higher prevalence rates than those revealed in the current investigation; for example, one study in Saudi Arabia found that 47% of students at King Saud University displayed symptoms of depression. This study, in conjunction with the current investigation, may indicate that Saudi students in health and medical colleges experience particularly high depression rates [23]. Internationally, a previous study on Polish medical students found an even higher prevalence rate (56.3%) [24].

A review of the literature demonstrates that different studies report different prevalence rates for depression. The significant range of

rates may result from different factors, such as the use of different instruments to measure depression rates as well as cultural, economic, and psychosocial factors that play a major role in depressive symptoms [25]. In Saudi Arabia, a study reported that the type of curriculum fulfills a role in increasing the rates of depressive symptoms among medical students [26]. This investigation encouraged the development of a mental health centre in the university campus to help students who are experiencing these mental disorders.

Research has reported higher stress levels among students in first three years [27]. Similarly, this investigation revealed that most students with severe depression were around age 21 and studying in their third year, while students with moderate depression were mainly around age 22 or 23 and studying in their fourth or fifth years. Other reports have supported the current study findings, as third-year students in health care programs, such as medical and dental schools, recorded a higher prevalence of depressive disorders [28,29]. This finding may result from the transition from basic courses to more specialised courses as well as student participation in clinical training. This transition period may increase levels of anxiety and depression, as studies have shown [30]. Moreover, high depression and anxiety levels may originate from social expectations in the Saudi culture, where students transition from high school, which requires following parent and teacher instructions, to more freedom yet more independence and responsibility in post secondary school. Another report found a significant association between early academic years and the severity of depressive disorders [27]. However, previous research failed to find any correlation between academic year and BDI score [5].

The findings about student age related to previous evidence that found similar results to those in the current study (Anum, Enfall & Hira, 2013). Specifically, these authors found that ages 18 to 25 represented the prime age for serious mental health conditions to emerge [31]. This result concurs with previous findings of depression levels. Based on these results, universities should pay more attention to the

psychological health of students in the first levels of their degrees in order to decrease their stress, depression, and anxiety. In particular, students and faculty members should receive more orientation and awareness about such mental disorders. Universities should establish mental health centres and enforce high levels of confidentiality for services. Finally, institutions should promote more social activities to allow students to make friendships, as studies have found that students with good social relationships exhibited lower levels of depression [32].

According to previous articles and reviews, anxiety is widely known as a high-energy state, while depression constitutes a low-energy state [33, 34]. Individuals with depression often suffer from anxious feelings that may occur as panic attacks, which can enhance depression. In fact, people with anxiety may experience panic or anxiety symptoms in situations where other people lack these feelings. For example, students demonstrate susceptibility to anxiety because of new challenges, exams, clinical training, and other anxiety triggers. Untreated anxiety may lead to depression, which reinforces the necessity of treating these symptoms. Some antidepressant medications and cognitive behavioural therapies for depression often help to overcome both anxiety and depression [33]. This link between anxiety and depression may support the current findings. In this study, the results showed that students with severe depression were more likely to experience moderate to severe anxiety and students with moderate depression were more likely to experience moderate anxiety levels. However, the precise reasons behind the co-occurrence of these two mental disorders, as well as their comorbidity among students, remains unknown. Despite these results, more studies are urgently needed, especially with university students, to identify the main causes for the co-occurrence of anxiety and depression.

The literature has hypothesized several factors that potentially enhance high prevalence rates of anxiety and depression. Some of these factors include workload, exposure to suffering patients, academic pressure, and financial concerns. These depression and anxiety disorders

have negative effects that may influence students' abilities and qualities of life. In addition, these illnesses may affect students during their life after graduation [35], potentially extending to the quality of patient care, safety, and professionalism [7, 35]. Therefore, this study, in conjunction with previous research, highlights the need to investigate and treat mental disorders in their early stages to prevent health professionals from incurring these illnesses, thus affecting their lives and their patients.

Some limitations of this study must be acknowledged. First, the cross-sectional design has some weaknesses such as inability to measure incidence and social acceptability bias. Second, the method of self-report questionnaires may entail reporting bias or undergo misinterpretation from students. However, the data from this study comes from students throughout the major regions in Saudi Arabia. Moreover, the used questionnaires were reliable, valid, and widely used. Finally, the sample size may be considered small; however, the difference between the estimated sample size and the collected sample is only 11 participants with a high 86% response rate.

CONCLUSION

Unfortunately, higher levels of anxiety and depression were found among Saudi physical therapy students. In addition, this study observed gender differences among several factors such as anxiety, GPA, health status, and smoking. The results emphasized an urgent need for encouraging the development of mental health centres for all universities. In addition, the high prevalence of anxiety and depression among students as well as the potentially negative effect these disorders can have on their future career underscores the need for preventive interventions. Despite the findings of this study, more investigations are needed in order to discover the causes and risk factors for the occurrence of anxiety and depression among students.

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