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Incidence of Depression, Anxiety and Stress among Final-Year Medical Students versus Internship Graduates of the Faculty of Medicine, Sana'a University 2023

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Abstract

Background: Depression, anxiety, and stress among medical students are significant health issues because of their impact on the challenging journey in medicine.

Objective: To assess the degree of relief in depression, anxiety, and stress symptoms attributed to the graduation of final-year medical students from the Faculty of Medicine and Health Science, Sana'a University, Yemen, in 2023.

Methodology: A comparative cross-sectional design was employed. There were 408 volunteers, with a response rate of 99.8%. All groups were contacted electronically via patch telegram groups. There were 212 final-year respondents and 197 interns in total. The data were collected via electronic questionnaires using google doc that included socio-demographic characteristics and a validated self-administered DASS-21 questionnaire to assess depression, anxiety and stress. The collected data were analyzed using SPSS version 26. An Ethical Clearance Certificate, according to the Helsinki Declaration, was obtained from the Faculty of Medicine, Sana'a University.

Results: Final-year medical students had incidence rates of 74.1% depression, 66% anxiety and 62.7% stress. However, 63.96% of internship graduates were depressed, 56.9% anxious, and 45% stressed. Improvements were significant in depression ($p=0.032$) and stress symptoms ($p<0.0001$), whereas anxiety was not significantly associated ($p=0.067$).

Conclusion: The rates of depression, anxiety and stress symptoms were high in both cohorts. The improvement attributed to graduation was significant for depression and stress.

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INTRODUCTION

Mental disorders are characterized by a clinically significant change in an individual's cognition, emotional regulation, or behavior. It is generally associated with distress or impairment of important functional areas. In 2019, 301 million people were living with anxiety disorders and 280 million people were living with depression. According to the World Health Organization (WHO), depression

is characterized by "a low mood or loss of pleasure or interest in activities for long periods of time." Depressive episodes last most of the day, nearly every day, for at least two weeks. Anxiety is an experience of fear and worry, which is both intense and excessive. These feelings are typically accompanied by physical tension and other behavioral and cognitive symptoms. Stress is defined as a state of worry or mental tension caused by difficult situations. Stress is a natural human response that prompts us to address challenges and threats in our lives [1].

Medical students have been found to suffer from depression and anxiety at higher rates than the general population and their fellow students [2, 3]. A systematic review estimated that the average prevalence of depressive disorders among university students was 30.6%, which is significantly higher than that reported in the general population [4].

The incidence of mental dysregulation among medical students is often attributed to competitive and stressful environments as well as other academic and professional demands, which often result in emotional exhaustion and psychological distress [[5]. Several studies have suggested that the transition time from premedical to medical, preclinical to clinical training, and from clinical training to approaching qualifications is particularly stressful for medical students [6–8]. The prevalence of depression, anxiety, and stress among medical students varies depending on the country, year of study, assessment tools, and other factors. For example, a meta-analysis in different countries reported a rate of 28%[9]. At Fayoum University, Egypt, a rate of 60.2% was reported [5]. In Bahrain (40%) [10], Ethiopia (51.30%) [11], Ain Shams University, Egypt (64.2%) [12], and Saudi Arabia (28%–70.6%) [13]. A meta-analysis reported rates of 33% [14] and 64.3% [5] among undergraduate medical students at Fayoum University, 51% [10] in Bahrain, 30.10% [11] in Ethiopia, 77.1% [12] in Ain Shams University Egypt, and 52.7% to 67% [13] in Saudi Arabia. Finally, the prevalence of stress among undergraduate medical students at Fayoum University was 62.4%[5], and among those in Ethiopia (52.4%) [11] and Ain Shams University, Egypt, it was 70.4% [12]. In a systematic review of Saudi Arabia, the rate ranged between 30.5% and 90.7%[13], whereas in developed countries such as the United States, it was 49%[15].

The journey of Yemeni medical students is rigorous and involves countless hours of study, clinical rotations, and high-stakes examinations. Yemeni students face challenges related to a difficult and unstable academic system due to the current crisis of the civil war. As students transition into their final year and internship, pressure intensifies, often leading to heightened levels of anxiety, depression, and stress. This study aimed to assess the degree of relief in depression, anxiety, and stress attributed to the graduation of final-year medical students from the Faculty of Medicine and Health Science, Sana'a University, Yemen, in 2023.

METHODS:

A comparative cross-sectional study was conducted to estimate the incidence of depression, anxiety, and stress symptoms among final-year medical students and internship graduates in the Faculty of Medicine and Health Science, Sana'a University, Yemen 2023.

STUDY SETTING:

This study was conducted at the Faculty of Medicine, Sana'a University, which is the first medical faculty in Yemen. It was first established in 1982. Sana'a University is considered the largest medical university in Yemen, and it enrolls many students from different parts of the country. Academic and administrative staff at Sana'a University are known for their qualifications and reputation. The journey of studying medicine lasts six years, in addition to an obligatory internship year to socialize graduates into their profession.

SAMPLE SIZE AND SAMPLING TECHNIQUE:

The study population for both the 6^{th} year and interns was 830. The sample size was calculated using an online statistical calculator (Statulator), assuming a 20% difference between the two cohorts. This assumption was based on a global meta-analysis of anxiety (33 %)[14]. The required sample size was 193 for each group (total sample size: 386 for both groups). A 10% increase in the sample size was used to overcome the loss or nonresponse to reach 409. All volunteers were contacted (n=409) through Telegram patch groups. Only one participant declined to participate and the achieved response rate was 99.8%. There were 212 final-year respondents and 197 interns. The questionnaire was then sent to all the volunteers in both batches. Volunteers who reported using antipsychotic or antidepressant drugs prior to the final year and those who refused to participate were excluded from the study.

A validated DASS-21 questionnaire was used. The DASS-21 is a short form of the DASS-42 [16], a self-report scale designed to measure the negative emotional states of depression, anxiety, and stress. The DASS-21 consists of three subscales, each containing 7 items, that assess dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest/involvement, anhedonia, inertia, autonomic arousal, skeletal muscle effects, situational anxiety, subjective experience of anxious affect, chronic nonspecific arousal, difficulty relaxing, nervousness, irritability, impatience, and over reactivity [17].

Individuals read each statement and circle a number 0, 1, 2 or 3 that indicates how much the statement applied

Table 1. Recommended Cut-Off Scores for Conventional Severity Labels for DASS-21

	Depression	Anxiety	Stress
Normal	**0-9**	**0-7**	**0-14**
Mild	**10-13**	**8-9**	**15-18**
Moderate	**14-20**	**10-14**	**19-25**
Sever	**21-27**	**15-19**	**26-33**
Extremely Sever	**28+**	**20+**	**34+**

to him/her over the past week. The rating scale was as follows: (0) "Did not apply to me at all," (1) "Applied to me to some degree, or some of the time," (2) "Applied to me to a considerable degree, or a good part of time," and (3) "Applied to me very much, or most of the time," each scale of the DASS-21 is calculated by summing the scores of the items that belong to that scale and multiplying them by 2. The scores range from 0 to 42 for each scale [17].

The DASS-21 has been shown to have adequate construct validity. The utility of the measure is enhanced by the provision of normative data based on a large sample [18]. The Arabic version of the DASS-21 is a translation of the original English version following a forward backward procedure. It was psychometrically evaluated in an Egyptian sample of inpatients with substance use disorders at a government psychiatric hospital. The Arabic DASS-21 alphas for stress, anxiety, and depression are 0.87, 0.85, and 0.90, respectively. The factor structure and convergence were also valid [19].

PILOT STUDY:

The online survey was pretested by administering it to 10 medical students who did not participate in the study to check the clarity and understanding of the questions and ensure that the content and length were appropriate. Additionally, to estimate the time it took to complete the questionnaire

The data were entered and analysed via the Statistical Package for Social Sciences Version 26 (SPSS) software for appropriate statistical analysis. Descriptive statistics (frequencies, percentages, means, and standard deviations (SDs)) were used to describe demographic characteristics, depression, anxiety, and stress. The chi-square test was used to assess whether any associations among the variables of the different questions were statistically significant. A P value of 0.05 or less was considered statistically significant.

Informed consent for the online survey was obtained from all participants. The questionnaires were anonymous. Ethical clearance, according to the Helsinki Declaration, was obtained from the Faculty Committee of Research Ethics of Sana'a University.

RESULTS

Socio-demographic characteristics

The data in Table (2) show that the median age of final-year medical students was 25 years, whereas the median age of internship graduates was 27 years. There were 114 (53.8%) male finals and 100 (51%) male internship graduates, while 98 (46.2%) final-year females and 96 (49%) internship graduates were female. Most participants lived with their families and represented 152 (71.7%) final-year graduates and 145 (73.6%) internship graduates. The majority of participants were unmarried, 179 (84.4%) were in their final year, and 141 (71.6%) were internship graduates. The majority of the participants had good financial conditions, as perceived by themselves: 125 (59%) from the final year and 116 (58.9%) from internship graduates, whereas 57 (26.9%) from the final year and 43 (21.8%) from internship graduates had limited financial conditions. Additionally, 30 (14.2%) of those whose financial conditions were limited were in their final year and 38 (19.3%) were internship graduates. Most of the participants did not work in addition to their studies, and represented 199 (93.9%) final-year graduates and 155 (78.7%) internship graduates. With respect to special habits such as khat chewing, many of the participants chewed khat, and 131 (61.8%) of the participants were in their final year, while 116 (58.9%) were internship graduates. Additionally, 204 final-year graduates (96.2 %) and 185 internship graduates (93.9 %) did not use shishas. Those who smoked cigarettes numbered 15 (7.1%) in their final year and 16 (8.1%) were internship graduates. Only one participant (0.5%) from each cohort smoked electronic cigarettes. All these characteristics were not different, that is, matched between the two cohorts, except for an age difference of 2 years, marital status (1.82 times) and working status (3.49 times).

Incidence of Depression:

The majority of finals were depressed (157, 74.1%), whereas 126 (64%) were internship graduates (P=0.032). Severe (21.6%, no=34) and extremely severe (25.5%, no=40) depression were more common (p= 0.015) than

Table 2. Socio-demographic Characteristics Analysis for the Final Year versus the Internship Year, Sana'a University, Yemen, 2023

Socio-demographic		Study year		Total	p value
		Final Year	Internship		
Sex	Male	114	100	214	0.324
		53.8%	51.0%	52.4%	
	Female	98	96	194	
		46.2%	49.0%	47.6%	
Age (years)	Mean	24.76	26.74	210	<0.0001
		(SD=1.142)	(SD=1.157)		
	Median	25	27	195	
Residence with family	Yes	152	145	297	0.374
		71.7%	73.6%	72.6%	
	No	60	52	112	
		28.3%	26.4%	27.4%	
Marital status	Single	179	141	320	0.001
		84.4%	71.6%	78.2%	
	Married	33	56	89	
		15.6%	28.4%	21.8%	
Financial condition	Very good	57	43	100	0.260
		26.9%	21.8%	24.4%	
	Good	125	116	241	
		59%	58.9%	59%	

	Limited	30	38	68	
		14.2%	19.3%	16.6%	
Work beside study	Yes	13	42	55	<0.0001
		6.1%	21.3%	13.4%	
	No	199	155	354	
		93.9%	78.7%	86.6%	
Khat chewing	Yes	81	81	162	0.309
		38.2%	41.1%	39.6%	
	No	131	116	247	
		61.8%	58.9%	60.4%	
Shisha	Yes	8	12	20	0.196
		3.8%	6.1%	4.9%	
	No	204	185	389	
		96.2%	93.9%	95.1%	
Smoking (cigarettes)	Yes	15	16	31	0.415
		7.1%	8.1%	7.6%	
	No	197	181	378	
		92.9%	91.9%	92.4%	
Electronic cigarettes	Yes	1	1	2	0.732
		0.5%	0.5%	0.5%	
	No	211	196	407	
		99.5%	99.5%	99.5%	

Table 3. Incidence of stress, anxiety and depression according to sex in both internship and final year medical students at Sana'a University, Yemen, 2023 (n=408).

Cohort		Depression no. (%)		Anxiety, no. (%)		Stress, no. (%)	
		Yes	No	Yes	No	Yes	No
Students	M	77(67.5)	37(32.5)	69(60.5)	45(39.5)	64(56.1)	50(43.9)
	F	80(81.6)	18(18.4)	71(72.4)	27(27.6)	69(70.4)	29(29.6)
Significance (Pearson chi square)		0.027 (5.444)		0.081 (3.340)		0.034 (4.589)	
Interns	M	52(52.0)	48(48.0)	43(43.0)	57(57.0)	36(36.0)	64(64.0)
	F	73(76.0)	23(24.0)	68(70.8)	28(29.2)	53(55.2)	43(44.8)
Significance (Pearson chi square)		0.001 (12.25)		<0.0001 (15.45)		0.01 (7.29)	

interns. The percentage of severely ill interns was 12.7% (n=20) and the percentage of extremely severely depressed interns was 20.6% (n=26).

Incidence of Anxiety

Among the anxious final-year medical students, 140 (66%) and 112 (56.9%) were internship graduates, whereas 72 (34%) were final-year medical students, and 85 (43.1%) were internship graduates. However, the difference between the two groups was not statistically significant. Severe and extremely severe anxiety in the final year constituted 47.1%, whereas severe anxiety and extremely severe anxiety among interns constituted 43.8%, with a non-significant difference (p=0.206).

Incidence of stress:

A total of 133 (62.7%) of the final students and 89 (45.2%) of the interns were stressed. The attributable risk was 17.5%, which is statistically significant ($p<0.001$). Compared with those in internships, moderate and extremely severe symptoms were elevated in the final year. With respect to the severity of stress, both cohorts were under stress, with a small difference in extremely severe stress among students (15.8% [n=21] vs. 9% [n= 8] among interns), which was statistically significant (p=0.004).

Higher incidence rates of stress, anxiety and depression were found in females than in males in both their final year and their internships. This high incidence in females was significant in all comparisons, except for anxiety in the final year, which was not significant (Table 3).

DISCUSSION

Medical students in Yemen, like those in many other countries, rank among the best 5% throughout their schooling, prior to affiliation with public medical schools. They find themselves out of the competition for seats in these highly respected schools, and only cream is offered. For the first time, they struggled to pass examinations regardless of the grade they received. This factor, together with other factors, exerts a highly stressful burden that leads to stress, anxiety, depression, and other psychological disorders.

Depression and anxiety are highly prevalent conditions among medical students worldwide. The prevalence of these mental disorders varies depending on academic year, country, and other factors. According to two global meta-analyses, more than one-third of medical students worldwide suffer from anxiety and more than one-quarter suffer from depression[9, 14].

In this study, the majority of the final-year medical students (74%) experienced symptoms of depression, 66% experienced anxiety, and 62.7% experienced stress, as measured by the DASS21. The findings indicate high levels of depression, anxiety, and stress. These rates are greater than those reported in meta-analyses by more than twofold-fold[9, 14]. Similar high levels have been found only in studies from Egypt and Iran [5, 12, 14]. These high levels in Yemen can be attributed to multiple factors, including conflicts that impact and decrease socioeconomic status.

In addition, similar study conditions exist in countries such as Egypt and Iran.

The results of this study showed considerable relief attributed to graduation; in depression was 10.1%, in anxiety was 9.1% while in stress was 17.5%. These findings

are supported by the small proportion of students who were married and engaged in paid jobs, in addition to their internship duties. For example, the highest rate of relief is observed for stress. However, stress continued to be high (45.2%) among the interns, despite their graduation. These rates of relief, which are attributed to graduation, are significant, but not sufficiently reduced. Continued stress might be linked to unpaid intern services despite the hard work they perform and the stressful conditions they face. Moreover, there is uncertainty in obtaining paid work opportunities in the future due to ongoing conflicts, where almost all public servants are not paid for the duties they perform. The rates of depression and anxiety (10.1% and 9.1%, respectively) were considerable but not high enough, probably for the same reasons mentioned above.

Our findings show that female interns suffer substantially more from depression, anxiety and stress than their male peers do. The same findings apply to final students, except for anxiety (see Table 3); for example, 81.6% of our female students experienced depression symptoms, while 67.5% of our male colleagues experienced depression symptoms. This finding, along with other findings of anxiety and stress in both cohorts, revealed a female predominance, such as that reported in Egypt, Ethiopia, and Saudi Arabia [5, 11, 13]. These differences in emotional disorders are more common among females than among males because of biological and social differences[20].

In conclusion, high rates of depression, anxiety and stress symptoms were reported by medical students and interns, with a female predominance. The improvements in depression and stress symptoms can be attributed to graduation.

DECLARATIONS:

*Ethics approval and consent to participate: Taken from each participant, an ethical clearance certificate was obtained from the Ethics Committee of the Faculty of Medicine and Health Sciences of Sana'a University.

*Consent for publication: Was taken from all co-authors and the volunteers were informed and agreed upon.

*Availability of data and material: available

*Competing interests: None.

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AUTHORS' CONTRIBUTIONS:

- KM and YA supervised the research.
- AF, AA, MA, RH, AR, AY, GA, NA and SF participated in the proposal construction, data collection and writing,
- YA and AY performed the analysis.
- YA and AY prepared the article for publication.

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