Comparison of depression, anxiety, and stress between public and private university medical students

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Abstract

Context: Depression, anxiety, and stress are common among medical students because of hectic and heavy studies. **Aim:** This study was carried out to determine the magnitude of the Depression, Anxiety, and Stress Scale (DASS) among undergraduate medical students and its relationship with its causative factors in public and private universities. **Setting and Design:** The study tool was DASS (Depression, Anxiety, Stress Scale-21) which was distributed through the Department of Physiology, College of Medicine, King Saud University, adopting a multistage cluster sampling method for an observational study design. **Subjects and Data:** Data from undergraduate medical students (N = 337) was collected from public and private medical colleges in Saudi Arabia. **Statistical Analysis:** Independent t-tests and analysis of covariance were applied to analyze the data. **Results:** There was a significant difference in depression with a higher mean score in private versus public medical students (8.38±5.93 vs 6.34±5.46, p=0.001), anxiety (9.49±5.12 vs 7.91±5.00, p=0.005), and stress (9.11±5.11 vs 7.93±5.02, p=0.035). There was a significant difference in the level of anxiety between second- and third-years students (p =0.01). **Conclusion:** Private medical university students have significantly higher depression, anxiety, and stress levels compared to public universities. More studies are needed to explore the causes of this psychological impact.

Keywords: Anxiety, medical students, private university, public university

Introduction

The stressful academic situation that faces medical students is a well-known fact that cannot be ignored. Such a situation has damaging effects on the performance as well as the lives of our future doctors. One of the main goals of medical schools is to prepare healthy future physicians with the right judgment. This needs a very well psychological status of undergraduate medical students to have the correct judgment when dealing

with patients in their careers. Adolescence is the stage of life that faces biological, physiological, and psychological changes. It is important to focus on this period of life on teenagers who may encounter psychiatric disorders, which is a great threat to public health practitioners, because of the financial conditions of the family and poor academic performance of the victims.

Several studies showed high levels of depression, anxiety, and stress among medical students when compared to the population.[1-3] In Saudi Arabia, levels of psychological distress were quite disappointing, to say the least, with depression (69.9%), anxiety (66.4&), and stress (70.9%).[4,5] These factors result in psychological problems and can intensify mental health. Free

Access this article online
Quick Response Code:
Website: http://journals.lww.com/JFMPC
DOI: 10.4103/jfmpc.jfmpc_1719_22

How to cite this article: Al-khlaiwi T, Habib SS, Akram A, Al-khliwi H, Habib SM. Comparison of depression, anxiety, and stress between public and private university medical students. J Family Med Prim Care 2023;12:1092-8.

health benefits, abundant job opportunities, and other public benefits may contribute to lowering depression and anxiety.

However, the COVID-19 situation devastated such a healthy lifestyle to the extent that a considerable proportion of the population experienced anxiety and depression. It affected the medical students too. Lack of physical exercise due to COVID restrictions, financial instability because of unemployment, and inadequate sleep hours due to extensive medical courses contributed to exam anxiety in medical students.[6] Financial strains could be stressor events (objective) and perceived stress (subjective). However, researchers have focused on objective indicators. In public health, lower financial conditions have been associated with mental health outcomes.[7,8] Moreover, financial debt and loans are also significantly associated with increased psychological distress.[9,10]

The psychological status of medical students is proportional to their academic achievements. Several factors give rise to a bad mental state, such as extra load; high competence for academic excellence with other candidates; balance between non-academic and academic aspects of their lives; and fear of failure and family financial condition.[7-9] Their expectations and satisfaction regarding the academic environment occupy a huge part of this stress among medical students which needs more attention and concern. These are some issues that can be great obstacles to their academic achievements.

There is no precise worldwide prevalence of psychological disorders among medical students so a wide range of prevalence has been observed through studies starting from lower values to very high values.[9,11,12] However, a moderate prevalence of over 25% was found to be the closest estimate.[10] This broad range is due to the number of variables highly fluctuating over academic reasons, and these can include excess information that is taught every day, unableness to cope, family study environment, high competence for academic excellence with other students, fear of failure, low GPA, and language barrier.[9,13]

Another research performed in Russia observed that living far away from parents, defects in self-explanatory textbooks, inappropriate treatment of teachers, unfair examinations, and a bad timetable organization are also weighting that sink a student's heart if not treated with proper care, and these are classified under non-academic reasons.[14]

As part of the teaching staff in governmental medical schools, there is a massive difference between governmental and private colleges including facilities, equipment, number of students, teaching curriculum, financial demands, teaching staff, etc. Additionally, financial and sociological status usually varies between governmental and private students. These differences between governmental and private schools also disrupt the mentality of medical students, which needs to be assessed. This study aimed to perceive the prevalence of anxiety, stress, and depression levels accounted more likely due to financial conditions among students and compare it in public and private medical colleges in Saudi Arabia. For this purpose, ethical approval (E-21-6431) was obtained from the Institute Review Board of the College of Medicine before further proceeding with data collection.

Method

A cluster sampling method was adopted to gather the data for this observational study that was adhered to at the Department of Physiology of the College of Medicine, King Saud University, Riyadh, which is a public medical college, whereas the private medical college was affiliated with Suliman Al Rajhi University – Al-Bukairiyah. The private medical college included in this study was randomly selected using the hat technique per percentage to represent a true or at least appropriate representative of the population. Therefore, with a 95% confidence level, a standard deviation of 0.5, and a confidence interval of ±5%, the estimated sample size was n=337.

Study tool

Depression, Anxiety, and Stress Scale-21 (DASS-21) items were adopted. This is a modified set of three self-report scales to measure the emotional states of depression, anxiety, and stress. The three DASS-21 scales contain every seven items for depression, anxiety, and stress. The depression construct assesses dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest, anhedonia, and inertia. The anxiety scale measures autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect, whereas the variation of levels of chronic non-specific arousal is associated with the stress scale that assesses difficulty relaxing, nervous arousal, being easily upset, irritable/over-reactive, and impatient. Scores for these elements (i.e., depression, anxiety, and stress) are calculated by summing up the scores at four levels.

Administration of study tool

Before administering the DASS-21, it was translated into Arabic with the cooperation of the university's language department. The certified Arabic version of the DASS-21 was sent through the IT department in close cooperation with the department of physiology to the chosen medical institutions explained earlier. The consent form was accompanied by the DASS-21 Arabic version for each recipient detailing the aims and objectives of the study, confidentiality of the personal information, any harmful effects of the participation, and volunteering participation with no financial honorarium. The recipients were followed thrice for a considerable period to avoid non-response errors from sampling and make sure they received the earlier email to obtain the desired responses for inferring analysis.

Data characteristics

The gathered data was entered into SPSS version 24. Its normality was checked with the Shapiro–Wilk test. A Shapiro–Wilk test (*P* >.05) and a visual inspection of their histograms, normal Q-Q plots, and box plots showed there were no outliers, and

data were approximately normally distributed. The normality of the anxiety variable was approximately distributed for both males and females with skewness of 0.265 (SE 0.177) and kurtosis of 0.810 (SE 0.352) for males and skewness of 0.264 (SE 0.199) and kurtosis of 0.564 (SE 0.396) for females. Hence, the anxiety scores were a little skewed and kurtotic for both males and females, but they were not significantly different from normality.

The relationship between two independent groups (male and female) was measured for anxiety, depression, and stress separately using the independent t-test. A combination of categorical (medical students with five levels, i.e., 1–5 years) used as independent variables and father's income used as covariate and scale data (anxiety) provided a pathway to apply a one-way analysis of covariance.

Results

Confirmatory factor analysis of the DASS was carried out using principal component analysis. Bartlett's test of sphericity (P <.001) and Kaiser–Meyer–Olkin measure >.883 showed the items correlated appropriately. The three factors (anxiety, stress, and depression) had eigenvalues (10.06, 1.21, and 1.04) which were greater than 1, and cumulative values of them (47.95%, 53.70%, and 58.66%) were almost close to 60%.

The 2nd-year students were the highest number of respondents, while the 4th-year and 5th-year students had lower values in terms of their responses in this manner. The study respondents (N = 338) consisted of 189 (55.9%) male students and 148 (43.8%) female students who responded to the survey as shown in Table 1 and Bar graph 1. Pie chart 1 shows the different age groups (18–26 years) of respondents and the majority, i.e., almost fifty percent, was from the 2nd-year students. The mean score for the stress section of the DASS tool was 1.229 with SD.727 [Table 2], while the mean score for depression was 1.1.5 with SD = 0.865 [Table 3], and the mean value with SD was 1.15, SD = 0.865 for anxiety [Table 4]. These values were calculated from five-point Likert scale items (1–5). Table 5 shows a comparison of depression, anxiety and stress between private and public university medical students. it shows There was a significant difference in depression with a higher mean score of private medical students (8.38±5.93 vs 6.34±5.46, P=0.001), anxiety (9.49±5.12 vs 7.91±5.00, P=.005), and stress (9.11±5.11 vs 7.93±5.02, P=.035).

A Chi-square test of independence was performed to assess the relations between male and female students from public and private medical universities. There was a significant relationship for the anxiety between the male and female students; X^2 (df, N) = 14.67 (5, 338), P = 0.012 as shown in Table 6. However, the association for depression in medical students for public and private universities was insignificant X^2 (df, N) = 2.14 (5, 338); P = 0.828 [Table 7].

Moreover, when the independent sample t-test was applied to compare the stress level (dependent variable) for public and private medical colleges, there was a significant difference in stress score (t (df) = 2.115 (335), P =0.035) with the mean score for students of private medical colleges (M = 9.11, SD = 5.11) that was higher than the mean score of students of public medical colleges (M = 7.93, SD = 5.02). The magnitude of the mean differences (mean difference = 1.179, CI 95%; 2.27 to. 08) was found to be significant. Hence, H_1 was accepted [Table 8].

A one-way analysis of covariance was applied to compare the impact of the father's income (Covariate) in assessing anxiety among medical students (five levels). Levene's test of equality of variances was met; F (4,332) = 4.46, P = 0.05. Other assumptions were met equally to perform the ANCOVA. From the adjusted means, it was found that 2nd-year students had the highest anxiety level (M = 9.15) while 1st- and 4th-year students had the almost same level of anxiety, and it was the least (M = 7. 9) among 3rd-year medical students [Table 9]. Figures 1-3 show the distribution of medical students according to studying year, gender, and age respectively.

Discussion

The impact of medical school diversities has a tremendous impact on medical students. The effects of financial burden, teaching quality, number of students, future employment as well as the reputation of the school play very essential role for the student. Recent studies display a higher prevalence of depression, anxiety, and stress in private school students than in government school students.[1,9] We believe the COVID-19 crisis played an integral role in adding greater pressure on private medical students due to increased financial demands on the students. In addition, parental behavior is also seen as a possible cause, elevating a bad mental condition. Furthermore, private schools are constantly raising their academic standards (requirements especially tuition fees) which in turn makes many students anxious. Another possible explanation might be due to the gap between their expectations and real academic situations. Students' satisfaction and expectations have to be carefully accounted for and evaluated to reduce stress and anxiety levels.

Our leading study compares governmental and private medical school students using the DASS. We found that in government students, the prevalence of depression, anxiety, and depression was about fifty percent, while for the private schools' students, they were above seventy percent. Mirza *et al.*[3] found a lower prevalence of depression (54%), anxiety (53%), and stress (38%) than both governmental and private school students. Our

Table 1: Frequency distribution of participants

Students	Frequency	Valid percent	Cumulative percent
1st Year	90	26.6	26.6
2nd Year	148	43.8	70.4
3rd Year	68	20.1	90.5
4th Year	14	4.1	94.7
5th Year	18	5.3	100.0
Total	338	100.0	

No	Depression-related statements	*n*	Mean	SD
Table 2: Descriptive statistics for depression (D1-D7) revealed an overall mean score of 1.15 (SD=0.865)				
D1	I could not seem to experience any positive feelings at all	337	1.14	1.014
D2	I found it difficult to work up the initiative to do things	305	1.41	1.035
D3	I felt that I had nothing to look forward to	304	1.14	1.086
D4	I felt down-hearted and blue	304	1.08	1.020
D5	I was unable to become enthusiastic about anything	305	1.16	1.009
D6	I felt I was not worth much as a person	304	0.99	1.085
D7	I felt that life was meaningless	305	0.97	1.079
Overall depression		301	1.157	0.865

No	Anxiety-related statements	*n*	Mean	SD
Table 3: Descriptive statistics for anxiety (A1-A7) revealed an overall mean score of 1.13 (SD=0.774)				
A1	I was aware of the dryness of my mouth	338	1.17	1.071
A2	I experienced breathing difficulty (rapid breathing, breathlessness in physical activity)	338	1.20	1.110
A3	I experienced trembling (e.g. in my hands)	337	0.99	1.070
A4	I was worried about situations in which I might panic and make a fool of myself	338	1.25	1.047
A5	I felt I was close to panic	337	1.12	1.021
A6	I was aware of the action of my heart in the absence of physical exertion (e.g. sense of heart rate increase, heart missing a beat)	338	1.06	1.069
A7	I felt scared without any good reason	338	1.14	1.107
Overall anxiety		336	1.13	0.774

No	Stress-related statements	*n*	Mean	SD
Table 4: Descriptive statistics for stress (S1-S7) revealed an overall mean score of 1.12 (SD=0.727)				
S1	I could not seem to experience any positive feelings at all	337	1.14	1.014
S2	I found it difficult to work up the initiative to do things	305	1.41	1.035
S3	I felt that I had nothing to look forward to	304	1.14	1.086
S4	I felt down-hearted and blue	304	1.08	1.020
S5	I was unable to become enthusiastic about anything	305	1.16	1.009
S6	I felt I was not worth much as a person	304	0.99	1.085
S7	I felt that life was meaningless	305	0.97	1.079
Overall stress		301	1.229	0.727
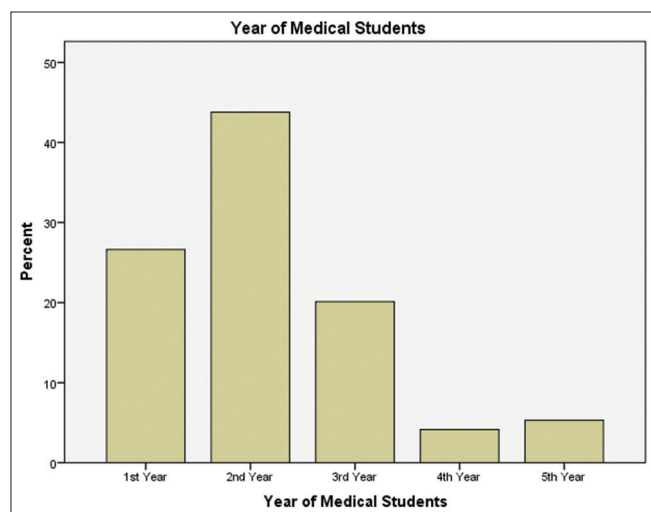
Figure 1: Percent distribution of students' medical years
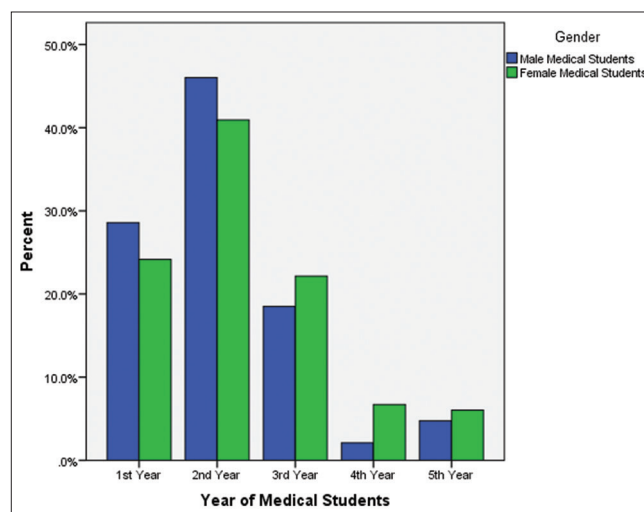
Figure 2: Gender distribution of medical students according to year

findings showed higher anxiety prevalence in private schools than in public school students similar to results described in a systemic review.[15]

In addition, the prevalence of anxiety in private school students was higher than the findings of public school students reported by Bano, *et al.*,[15] during the COVID era. On the other hand, we

Table 5: Comparison of depression, anxiety and stress between private and public university medical students

Variable	Gender	n=337	Variable Mean	Variable SD	Levene's test for equivalency		t	df	t-test P	Mean Difference	95% CI	
					Sig. value	F					Lower	Upper
Depression	Private	189	8.38	5.93	0.349	0.879	-3.27	335	0.001	-2.040	-3.26	-0.81
	Public	148	6.34	5.46								
Anxiety	Private	189	9.49	5.12	0.874	0.025	-2.84	335	0.005	-1.576	-2.66	-0.49
	Public	148	7.91	5.00								
Stress	Private	148	9.11	5.11	-0.734	0.115	-2.115	335	0.035	-1.179	-2.27	-0.08
	Public	189	7.93	5.02								

Table 6: Association of anxiety in public and private medical students

	Variables			Anxiety Score						Total	Chi-square value	df	Sig. Value
				0	1	2	3	4	5				
Male	University	Public Uni	Count	5	40	9	23	6	20	103	11.22	5	0.047
			% within University	4.9%	38.8%	8.7%	22.3%	5.8%	19.4%	100.0%			
		Private Uni	Count	4	17	12	21	13	20	87			
			% within University	4.6%	19.5%	13.8%	24.1%	14.9%	23.0%	100.0%			
	Total		Count	9	57	21	44	19	40	190			
			% within University	4.7%	30.0%	11.1%	23.2%	10.0%	21.1%	100.0%			
Female	University	Public Uni	Count	0	8	4	15	2	16	45	2.02	5	0.846
			% within University	0.0%	17.8%	8.9%	33.3%	4.4%	35.6%	100.0%			
		Private Uni	Count	1	14	6	32	8	42	103			
			% within University	1.0%	13.6%	5.8%	31.1%	7.8%	40.8%	100.0%			
	Total		Count	1	22	10	47	10	58	148			
			% within University	0.7%	14.9%	6.8%	31.8%	6.8%	39.2%	100.0%			
Total	University	Public Uni	Count	5	48	13	38	8	36	148	14.67	5	0.012
			% within University	3.4%	32.4%	8.8%	25.7%	5.4%	24.3%	100.0%			
		Private Uni	Count	5	31	18	53	21	62	190			
			% within University	2.6%	16.3%	9.5%	27.9%	11.1%	32.6%	100.0%			
	Total		Count	10	79	31	91	29	98	338			
			% within University	3.0%	23.4%	9.2%	26.9%	8.6%	29.0%	100.0%			

found lower depression prevalence in both governmental and private school students. The anxiety score of private school students in our study was higher than in previous studies conducted in Saudi Arabia which were conducted before the COVID era which might make the "COVID-19 crisis" the cause of this high prevalence.[11,12,16,17] COVID-19 placed tremendous financial pressure on the public which might elevate the prevalence of anxiety in private medical schools students who have no chance to be admitted to government schools.

This study examined the association between family income and psychological distress in terms of anxiety and stress among medical students. It was found the family's financial worries had a profound effect on the anxiety level. The more anxiety level was associated with lower-income family backgrounds. Similar findings were found in previous studies.[16] On the other hand, our study had a limitation we didn't get further details about family income, e.g., how much they had loans or debt. This might be because our study tool had a broader measure of the financial income of the family. In Europe and USA, mortgage and medical insurance contribute significantly resulting financial debt. In Saudi Arabia, medical bills are almost nil to pay as the government provides free treatment and there is a loan without interest for its citizens.

These findings carry an over-bearing amount of importance when it comes to assessing the mental health of medical students from the COVID-19 era, especially as the study identified a high prevalence of medical students who should be further evaluated for generalized anxiety disorder and depression. The researchers observed a higher level of anxiety in second years students and early clinical years as compared to senior students.[18,19] The findings of this study are almost similar to previous studies.

The social networking utilized methodology was to rapidly sample participants across the country, as this was relatively a larger study sample conducted compared to similar mental health studies on medical students and consisted of participants across all academic years from forty different allopathic and osteopathic schools across all regions.[17,20,21] The sharp rise in GAD and depression, along with the challenges of seeking care during a pandemic, is a worrisome combination as far as it is known that this is the study that compared DASS between governmental and private medical school students. Feedback from students was overwhelming, and a majority of them were

Table 7: Association of depression in public and private medical students

Variables				Depression Score					Total	Chi-square value	df	Sig. value
				1	2	3	4	5				
Male	University	Public Uni	Count	42	8	22	12	11	95	4.43	4	0.351
			% within University	44.2%	8.4%	23.2%	12.6%	11.6%	100.0%			
		Private Uni	Count	26	4	20	6	15	71			
			% within University	36.6%	5.6%	28.2%	8.5%	21.1%	100.0%			
	Total		Count	68	12	42	18	26	166			
			% within University	41.0%	7.2%	25.3%	10.8%	15.7%	100.0%			
Female	University	Public Uni	Count	11	7	11	6	9	44	1.98	4	0.738
			% within University	25.0%	15.9%	25.0%	13.6%	20.5%	100.0%			
		Private Uni	Count	24	8	28	12	23	95			
			% within University	25.3%	8.4%	29.5%	12.6%	24.2%	100.0%			
	Total		Count	35	15	39	18	32	139			
			% within University	25.2%	10.8%	28.1%	12.9%	23.0%	100.0%			
Total	University	Public Uni	Count	53	15	33	18	20	139	6.44	4	0.168
			% within University	38.1%	10.8%	23.7%	12.9%	14.4%	100.0%			
		Private Uni	Count	50	12	48	18	38	166			
			% within University	30.1%	7.2%	28.9%	10.8%	22.9%	100.0%			
	Total		Count	103	27	81	36	58	305			
			% within University	33.8%	8.9%	26.6%	11.8%	19.0%	100.0%			

Table 8: Estimated marginal means of medical students (n=337)

Groups	n	Mean	SE	95% CI		Levene's test of equality			
				Low	Up	df1	df2	F	P
First Year	90	7.98	0.53	6.92	9.04	4	333	0.781	0.538
Second Year	148	9.15	0.42	8.32	9.98				
Third Year	68	8.49	0.61	7.27	9.70				
Fourth Year	14	7.91	1.35	5.25	10.58				
Fifth Year	18	8.12	1.19	5.76	10.47				

One-way ANCOVA

Figure 3: Distribution of medical students according to age

from the second year, thereby narrowing the range of possible views of students.

This study expanded the prevalence of depression, anxiety, and stress among medical students from private and public sectors in Saudi Arabia as found by researchers among high school students as well as medical students recently.[22,23]

Implication

This study provides a profound understanding of psychological symptoms medical students experience to psychologists, counselors, and medical educationists. These professionals need to be aware of financial worries as a possible contributing factor to mental distress. Medical students who suffer mental stress and anxiety because of financial hardship should undergo regular psychology screening during their study period. Medical educationists should monitor the credit hours load of the medical programs, and they suggest a revision as such a need arises.

Limitation

This study was conducted through an e-survey that was sent out. Though it was anticipated to reach the desired number of students who were sorted out from the sample frame. There
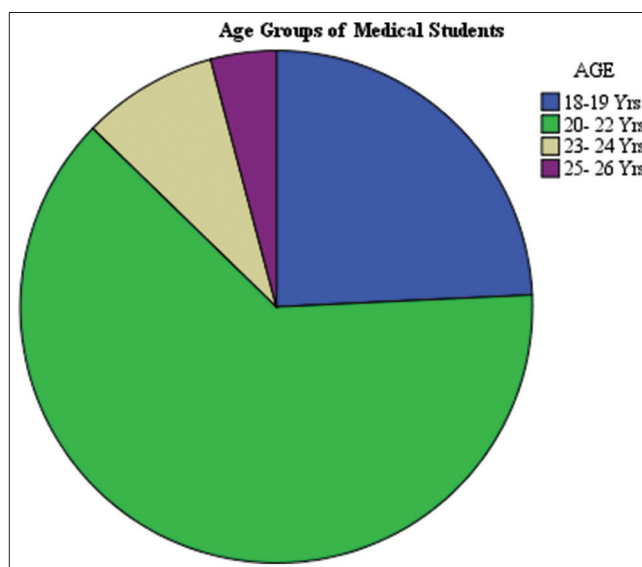
was a lack of an active control group in the study, it was enacted during the COVID-19 era, and comparisons were not made.

Conclusion

Public and private universities have a different impact on the psychological status of medical students. This could be due to financial issues or others which need more elaboration. The analysis of covariates revealed that lower financial income was significantly associated with higher anxiety levels among medical students.

Furthermore, the results of this study are valuable information to the administrators of medical universities and medical

Table 9: Pairwise comparison of medical students

Medical Students	Mean differences	Std error	Sig.	95% CI	
				Upper	Lower
First Year					
Second Year	0.337	0.110	0.007	0.065	0.689
Third Year	-0.024	0.133	1.000	-0.399	0.351
Fourth Year	0.184	0.237	1.000	-0.486	0.855
Fifth Year	-0.022	0.213	1.000	-0.625	0.580
Second Year					
First Year	-0.377	0.110	0.007	-0.689	-0.065
Third Year	-0.401	0.121	0.010	-0.743	-0.059
Fourth Year	-0.193	0.231	1.000	-0.846	0.460
Fifth Year	-0.399	0.206	0.536	-0.982	0.183

educationists to combat anxiety, stress, and other psychological distress. Medical universities can arrange psychological screening, counseling, and peer advocacy. Additionally, vulnerable medical students feeling symptoms of anxiety and stress should seek professional mental health care before they provide it to patients.

Authors' contribution

All authors equally contributed to the design, processing, and drafting of the manuscript.

Financial support and sponsorship

Conflicts of interest

There are no conflicts of interest.

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