Original Article :

Influence of Perceived Academic related Stress on Academic Performance of Medical Students - A Cross Sectional Study.

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Abstract

Background and Aims:
Stress among medical students across the globe is a common phenomenon, they have been found to be at serious risk of mental stress and disorders with diminished life satisfaction. The present study was carried out with the objective to assess the academic stress in medical school along with it's correlation and impact on academic performance.

Methods:
This study was carried out among the male and female students of College of Medicine and preparatory year, Majmaah University. The participants were selected by simple random sampling. The participants were asked to fill Perceived Mean Stress Score (PMSS) questionnaire and the data was analyzed by using SPSS version 25. The Mean and standard deviation for each response for PMSS was calculated. Appropriate statistical tests like ANOVA & multi variable logistic regression were applied to assess the impact of academic stress on their performance.

Results:
242 students participated in the study out of which there were 153 males and 89 females. Male and female students were tested for difference in Perceived Mean Stress Score for all 13 domains It was noted that the Overall a higher average PMSS scores were noticed with advancing courses and also the students developed more anxiety and depression in higher grades which was reflected on their Grade Point Average (GPA) scores.

Conclusions:
High mean scores for stress and anxiety necessitate early identification especially in initial years of medical school and integration of preventive mental health services in routine clinical services for medical students.

Keywords:
Academic stress, Perceived Mean stress scores, Anxiety.

Introduction

Medical education is perceived as one of the most stressful educational fields, where medical students go through a high amount of stress which deeply impacts their learning and cognitive functioning resulting in poor academic performance. The stressful environment and poor performance in academics become part of an endless vicious cycle where an increase in stress prompts diminishing academic performance, which increases the stress. This endless vicious cycle has a potential negative impact on the physical, emotional, and mental well-being of medical students.

The term stress can be defined as "the sum of physical, mental and emotional strains or tensions on a person[1]. It results from a reaction to an adverse environment that causes a threat to a person's physical, mental, and emotional well-being. The stress in medical students can be due to different reasons, for example, monetary issues, health-related issues, social issues, or academic challenges. Nonetheless, Coburn et al study as indicated that stress or mental trauma in medical students is more related to academic challenges instead of social factors.[2] The study further states that the process of medical education can be exceptionally discomforting experience particularly in the first year of education where students are inundated with an overwhelming amount of materials to be absorbed, social isolation, exam pressures, and high expectations from family and relatives. Such an environment of medical education puts a student under high psychological trauma and depression.[2]

Acute stress, episodic acute stress, and chronic stress are the three categories of stress, according to the American Psychological Association (APA).[3] Scholastic stress, on the other hand, is a psychological discomfort related to some expected frustration linked to scholastic failure or even awareness of such failure's probability. Academic stress has been identified as a significant barrier to academic success in college students, according to a 2006 survey conducted by the American College Health Association.[4] Tests, a lack of organisation skills, ineffective time management, and waiting until the last minute to complete assignments are some of the main causes of academic stress. If stress is severe and prolonged, it may reduce academic performance, impede the

student's ability to engage and add to campus life, and increase the likelihood of abuse of substances and other potentially destructive behaviors.[4]

Stress is a typical occurrence among medical students worldwide, and research has shown that they are seriously at risk

for mental health problems and diseases as well as lower levels of life satisfaction. The competitive nature of the educational environment, an overwhelming workload, exams, time limits, relationships with people of other genders, a lack of free time, financial restraints, and decisions about future careers are among the frequently cited causes of stress. According to studies, Malaysia (56%), Thailand (61.4%), Saudi Arabia (63%), and India (89.64%) have the highest prevalence rates.[5] A decrease in academic performance, memory loss, and strained relationships with friends and family can all result from stressful settings. It also weakens the immune system, suppresses fertility, causes digestive disorders, hampers appetite, and increases the use of illegal and prescription drugs.[6] According to this rationale, objectives of the current study are to assess medical students' reported stress levels and to correlate any relationship with academic achievement.

Materials and Methods

The pre-medical year, or preparation year, is included in the six-year program of Majmaah University's College of Medicine. After that, there are three years of clinical work, one year of rotating internship, and two years of fundamental medical sciences. Two semesters in a year are part of the integrated curriculum that is taught during all six years of schooling. A midterm and final module test are included in the 16–18 hours of credit per semester. Both formative and summative evaluation methods are used to evaluate students. It is anticipated that this form of modular instruction will overwhelm pupils with roughly ten tests in a semester in addition to summative evaluations.

The complete enumeration technique was used to include the study participants. The chosen participants were given an informed consent form that outlined the study's aims, as well as a demographic profile sheet. To protect their privacy and anonymity, the chosen student volunteers who agreed to take part in the study were assigned a special ID number.

Statistical Analysis: An Excel file containing the data was obtained, and IBM SPSS Statistics 24 was used for analysis. The quantitative variables' mean and standard deviation were estimated. For the qualitative variables, percentages and frequencies were computed. To find out how the means of the various student groups differed, an ANOVA test was used. Logistic regression analysis was also used to determine the log-odds of various study parameters. Statistical significance was determined by a p-value of less than 0.05.

Ethical concern: The IRB was obtained from Deanship of Scientific Research at

Majmaah University with Ethics Number: MUREC-.MAY 17/COM-2021/33-1.

Result

The study included 242 students, 153 of whom were males and 89 of whom were females. The majority of the students (97.5%) were single, with only 4 (1.7%) married . The average age was 22.06 ± 1.95. Except for first-year students (6.5%), an approximately identical proportion of students participated from second to final year students.. Out of the total 242 pupil, 60 were repeaters, and 40 (66.7%) of the repeaters had only repeated once. The majority of students (78.1%) graduated from high school with grades ranging from 97 to 100%. (Table 1).

Table 1: General characteristics of study participants

Characteristics		Frequency	Percent
Gender	Male	153	63.2
	Female	89	36.8
Marital Status	Single	236	97.5
	Married	4	1.7
	Widowed	1	.4
	Divorced	1	.4
Mean Age ± S.D		22.06 ± 1.95	
City of residence	Majmaah City	92	38.0
	Outside Majmaah City	150	62.0
Academic Year	1st year (Pre-medical)	6	2.5
	2nd year (1st Basic sciences preclinical year)	46	19.0
	3rd year (2nd Basic sciences preclinical year)	44	18.2
	4th year (1st Clinical year)	43	17.8
	5th year (2nd Clinical year)	33	13.6
	6th year (3rd Clinical year)	34	14.0
	Internship	36	14.9
Have you repeated any year in college	No	182	75.2
	Yes	60	24.8
if yes, how many years	1	40	66.7
	2	18	30.0
	3	2	3.3
Graduation grade from high school	90-91	4	1.7
	91-92	2	.8
	92-93	1	.4
	93-94	9	3.7
	94-95	9	3.7
	95-96	12	5.0
	96-97	16	6.6

Characteristics		Frequency	Percent
Graduation grade from high school	97-98	44	18.2
	98-99	127	52.5
	100	18	7.4

*SD-standard deviation

64 students got excellent GPA grades [(4.51 - 5.00), 26.4%], 52 students had above average GPA grades [(3.01-3.50), 21.5%], and a very small number of students (n=4) had average GPA grades of [(2.01 - 2.50), 1.7%]. The aggregate average GPA of all students was 3.91± 0.70.

The difference in Perceived Mean Stress Score between male and female students was investigated across all 13 parameters. Only 'Accommodation (Housing) is a source of concern to me' was found to be significant in stress ratings (P=0.018). PMSS was also compared between those who repeated in any year and those who did not, but no significant difference was found. (Table2)

Table 2: Perceived Mean Stress Scores of Male and Female Medical students

PMSS	Male (N=153)		Female (N=89)		Total (N=242)		T-value	P-Value
	Mean	S.D	Mean	S.D	Mean	S.D		
Medical school encourages students' secrecy and feelings of isolation.	3.20	1.09	3.43	1.00	3.29	1.06	-1.591	0.113
I'm worried that I won't be able to handle the lengthy hours and responsibilities of clinical training and practice.	2.83	1.09	2.89	1.04	2.85	1.07	-0.404	0.687
I'm not sure what the academics and administration expect of me.	3.26	1.04	3.20	0.99	3.24	1.02	0.433	0.665
My medical training dominates my life and leaves me with insufficient time for other pursuits.	3.44	1.06	3.55	0.95	3.48	1.02	-0.825	0.410
I'm worried that I won't be able to master the complete body of medical knowledge.	3.35	1.05	3.35	1.14	3.35	1.08	0.032	0.974
This medical school prioritises the physician position over one's individuality and interests.	3.21	0.90	3.07	0.93	3.16	0.91	1.168	0.244
Medical school is more competitive than I had anticipated.	3.37	1.06	3.55	1.11	3.44	1.08	-1.237	0.217
Too many faculty members believe that students should be subjected to "baptism of fire."	3.33	0.87	3.38	0.85	3.35	0.86	-0.480	0.632

PMSS	Male (N=153)		Female (N=89)		Total (N=242)		T-value	P-Value
	Mean	S.D	Mean	S.D	Mean	S.D		
The majority of students believe that success in medical school occurs in spite of rather than because of the administration.	3.32	0.93	3.27	0.82	3.30	0.89	0.426	0.671
Medical school is impersonal, chilly, and overly bureaucratic.	3.11	1.13	3.15	1.04	3.12	1.09	-0.239	0.811
Medical school is a threat rather than a challenge.	3.04	1.15	2.90	1.23	2.99	1.18	0.895	0.372
My own finances are a worry of mine.	3.32	1.02	3.16	1.10	3.26	1.05	1.163	0.246
Accommodation (Housing) is a source of concern to me	3.31	1.13	2.94	1.16	3.17	1.15	2.386	0.018*
Sum	42.09	7.62	41.83	6.95	42.00	7.37	0.264	0.792

* P < 0.05 considered statistically significant

Students were asked about their opinion on different aspects, how much they agreed on it. Majority of the students were neutral on many aspects, however rest of them gave their fair opinion. 26.4% of students believed that they could not handle the long hours and responsibilities of clinical training and practise; 21.5% said medical school is cold, impersonal, and unduly bureaucratic; and 24.8% said it's more of a threat than a challenge. About 50% of respondents said that medical school controls their lives and leaves too little time for other activities, about 37.2% agreed that "they do not know what the faculty/ administration expects from them," and 48.1% said that "medical school is more competitive than I expected." (Fig.1)

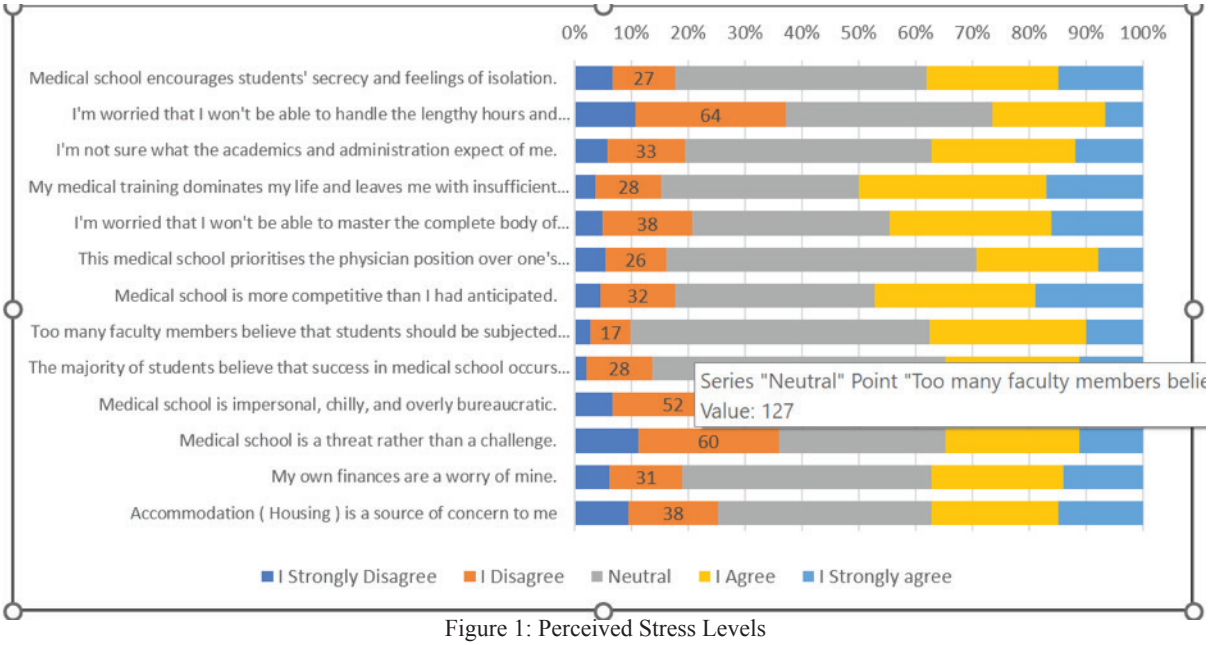


Figure 1: Perceived Stress Levels

Analysis showed that there in an increase in the overall average PMSS scores as students jump to the higher grade of their course. There was a mean score of 36 in the first year of their graduation, but we can observe that the mean score increased as students' progress further. There was a mean score of 39.20, 41.57, 42.70, 41.61, 45.03 at 2nd year, 3rd year, 4th year, 5th year and 6th year respectively. We can also see the fall in the stress score at their internship (43.75). The difference in mean scores between students of different year was found statistically significant. (Table 3)

Table 3: ANOVA to compare overall mean stress scores between students of different years.

Year of Study	N	Mean	Std. Deviation	F-Value; P-Value
1st year (Pre-medical)	6	36.00	12.12	3.363; <0.01
2nd year (1st Basic sciences preclinical year)	46	39.20	7.72	
3rd year (2nd Basic sciences preclinical year)	44	41.57	6.92	
4th year (1st Clinical year)	43	42.70	6.94	
5th year (2nd Clinical year)	33	41.61	5.55	
6th year (3rd Clinical year)	34	45.03	8.34	
Internship	36	43.75	6.02	
Total	242	42.00	7.37	

Stress scores were higher in students with lower GPA scores and less in students with high GPA score. Mean stress score in students with GPA score between (4.51-5.0) was 38.6 while it was 40.8 in (2.51-3.0). Analysis showed that, students whose GPA scores were high they were less likely to have a stress. Odds of developing stress among the students with GPA (3.01-3.50) are 1.11 times more likely as compared to students with GPA (4.51-5.00).

Discussion

The study demonstrates that most of the students were neutral about their opinion on different aspects. However, a larger proportion of the respondents agreed on some of the aspects. Among that 19.8 % of the respondents agreed and 6.8 strongly agreed that 'they are concerned that they will not be able to endure the long hours and responsibilities associated with clinical training and practice. Similarly, 23.1% of students agreed and 14.9% of students strongly agreed that they have a sense of anonymity and feelings of isolation among the students. On the line of the impact of the study environment in medical school on personal life, students agreed that medical training controls their lives leaving too little time for other activities, and they consider it more of a threat than a challenge. Moreover, they found medical school as cold, impersonal, and needlessly bureau-

cratic (Fig. 1).

The chief finding of the current study that suggests a large proportion of students (28.5% agree, and 16.1% strongly agree) fear about their inability to comprehend with the pool of medical knowledge, confirm the previous studies which indicated that the damage done to the self-image of a medical student is the most serious consequences of medical education. [2, 7] With regards to the gender differences, no other dimensions except 'accommodation (housing) was a source of concern for female students and was found in stress scores (P=0.018). This finding supports the earlier studies which found a significant association between stress and accommodation where psychosocial factors such as "quality of food in mess," "lack of entertainment," "feeling of loneliness" played an important role in causing stress.[8] The current study also found that there is an increase in the overall PMSS scores from the start of medical education in the first year to the end of the course. The overall average PMSS scores increases as students achieve higher grades of their course. This is similar to the finding of another study where the level of stress increased progressively during the course, to reach as high as 40% by the end of the clinical training period. [9]

The current study shows that when a student steps up from one grade to the higher grade, s/he develops more anxiety and depression. The odds of developing anxiety in the 6th year are 8.20 times more than 2nd year students and odds of developing depression are 4.67 times. This finding supports several previous studies that demonstrated long and tiring medical education had a negative effect on the psychological status of students. [10] The association between perceived stress and academic performance was found to be statistically significant in this study (Table 3), which means greater the stress, lower would be the performance. Though few studies [11, 12] support this finding of the current study, however, in contrast, few studies suggest that many students feel stress motivates them to perform better. [13, 14]

Thus, it is well-established fact that medical academic studies are associated with chronic and high-stress exposure, which worsen academic performance, elevate depression, anxiety, and cause many health problems.[15] The current study also showed a high level of stress among medical students and its influence on their academic performance as well as their personal life and health, therefore, it becomes imperative that target stress prevention strategies are adopted. And hence the development of student support systems, wellness, and mental health programs is of utmost im-

portance. Moreover, stress management and coping mechanism should be included in the medical curriculum. This will assist students with developing ways of dealing with stress among themselves and smooth progress between different learning environments and a growing burden on their psychological and physical capacity.[10] The current study has the limitation due to lack of objective evidence that the year of study is related with anxiety and depression scales in medical students.

Conclusion

The findings of this study point towards high stress scores in students with low GPA scores. This issue can be addressed by a good student support system, counselling sessions and mentor mentee programs. Providing non-formal opportunities for medical students to express their feelings might help them to cope with stress better. It would be very effective in dealing with stress during exams if the academic support offices are in place within the campus to offer peer tutoring programs. Faculty development programs for the teachers to assess and evaluate the high expectations to mitigate students stress is vital.

List of abbreviations in the order of appearance

PMSS -Perceived Mean Stress Score, GPA- Grade Point Average, APA - American Psychological Association, SPSS- Statistical Package for Social Sciences, ANOVA- Analysis of Variance, SD- Standard Deviation

Conflict of Interest

Author declares that there is no conflict of interest.

Financial support

Author declares that there is no financial support has been sought/received to carry out this study.

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