

Stress and Academic Performance Among Medical Students

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ABSTRACT

Objective: To determine the relationship of stress and academic performance in first year medical students and to identify sources of stress, levels of stress and relevant coping strategies.

Study Design: Mixed method sequential.

Place and Duration of Study: Allama Iqbal Medical College, Lahore, from March to December 2010.

Methodology: Survey questionnaire and in-depth interviews were carried out in the first year students with their consent. Two hundred and fifty students were surveyed, out of whom 120 students responded. Twelve students with their consent were interviewed. Non-probability purposive sampling was employed for both types of data collection. SPSS version 20 was used. The qualitative data generated through structured in-depth interviews, were analyzed by content analysis.

Results: Low level of stress was found in 7.5% (score <150), moderate level of stress was present in 71.67% (score between 150 and 300), and high level of stress was observed in 20.83% (score >300) of the students. There is moderate negative (-0.583) and significant ($p < 0.01$) correlation between academic performance and sources of stress. Similarly there is moderate negative (-0.478) and significant ($p < 0.01$) correlation between academic performance and levels of stress. There was strong positive (0.799) and significant ($p < 0.01$), correlation between stress level and number of stress sources.

Conclusion: The study showed a diversity of stress sources and a high level of stress in the medical students. The results also show that higher level of stress is associated with poor academic performance.

Key words: Stress. Medical students. Coping strategies. Academic performance.

INTRODUCTION

Medical education is inherently stressful and demanding. Overwhelming burden of information leaves a minimal opportunity for the student to relax and recreate. Stress and depression have been consistently linked to mental and physical health effects.¹

An optimal level of stress enhances learning while excess of stress can cause health problems. This results in reduction of students' self-esteem and affects their academic achievement. A high level of stress may have negative effect on cognitive functioning and learning of students in medical school.² The young student population is vulnerable to stress of higher professional education due to competitive environment. Comparing stress between medical and non-medical student, literature review shows that medical students perceive higher stress.³

Any level of stress, if left unattended, can lead to sleeping disorders, burnout, a drop out, a fact presented by Dyrbye *et al.* in their numerous studies.^{3,4} Canadian and US based studies suggest high prevalence of depression anxiety and psychological distress among medical students than in general population.⁴ Stress

sources include curriculum, personal competence, endurance and time outside medical school. Increase in concerns correlated with an increase in depression and anxiety.⁵⁻⁸

The rationale of this study was to identify sources, level of stress in medical students, coping strategies employed by students and its effect on their academic performance in a local context.

The objectives of this study were to determine the relationship of stress and academic performance and to identify different sources, levels of stress and relevant coping strategies among first year medical students.

METHODOLOGY

The study was conducted among first year medical students of Allama Iqbal Medical College, Lahore, from March 2010 to December 2010. Survey questionnaire was distributed to whole class of 250 students. One hundred and twenty questionnaires were completed, returned and were thus included in the study. Twelve students who volunteered were interviewed.

After an informed consent, the students were asked to fill in the student stress test one month before their send up examination in order to address confounding factors for stress other than examination. The survey also included different coping strategies, as used by the students. The students were asked to tick the most appropriate strategies used by them to counter stress. Twelve students volunteered for the in-depth structured

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interviews. The interviews included questions to explore factors causing stress to the students and their expectations from the faculty. Researcher also expected to explore some new sources. The send up result of the students were collected. Statistical Package for Social Sciences (SPSS) version 20 was used for analysis. Spearman's correlation was calculated to find relationship between sources of stress and academic performance.

The students stress scale with 31 items was used. This scale is pretested on western medical college student, with an \pm alpha-coefficient value of 0.98. The score varies from 300 or more as maximum and 149 or less as minimum. A score of 300 and above indicated high level of stress, with 80% chances of getting sick, a scale of 150 – 299 indicated a moderate level of stress with a 50% chance of serious health change and a score of 149 or less indicating a lower level of stress but still with a 30% chance of serious health change.

The students were categorized on an interval scale, which identified any student scoring below 50 marks to be classified as fail, 50 – 59 marks 2nd Division, 60 – 79 marks 1st Division, and 80 marks and above as distinction.

RESULTS

One hundred and twenty students who completed questionnaires were included in the study. Twenty point eight percent of the subjects had severe stress, 71.6% had moderate stress and 7.6% had low stress. Gender distribution of stress showed that females had more preponderance to severe stress (30.0 – 11.7% respectively) than males. Seventy eight point three percent of males had moderate stress and 65.0% of females had moderate stress. Ten percent of males were suffering from low stress as compared to 5.0% of females. Ninety seven point five percent of students passed in send up examination (Tables I and II).

Main source of stress identified among males was security, law and order situation with a percentage of 85.0%. While 90.0% were stressed due to general corruption in the country. Forty eight percent were stressed due to teacher's discouraging attitude. Main source of stress identified among females was security, law and order situation with a percentage of 97.0%. Ninety percent were stressed due to general corruption in the country. Eighty five percent were stressed due to non-availability of a well paying job after qualification and lack of health facilities. Eighty percent were stressed due to patients suffering (Figure 1).

Coping strategies were also analyzed among male and female medical students. Seventy five percent of males went out with friends, 68.0% used internet chat and text messaging, 48% used tranquilizers and 50.0% liked counselling from senior students or doctors. Among females, 92.0% watched television, 87.0% used internet

chatting and text messages, 48.0% used virtual interaction with people online or on cell, 48.0% read books and 45.0% used tranquilizers (Table III).

Spearman's correlation coefficient among students' academic performances, sources of stress and levels of stress were carried out to assess the association. There was moderate negative (-0.583) and significant ($p < 0.001$) correlation between academic performance and of stress sources, i.e. higher the stress sources lower will be the academic performance. Similarly, there is moderate negative (-0.478) and significant (p value < 0.01) correlation between academic performance and levels of stress, i.e. higher the level of stress lower will be the academic performance (Table IV).

The in-depth interviews were conducted and themes were identified as daily stressors, accommodation issues, extensive memorization, stressful events, lack of facilities and expectations from faculty.

Table I: Total stress score (n = 120).

Gender	Severe stress		Moderate stress		Low stress	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Males	7	11.7%	47	78.3%	6	10.0%
Females	18	30.0%	39	65.0%	3	5.0%
Total	25	20.8%	86	71.6%	9	7.6%

Severe stress score = > 300, Moderate stress score = 150 - 300, Low stress = < 150.

Table II: Send up result (participants of the survey).

Results	Male	Female	Total
Pass	58 48.3%	59 49.1%	117 97.5%
Fail	2 1.6%	1 0.9%	3 2.5%
Total	60 50.0%	60 50.0%	120 100.0%

Academic performance: The students were categorized on an ordinal scale, which identified any student scoring below 50 marks to be classified as fail, 50 – 59 marks, 2nd Division, 60 to 79 1st Division, and 80 Marks and above as Distinction. Only (3) 2.5% students out of a total of 120 students failed in the send up examination.

Table III: Coping strategies.

Strategies	Males	Percentage	Females	Percentage
Talking/discussion with family/relatives	20	33	45	75
Counselling with senior students or doctors/ professionals	30	50	39	65
Going out with friends	45	75	25	42
Watching TV/movie	21	35	55	92
Reading books	12	20	29	48
Taking a walk	1	2	10	17
Going shopping	5	8	15	25
Smoking	19	32	2	3
Alcohol	2	3	0	0
Tranquilizers	29	48	27	45
Eating	18	30	12	20
Cooking	4	7	25	42
Internet chats/text messages	41	68	52	87
Number of virtual interactions with people online and cell phone	15	25	29	48

Table IV: Non-parametric correlation spearman rank correlation coefficient matrix.

		Academic performance	Number of stress sources	Stress level
Spearman's rho				
Academic performance	Correlation coefficient	1.000	-.583**	-.478**
	Sig. (2-tailed)	–	.000	.000
	N	120	120	120
No of stress sources	Correlation coefficient	-.583**	1.000	.799**
	Sig. (2-tailed)	.000	–	.000
	N	120	120	120
Stress level	Correlation coefficient	-.478**	.799**	1.000
	Sig. (2-tailed)	.000	.000	–
	N	120	120	120

** Correlation is significant at the 0.01 level (2-tailed).

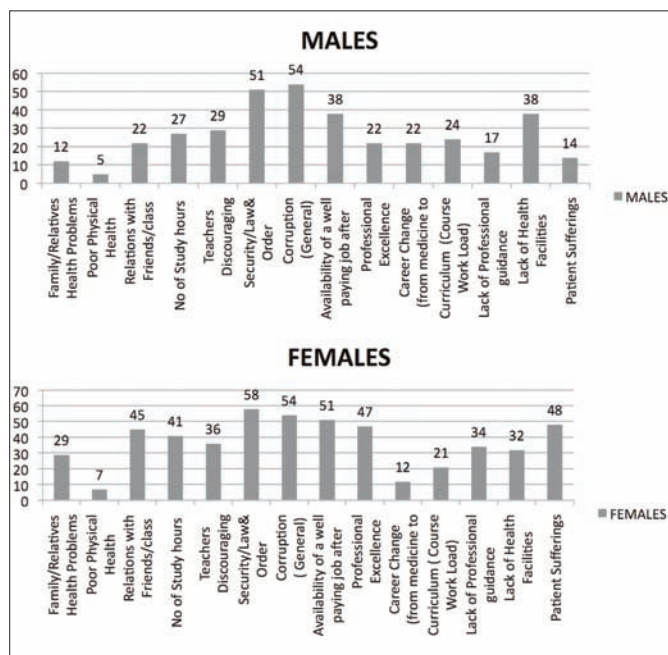


Figure 1: Sources of stress for male and female students.

Eight students (66.7%) identified number of things which generated stress like unavailability of transportation, 7 students (58.3%) identified traffic jams, 7 (58.3%) felt tiredness to be a stressor, 6 students (50%) cited electricity load shedding at home as cause of stress and 6 students (50%) felt inadequate air conditioning in classrooms and dissection hall to be a stressor.

Two students (16.6%) those residing in the hostel complained of lack of rooms, 2 students (16.6%) felt that there was overcrowding of students in rooms, 1 student (8.3%) felt lack of air conditioning was a stressor and 1 student (8.3%) felt that the poor quality of food caused stress.

Twelve students (100.0%) were distressed with the extensive memorization in a short period of time especially for the subject of anatomy and attending compulsory tutorials in physiology and biochemistry.

Besides personal or family ill health causing stress temporarily, 6 students (50.0%) specifically identified junior doctors' strike twice during their academic year disrupting their teaching schedule.

Seven students (58.3%) felt stress due to lack of facilities in study rooms or proper seating arrangements or cabins in the library. Some students had to carry out studies in the open or in their own rooms where often presence of other students was a distracter.

All the students expected the teachers to show flexibility in organizing tests, sub-stages and tutorials and to explain and repeat difficult concepts. Six students (50.0%) suggested that small breaks should be given after tests and sub-stages. Five students (41.6%) thought that special guidance and help should be given to anyone who needs it.

All the students felt that they were lucky to be paying low tuition fees than the private medical students and this economic advantage meant less worries as compared to their friends studying at private medical colleges.

DISCUSSION

Majority of the students were identified in the moderate stress category. This is similar to studies from Portugal and Saudi Arabia about stress prevalent in medical students.^{6,7} Distinct and separate studies from Iran and Saudi Arabia show prevalence of stress, depression, anxiety amongst medical students.^{8,9} A study from Pakistan indicate presence of depression, anxiety and stress amid medical students.¹⁰ Another study from Pakistan focuses on stressors arising from academic and psychosocial domains indicating that the stress phenomenon is not bounded by cultural and societal factors.¹¹ Overall this is aligned with the global perception of stress as associated with medical education.¹²

The perception of a greater level of stress by the female students in this study can not be attributed to a single source. Overall the females reported feeling stressed from a number of sources. This is in accordance with the studies carried out by Dyrbe indicating higher stress in the female medical students in Canada and United States.^{3,4} This finding is in agreement with the study from Pakistan by Khan *et al.* showing higher stress in female students.¹³

The overall high level of stress in the medical students can be attributed to the normal everyday stressors of daily life as well as to the additional stress of course workload, lack of leisure time, material to be learned and frequent academic examinations in a competitive environment. The fact that frequent sub-stages and stages in anatomy and essential tutorials in physiology and biochemistry put the students in stress as they have to pass these to be eligible to sit in the final examination. This finding is similar to a study from Nepal

by Sreeramareddy *et al.* where the most important sources of stress for the students were staying in hostel, parental expectations, curriculum, tests, lack of time and facilities for entertainment.¹⁴ These sources of stress were highlighted in the in-depth structured interviews conducted in this study. Students expressed their concerns that they faced stress from their family, peers and friends that they should excel in their studies. These high expectations often proved to be a reason of stress and poor performance.

This study shows that majority of students were concerned regarding their future, and about getting job after graduation, which is in contrast to a study carried out by Ahmadi *et al.*, which shows the students to be optimistic about future and devoid of self-harming thoughts.¹⁵ The primary reason being the difference in professional medical opportunities available in Pakistan to that available in Dubai and UAE.

The sources of stress that were found to be common for both the male and the female students were course content, worrying about law and order situation, general security within the city as well as in the country, teacher's attitude and possible career change. This means that the students identify stress to be stemming out of these sources uniformly regardless of their gender. The other sources of stress pertaining to curricular content and teacher's responses are not different as reported in studies from other countries. This finding is in accordance with a study by Yousaff *et al.* from Malaysia where the major stressors identified by the students were related to academics.¹⁶

Students in the in-depth interview revealed that they were not facing stress due to high tuition fees being paid by other students in private colleges of the country. This tuition fee often adds upto stress as identified by Ross *et al.* that medical students who have higher levels of debt worry about their finances and experience higher levels of stress.¹⁷

The students showed stress related to personal life events like death and major personal or family illness. This is shown by Dyrbe *et al.* where students reported stress due to similar sources. They proposed that these students need support not only in their first year but also in the years to come till they have developed an effective coping strategy.³

Most of the students in this study were found using combination of coping strategies. This is similar to different studies which show students utilize a number of strategies to cope stress. The students were found using problem solving (discussion with seniors) and emotion focused (walks, cooking etc.) coping strategies. The use of internet chats and cell phone texting utilized by both male and female students as a coping strategy indicate that this can be classified as a problem solving coping strategy when discussing with friends or an emotion

focused coping strategy which often takes an ugly form of escaping from real problems. The problem solving strategy leads to attainment of higher level of academic achievement and success as noted by Gaudreau *et al.*¹⁸ This study, however, did not aim to look into the difference in coping strategies as utilized by students leading to difference in the level of academic achievement.

Smoking to relieve stress was popular amongst males and least amongst females in this study. Two of the male students resorted to alcohol intake to counter stress. It cannot be quoted with confidence whether this is the actual situation or an under or over stated fact. However, this information needs to be further looked into. It is known that stress can lead to depression and propensity to alcohol intake and students screened positive for depression were found at risk of alcohol intake.^{3,4} Occasional use of tranquilizers was high both for male and female students. This is in agreement with the study carried out by Amr *et al.* that females are less likely to report stress due to relationship problems with teachers and substance abuse.¹⁹

The results of the send up examination of the participants showed that despite the stress, majority of the students passed the examination. The students failing in the examination exhibited severe level of stress. Different studies show different impact of stress on academic performance. Pfeiffer showed that too much stress negatively interfered with student's preparation, concentration and performance while positive stress helps student achieve peak performance.²⁰ Also it must be suggested that this send up was the first examination in which the students were exposed to handling a considerable amount of consolidated curriculum, most of the time students are suggested by their seniors that in subsequent years of education to follow, the stress levels would be low and they would be able to handle stress in an effective manner and improve their academic performance.

The limitations of the study include students being of same class and same institution. The sources of stress and coping strategy were also limited. The sample size also limited data collection as well as some of the student's decision not to respond to the questionnaire. The structured interviews may have resulted in less flexibility limiting the students' responses and analysis of this qualitative data was interpretive so it is less accurate representation and may have been influenced by students not sharing some factual information in the presence of a faculty member of their medical institution. Therefore, it is difficult to generalize and apply the results of this study to 1st year medical students of different medical colleges of different countries.

It is suggested that larger, multi-institutional and longitudinal studies to be carried out to find the sources

of stress, levels of stress and its effect on students' academic performance. To solve problem of poor academic performance, the students may need to identify sources, levels of stress and a coping strategy to improve the poor performance.

CONCLUSION

This study illustrates the presence of a moderate, negative and significant relationship between sources of stress, levels of stress on the academic performance of a student. The study also reveals that there is a strong, positive and significant relationship between stress levels and sources of stress. The results also show that higher level of stress is associated with poor academic performance.

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