

Stress Level Comparison of Medical and Non-medical Students: A Cross Sectional Study done at Various Professional Colleges in Karachi, Pakistan

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Abstract

Objective: To compare the stress levels of medical students with that of other professional colleges.

Background: Stress is known to affect learning abilities and also be a risk factor for various health and psychological difficulties. Through earlier studies, stress levels of medical students have established to be high during their academic life. In Pakistan, local epidemiological data about psychological morbidity among medical undergraduate students is infrequent. An extensive electronic Internet-based search failed to locate any study which shows a comparison of stress between medical students and the students of other professions in Karachi, which is the objective of our study.

Methods: The study was conducted at various professional colleges all over Karachi. A sample of 600 students, 50 from each of the 12 selected colleges was taken. A standardized stress questionnaire of the International Stress Management Association (UK) was used to assess the stress levels which categorized the level of stress into mild, moderate and severe.

Results: Stress levels were found to be higher in medical students, and this stress was mostly attributed to studies according to majority of the medical students (75.6%), where as calculated stress levels were also higher in medical students (54.6%)

Conclusion: Stress levels of medical students were found to be suggestively higher than those of non-medical professional students. Thus, medical students should be provided with appropriate counseling and stress relieving activities to prevent the long term antagonistic effects of elevated stress levels on the physical and mental health of future doctors.

Keywords: Stress levels; Comparison; Medical students; Mental health; Depression

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Introduction

Stress can be defined as “a state of mental or emotional strain or suspense” and also as “a number of normal reactions of the body (mental, emotional, and physiological) designed for self-preservation” (Princeton University, 2001). Despite its diffuse perception, most of the well-known definitions emphasize stress as “any factor that threatens the health of an individual or has an adverse effect on the functioning of the body” (Oxford Medical Publications, 1985).

It has been proven through various researches that medical students experience elevated stress levels throughout their medical school life [1,2]. The personal and social expense they have to make in order to maintain respectable academic results, in a highly competitive environment, puts them under a lot of stress [3]. Stress can lead to interruptions in both physical and mental health. It may lead to the development of depression and anxiety coping with the help of drugs, analgesics; alcohol, smoking and eating actually are counterproductive and may

worsen the stress. While some students see the pressure as challenge to work harder, others find it hard to cope with the stress and lag behind.

Stressors (triggers) are anything that tosses the mind-body-spirit connection out of equilibrium (homeostasis). When your mind/brain construes stressors (triggers) to be a threat to internal balance and synchronization, then a protective "good stress" response is generated in order to restore homeostasis. Allostasis is the process of attaining constancy (homeostasis) through change, which functions by way of the mind-body-spirit communication systems. Allostasis is central for your health and survival.

Researchers from Heptares Therapeutics, a drug company, have exposed the 3-D structure of a protein receptor that mediates our response to stress, CRF1, a molecule on the outside of cells on the pituitary gland, releases CRF, hormones involved in regulating our stress response that over time underwrite to anxiety and depression. A vital aspect of the discovery is that the receptor has a small binding pocket positioned in a much dissimilar position than other G-protein-Coupled Receptors, (GPCRs). Knowing the structure of Class B GPCRs like CRF1 could possibly help researchers develop drugs that better target receptors within the same family, Heptares claims. Scientists could just enterprise a drug that pops right into that pocket.

Additionally, research suggests that stress can block chemical responses in the brain that are necessary for learning. Stress can disrupt learning and memory progress (Long-Term Potentiation (LTP)) as it forces the brain to revert to more primitive survival needs. Although it is known that long-term or chronic stress can affect the brain's learning and memory region, a new finding discovers short-term stress, lasting as little as a few hours, can also impair brain-cell communication in these critical areas [4].

Our research is based on our hypothesis that medical students are subjected to even more stress than students of other professions, which in itself is immensely counter productive as no other profession demands better mental and social well being than the medical profession, as there is no aspect of the job that does not require public interaction or the ability to make quick, responsible decisions.

Methods

Instrument

The instrument used was the Standardized Stress Questionnaire formulated by the International Stress Management Association UK. The questionnaire was slightly modified to better adapt to our topic of study. It consisted of 25 questions, along the lines of 'Do you study till late in the night?' and 'Do you think there are too many deadlines in your study life that are difficult to meet' to assess the academic stress levels of individual students. The questions were to be answered in either yes or no, which was designed so to be very easy for the student rather than scoring which doesn't give a clear answer. For each yes, there was one mark while each no was valued to be zero. The scores were

calculated out of a total of 25 and categorized into low (score=6 or less), moderate (score=7-14) and high (score=more than 14). The low, moderate and high scores were reflecting the level of stress found out to be present in these students. Additionally, 2 more questions were added to check for perceived stress levels and stress attributable to studies.

Study subjects

Twelve professional colleges of Karachi were selected at random, 3 from each of the four following fields.

Medical: Agha Khan University, Jinnah Medical and Dental College and Liaquat National Medical College.

Arts: Karachi School of Arts, Iqra University and Indus Valley School of Arts.

Engineering: Foundation for Advancement of Science and Technology (FAST), National University of Science and Technology (NUST) and Bahria University.

Commerce: Institute of Business Management (IoBM), Bahria University and Shaheed Zulfiqar Ali Bhutto Institute of Science and Technology (SZABIST).

50 students were selected, by random sampling from each of the 12 colleges, making a total sample size of 600. The data collection was carried out over a period of 2 months (April-May).

Inclusion and exclusion criteria: Students of 2nd and 3rd years were selected. All students other than the ones in 2nd and 3rd year were excluded as stress levels are perceived to be high at the beginning and towards the end of the professional education. Questionnaires were to be filled out by the students in the mid of the term ensuring that they weren't about to give any examinations as stress levels would be invariably high during that period. Only students from the private colleges were selected specifically; excluding all Government colleges.

Collection of data: We personally visited each of the colleges. The students who fitted selection criteria were selected at random. The students were allowed to respond in their own time and privacy. The participation was entirely voluntary.

Results

50 students from each of the 12 colleges mentioned above filled out the questionnaires. The stress levels were calculated out of a total of 25, and categorized into low, moderate and high. Out of these, 54.6% medical students have stress levels in the 'high' range compared to the 20.6% of engineering, 20.6% of arts and 32% of commerce students in the same category. Most of the non-medical students fall into the 'moderate' stress levels range with the highest being that of the engineering students 74.6%, then arts students 68.6% and finally commerce students 68% (**Table 1a**).

In 'perceived stress levels' (percentage of students who considered their stress levels to be higher than 6 on any given day) 54.3% of medical students responded with a yes while 15.3% of engineering students, 32% of commerce and 36.6% of arts students had the same response. About 75.6% medical students

have attributed their high stress levels to studies (p-value=0.000), which is more than twice that of students of other professions as compared to engineering 20%, commerce 38% and arts 36.6%.

A number of variables showed results that could explain this difference in statistics such as: around 81.3% medical students complained that they had too much to study followed by commerce 62.6%, engineering 60% and arts 48% as shown in **Table 1b**. Approximately 76% medical students thought that they had too many deadlines in their life followed by commerce 58%, engineering 48% and arts 46% as shown in **Table 1b**.

Discussion

Studies have shown that medical students experience a high level of stress during their undergraduate course [5-9]. High level of stress may have a negative effect on cognitive functioning and learning abilities of students in the medical school [10].

The estimated prevalence of emotional disturbance found in different studies on medical students was higher than that in the general population. In three British universities, the prevalence of stress among medical students was 31.2% [11], and 41.9% in a Malaysian medical school [12] and 61.4% in a Thai medical school [13]. In a Swedish study, the prevalence of depressive symptoms among medical students was 12.9%, and 2.7% of students had made suicidal attempts [10].

Thus, the stress levels of medical students have been found to be significantly higher than those of the other 3 professional colleges (**Figure 1**). The factors that could be attributed to this difference are: The vastness of the course that has to be covered in a relatively short amount of time, too many deadlines that are difficult to meet (p value=0.00) and the inability to relax due to feelings of guilt while relaxing (p value=0.00) (**Table 2**).

When asked if the stress was due to studies, 75.6% of medical students responded with a yes whereas 20% of engineering, 38% of arts and 35.6% of commerce students answered yes (**Figure 2a and 2b**).

The perceived stress levels were high in 54.3% of medical students as compared to the 54.6% who had high levels of calculated stress (true positives). This implies that a great percentage of students are unaware of their elevated stress levels, which could be potentially dangerous because these students are unlikely to seek counseling or help to reduce their stress levels.

The negative effects of long and tiring medical education on the psychological status of students have been shown in several studies. Results of a study in the UK showed that one-third of psychologically-ill students did not graduate from the college [14].

Our study showed three aspects of the effects of high stress levels on an individual namely: physical, psychological and professional. The physical effects can be seen in the form of loss of appetite (p value=0.000), constant fatigue (p value=0.000), increase in muscular aches (p value=0.006); the psychological problems in the form of critical personality (p value=0.046), impatience (p value=0.000) and inability to relax (p value=0.000); and professional in the form of being constantly preoccupied with own thoughts (p value=0.000), clouded judgment and inability to concentrate (p value=0.001) **Table 2**. Therefore, the short term effects would be that the lack of physical fitness would reduce the students' ability to learn and perform well in their exams as they are unlikely to be able to focus on lectures during classes. The long term effects of these would be increased likelihood of developing chronic diseases such as ulcers, hypertension and diabetes, psychological abnormalities such as anxiety and depression and poor professional abilities due to lack of knowledge, poor judgment and inability to make quick and sensible decisions.

Therefore, with early identification and effective psychological services, possible future illnesses may be prevented. It is very important to target stress-prevention strategies at students who have any level of psychological stress to prevent the development of more serious conditions relating to stress. Wellness and mental

Table 1a: Stress levels of professional field.

Professional Field	Stress due to studies		Calculated stress			Dependency on drugs	
	No	Yes	1-6	7-14	15-25	No	Yes
ARTS	98(65.3%)	52(35.6%)	16(10.6%)	103(68.6%)	31(20.6%)	82(54.6%)	68(44.3%)
COMMERCE	93(62%)	57(38%)	0(0%)	102(68%)	48(32%)	75(50%)	75(50%)
ENGINEERING	120(80%)	30(20%)	7(4.6%)	112(74.6%)	31(20.6%)	59(39.3%)	91(61%)
MEDICAL	38(25.3%)	112(75.6%)	3(2%)	65(43.3%)	82(54.6%)	74(49.3%)	76(51.6%)

Table 1b: Stress levels of medical students.

Professional Field	Too Much to Study		Too many deadlines		Stress levels > 6	
	No	Yes	No	Yes	No	Yes
Arts	78(52%)	72(48%)	83(55.3%)	67(44.6%)	95(63.3%)	55(36.6%)
Commerce	56(37.3%)	94(62.6%)	63(42%)	87(58%)	102(68%)	48(32%)
Engineering	60(40%)	90(60%)	81(54%)	69(46%)	127(84.6%)	23(15.3%)
Medical	28(18.0%)	122(81.3%)	36(24%)	114(76%)	70(46.6%)	80(54.3%)

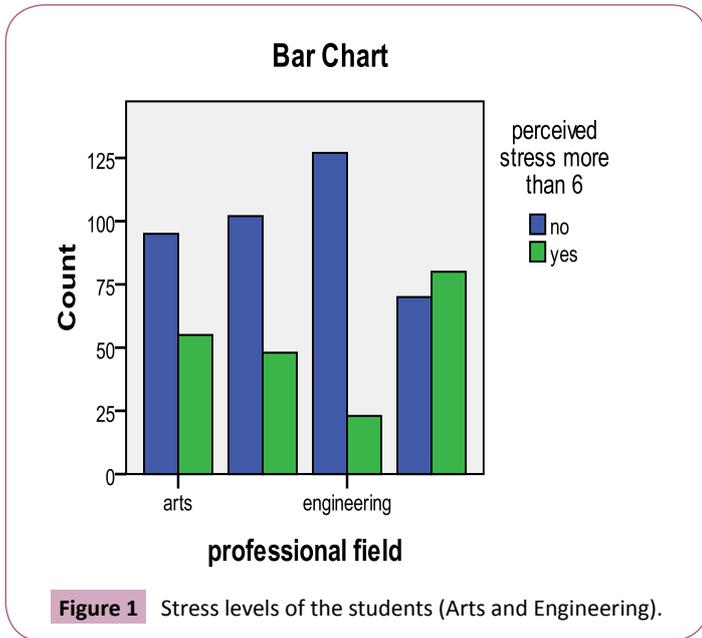


Figure 1 Stress levels of the students (Arts and Engineering).

Table 2: Factors attributing the difference of students.

Factors	P-Value
Too many deadlines	0.000
Feelings of guilt while relaxing	0.000
Inability to relax	0.000
Perceived stress levels	0.000
Calculated stress	0.000
Stress was due to studies	0.000
Loss of appetite	0.000
Constant fatigue	0.000
Muscular aches	0.000
Critical personality	0.006
Impatience	0.000
Preoccupied with own thoughts	0.000
Clouded judgment	0.001

health programs are also needed to help students make smooth transition between different learning environments with changing learning demands and a growing burden on their mental and physical capacity. Medical schools in the United States and Canada have initiated health-promotion programs and have reported positive results in reducing the negative effects of stress upon health and academic performance of medical students [15-17]. A similar approach to reduce the level of stress could be used for the medical students Karachi. On the other hand, a minimal amount of stress is necessary to add spice to one's life and to achieve optimal performance at examinations. An element of stress is involved with growth and is essential for sound personal functioning.

Students should be encouraged to participate in extra curricular activities by allocating proper time and giving incentives such as extra points in final examination or awards and cash prizes to distract the students from the burden of their stressful academic life.

Limitations

This cross-sectional study was based on self-reported information provided by students. Therefore, there is some potential for reporting bias which may have occurred because of the respondents' interpretation of the questions or desire to report their emotions in a certain way or simply because of inaccuracies of responses.

Recommendations

Another longitudinal study should be carried out with a cohort of students to investigate the levels of stress among students in all the five years of education.

Conclusion

The findings of the study recommend that the level of stress was higher amongst medical students as compared to students

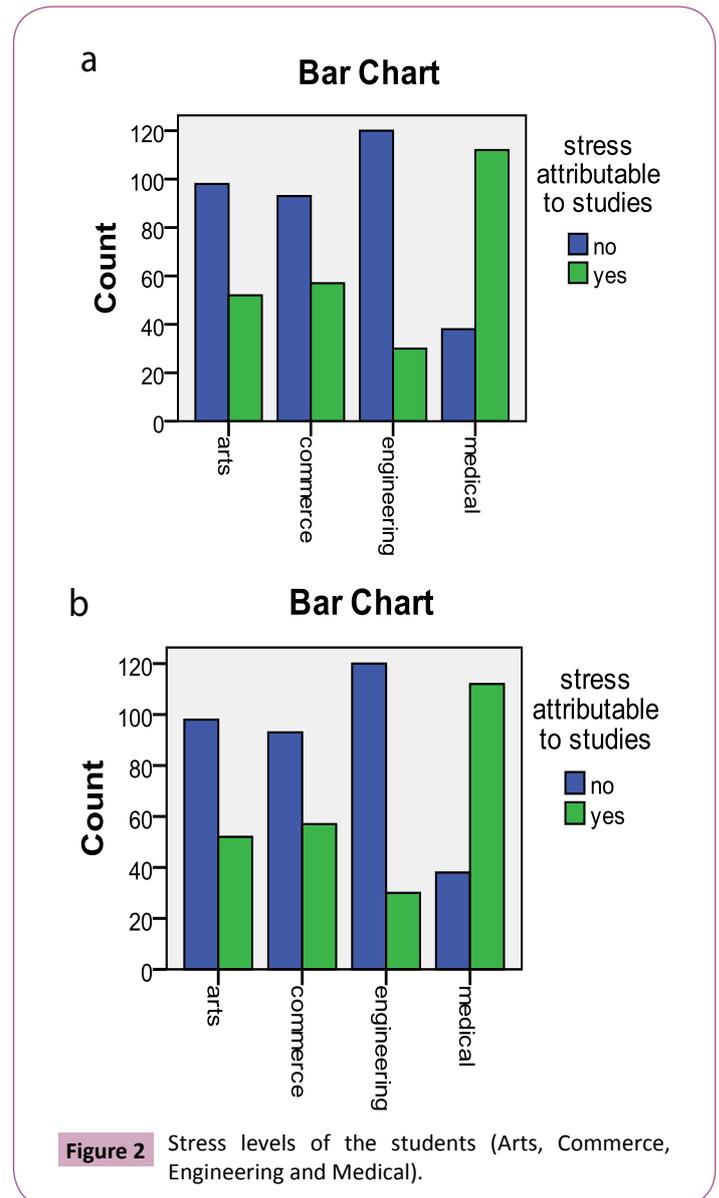


Figure 2 Stress levels of the students (Arts, Commerce, Engineering and Medical).

of other profession. These augmented stress levels in turn are responsible for symptoms such as decreased appetite, impaired attention and clouded judgment. These findings also suggest that special care must be taken to find out the obvious psychiatric problems among them. The major finding of high stress in medical students points to the need for establishing counselling and preventive mental health services as an integral part of

routine clinical services being provided to the medical students and initiatives must also be taken by the governing body to bring about a change in the curriculum which may help in decreasing stress due to studies. Students should also be encouraged to indulge themselves in various extracurricular activities which may have a refreshing effect on their minds.

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