

# Perceived Stress, Contributing Factors and Coping Mechanisms in Prospective Medical Students of Karachi: An Exploratory Study

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## ABSTRACT

**Objectives:** To determine the perceived level of stress, identify the factors contributing to it and the coping mechanisms among Medical College Admission Test (MCAT) candidates.

**Study Design:** Cross sectional exploratory study

**Place and Duration of Study:** This study was conducted at Anees Hussain (to provide MCAT preparation) all branches of a major private MCAT preparation center in Karachi immediately before the scheduled test date in July 2016 to November 2016.

**Materials and Methods:** All candidates registered for MCAT preparation at the center were requested to participate in the study. Perceived stress was measured using Cohen's Perceived Stress Scale (PSS-14). A separate structured questionnaire was used to determine contributing factors on a 3 point Likert scale and coping mechanisms on a dichotomous scale. Data was analyzed using SPSS 21.0.

**Results:** A total n=500 respondents completed the study. There were 24.0% (n=120) males and 76.0% (n=380) females with mean age 18±0.75 years. Majority 81.4% (n= 407) had premedical education from Sindh Board. The overall mean PSS-14 score was 30.00 ±7.31 and 48% candidates had a score greater than mean. Preference for public sector institute was cited by 80.3% (n=305) females and 78.2% (n=93) males whereas financial constraints was consideration for this preference among 45.9% (n= 174) females as compared to 30.8% (n=36) males. Major factors contributing to stress were self-study problem, examination pressure, vast syllabus, time shortage and high level of competition. Pressure to study medicine against will was admitted by 19.0% (n=72) females and 12.5% (n=15) males. The most frequent coping mechanism in both males and females were sleeping and talking to someone.

**Conclusion:** There is a moderate to high level of stress present in prospective medical students of Karachi. Students entering medical college with prior stress may be at added risk with consequent impacts on learning and physical health. Standardized premedical education at national level and a universal admission test can reduce stress levels. Good study management skills should be inculcated since school to prevent stress of competitive examinations. Medical undergraduate education is extensive and potentially stressful. Therefore, medical colleges should initiate stress management counseling to incoming students immediately after commencement.

**Key Words:** MCAT, Stress, Coping mechanisms

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## INTRODUCTION

Stress is an uncomfortable emotional experience accompanied by predictable biochemical, physiological and behavioral changes. It is a recognized cause of morbidity from non-communicable diseases and increases risk of infections.<sup>1</sup> Perceived stress is "the feeling or thoughts that an individual has about how

much stress they are under at a given point in time or over a given time period". Perceived Stress Scale (PSS) is a widely used and validated psychological tool to measure this perception of stress by individuals. Developed by Sheldon Cohen in 1983, its latest format includes 14 items. Though not a diagnostic tool, it reliably objectifies the subjective perception of stress in an individual. Score from PSS-14 range from 0–56, with a higher summative score predictive of higher perceived stress during the preceding week or month. It is quick to administer and its language is simple enough to be comprehended by a person who has passed high school English and therefore a reliable tool to measure stress in post-high school students.<sup>2</sup>

The Medical College Admission Test (MCAT) is a standardized annual examination conducted by medical colleges in numerous countries to assess candidates and facilitate the selection process. Though candidate selection for medical training was stringently conducted

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even in the apprenticeship model, the current form of this examination was started by the Association of American Medical Colleges (AAMC) since its inception in 1876.<sup>3</sup> Majority of the tests across the world follow a multiple choice format and include questions that assess knowledge, language, problem solving and critical thinking skills. Test is mostly conducted at the national level to standardize selection of candidates coming from a variety of educational backgrounds and testing boards. Nowadays these tests are conducted nationally around the world in Australia, Canada, China, Hong Kong, Cyprus, France, Germany, Guam, Israel, Japan, Kazakhstan, Malaysia, Lebanon, Pakistan, Puerto Rico, Qatar, Singapore, South Africa, Taiwan, Thailand, United Kingdom and United States of America.<sup>4</sup>

Up till the 1990s, admission to the medical colleges in Pakistan was based on fixed quota system followed by an open merit system using the passing percentage of marks in pre-medical education. Subsequently with increase in number of private medical colleges, there was a need to filter suitable candidates and hence institutes started conducting their own entry tests and interviews. In 1998, admission policy for medical colleges was changed to develop a merit based on weightage of matriculation exam, pre-medical exam and a universal provincial level MCAT.<sup>5</sup> The standard pattern was a one hour, 100 multiple choice question test covering physics, biology, chemistry and Basic English. In the year 2017, it was converted to the Medical & Dental College Admission Test (MDCAT) containing 220 Multiple Choice Questions (MCQs) with negative marking.<sup>6</sup> Punjab has been conducting a single National Testing System based MCAT for all its public sector universities since 1998 however public sector universities in Sindh introduced it only recently.<sup>7</sup> Currently, there are 101 private and 55 public sector medical and dental colleges in the country with approximately 13,650 seats.<sup>8</sup> Despite the new policy, private colleges continue to hold their own test and interview, giving partial weightage to the NTS MCAT. Additionally, some private sector medical colleges having a high international ranking, require very high merit and high MCAT scores.<sup>9</sup> Though test pattern is similar, private medical college tests vary in level of difficulty, a key utilized by private medical colleges to filter better candidates. The education systems in Pakistan from school to premedical college also vary in the quality and depth of their curriculum, teaching and assessment methods. There are 31 Boards of Intermediate & Secondary Education in the public sector and additional Cambridge and Aga Khan Boards in the private sector.<sup>10</sup> In absence of standardized education, it is difficult for even meritorious students to cope with mismatch of their educational background with competing peers.<sup>11,12</sup> The legislative move towards a single provincial MDCAT is yet to achieve complete

implementation. To increase possibility of securing a medical college seat, most candidates apply to at least one public sector and more than one private sector college. Consequently, students with a wide range of prior education have to deal with another wide range of tests. The difference in educational expense of public sector and private sector institutes promotes additional pressure. The respectability of profession also drives parents to pressure their children into securing an admission many a times at expense of student's mental and emotional wellbeing. Hence, the MCAT candidates are put into a stressful situation due to their aspiration to secure a medical college admission.<sup>13</sup>

Numerous studies have shown that medical college undergraduate students worldwide, have a high degree of study related stress.<sup>14,15,16</sup> If this stress is occurring during the admission process, candidates may associate it with medical studies which can then persist into the medical college and cause or aggravate the stress of undergraduate medical education. Stress is known to interfere in process of learning and impacts performance.<sup>17</sup> However, the stress perceived by MCAT candidates prior to starting medical studies is not known. Therefore, this study was conducted using the PSS 14 scale to determine the perceived stress level in MCAT candidates. This study also explored the possible factors contributing to the stress so that strategies aiming to resolve them can be developed. The effect of the stress on health of individuals also depends upon how they have learned to manage the stress. Therefore, this study also explored how the young adults manage their stress.

## MATERIALS AND METHODS

This was a cross sectional exploratory questionnaire based study. Perceived stress was evaluated using Cohen's 14 item Perceived Stress Scale (PSS-14). The PSS 14 comprises of 14 questions, including seven negative and seven positive responses in 5-point Likert Scale (never to very often), scored 0 to 4. The positive items were scored 0-4 and the negative items (numbers 4-7, 9, 10 and 13) were reverse coded. All 14 scores were summated for final score.

Three informal focus groups were conducted with 10-12 students preparing for MCAT to ask if they felt stressed, about factors contributing to their stress and coping mechanisms they and their peers adopted to manage stress. The responses were used to generate a list of possible options. A structured questionnaire was then constructed to determine sources of stress on a 3 point Likert scale (Agree-Maybe-Disagree) and coping mechanisms were measured on a dichotomous scale of Yes/No. An open ended option of "other" was also included to accommodate any missed option. Questionnaire and PSS-14 was distributed to all the candidates, at all five branches of MCAT preparation institute in Karachi immediately before the scheduled

test dates in November 2016. They were requested to anonymously participate in the study. Submission of completed questionnaires was considered as voluntary implied consent.

Data was analyzed using SPSS 21.0. The study was conducted after review from Research Committee of Jinnah Medical and Dental College and permission was taken from the coaching center administration.

## RESULTS

A total n=500 respondents returned the questionnaires and were included. There were 24.0% (n=120) males and 76.0% (n=380) females as shown in Figure 1 with mean age 18±0.75 years. Majority 81.4% (n= 407) had premedical education from Sindh Board. The overall mean PSS-14 score was 30.00 ±7.31 which reflects moderate level of perceived stress. Stress scores were normally distributed among the study sample as shown in Figure 2. A total 48% (n=239) candidates scored > mean score. Among males, mean score was 28.3±7.2 and 48.3% (n= 58) males had a perceived stress score greater than 28. Among females, mean score was 30.6±7.3 and 50.7% females had a perceived score greater than 30.

Most frequent factors contributing to stress as reported by participants were self-study issues, exam pressure, vast syllabus and short preparation time as shown in Table 1. Examination pressure and high level of competition were significantly different between genders with p<0.05. Pressure to study medicine against will was admitted by 19.0% (n=72) females and 12.5% (n=15) males. Preference for public sector institute was cited by 80.3% (n=305) females and 78.2% (n=93) males whereas financial constraints was consideration for this preference among 45.9% (n= 174) females as compared to 30.8% (n=36) males.

The most frequent coping mechanism in both males and females were sleeping and talking to someone. Table 2

shows the difference in coping mechanisms between males and females. There is a very highly significant difference between genders for coping mechanisms with males using of exercise and playing games to manage stress and females using crying to manage stress. Negative coping strategies of smoking and taking drugs were identified only by a few candidates.

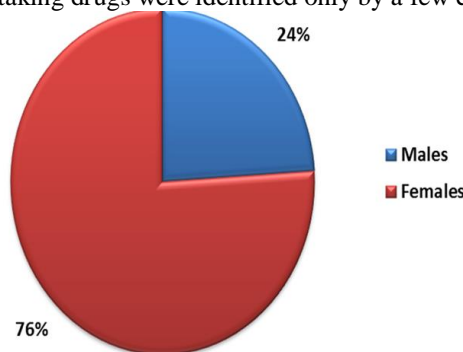


Figure No.1: Gender distribution of MCAT candidates

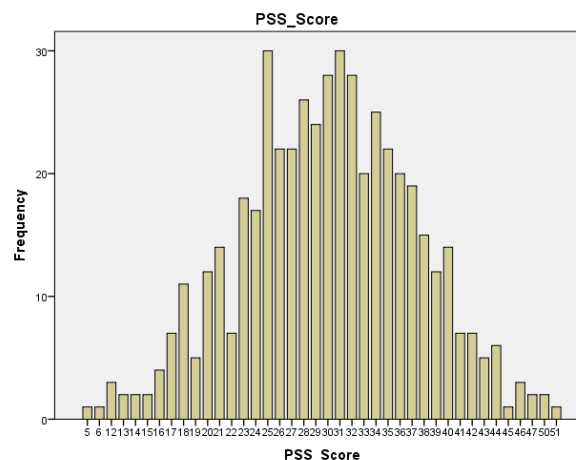


Figure No.2: Histogram of Perceived Stress Scale -14 Scores of MCAT candidates

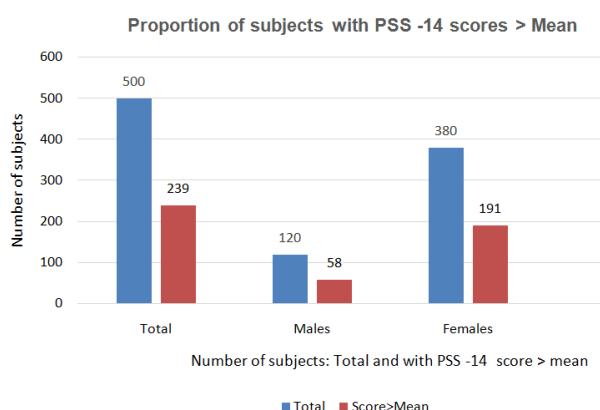
Table 1: Factors contributing to stress as identified by respondents and the difference between genders

Sources of Stress	Total Respondents	Agree n(%)	Maybe n(%)	Disagree n (%)	X <sup>2</sup> Value
Vast Syllabus	458	339 (74.0)	90 (19.6)	029 (6.3)	< 0.218
Tough topics	462	183 (39.6)	210 (45.9)	069 (14.9)	0.223
Short preparation time	463	343 (74.1)	068(14.6)	052 (11.3)	0.083
Problem in memorizing	461	231 (50.1)	146 (31.6)	084 (18.2)	0.202
Self-study issues	456	408 (89.4)	040 (8.8)	008 (1.7)	0.263
High competition	464	286 (61.6)	110 (23.7)	068 (14.6)	<0.001***
Examination pressure	468	442 (88.7)	038 (7.3)	020 (4.0)	<0.001***
Performance pressure	465	321 (69.0)	102 (21.9)	042 (9.0)	0.222
Family/teacher's expectations	463	310 (66.9)	112 (24.4)	041(8.8)	0.075
Family pressure to become a doctor	465	085 (18.3)	062 (13.3)	318 (68.4)	0.555
Total responses from n=500 excluding missing response      n= numeric count      % = valid frequency					
p-value is calculated using cross tabulation and chi-square test for difference between genders; significant at <0.05					
***Very highly significant ** highly significant * significant					

**Table 2: Coping strategies used to manage stress by males and females**

Coping Strategy	ALL n (%)	Males n (%)	Females n (%)	p-value
Eat	108 (21.6)	20(16.8)	88 (23.2)	0.142
Sleep	195 (39.9)	40 (34.5)	155(41.4)	0.181
Take Drugs	22 (04.4)	09 (07.6)	13 (3.4)	0.023
Talk to Someone	201 (40.2)	44 (37.0)	157 (41.3)	0.399
Exercise	25 (05.0)	17 (14.3)	08 (2.1)	<0.001***
Watch Movie	96 (19.2)	30 (25.2)	65 (17.1)	0.049
Play Games	61 (12.2)	27 (22.7)	34 (8.9)	<0.001***
Read	66 (13.2)	15 (12.6)	51 (13.4)	0.819
Listen to Song	20 (04.0)	07 (05.9)	13 (3.4)	0.232
Shop	25 (05.0)	05 (04.2)	20 (5.3)	0.643
Smoke	04 (00.8)	03 (02.5)	01 (0.3)	0.015
Cry	47 (09.6)	01 (0.9)	46 (12.3)	<0.001***
Pray	10 (02.0)	01 (0.8)	09 (2.4)	0.299
Other	107 (21.4)	18 (15.1)	89 (23.4)	0.054

n= numeric count % = valid frequency p-value is calculated using chi-square test; significant at <0.05  
 \*\*\*Very highly significant \*\* highly significant \* significant



**Figure No.3: Number of subjects: Total and with PSS 14 scores > mean by gender**

## DISCUSSION

Taking up Medical College Admission Test is a milestone in every student life who is aspiring to secure a seat in a medical college. It is one of the career building turning point of life and consequently generates a stressful situation.<sup>18</sup>

The gender ratio of candidates reflects the current predominantly female enrollment ratio in medical colleges of Pakistan. It has been speculated that this ratio is a result of inability of males to academically compete with female peers. However, this study shows that males are not seeking medical college admissions at all. Therefore, the gender ratio of MCAT applicants is reflective of the professional choice of male and female science students. No published study was found on the changing professional choices of college students in Pakistan.

The stress scores of the candidates indicate a moderate amount of stress in almost half of the total sample and both males and females are equally affected. Studies on stress reveal that women significantly higher on chronic stress and minor daily stressors, however in this study,

both scored similarly.<sup>19</sup> Numerous studies in undergraduate medical students show that there is high level of stress present in them. This study shows that stress is also present even before entering medical college. The undergraduate stress can thus be a continuation of stress developed in reference to medical college admission initiating a predisposition and conditioning that medical studies are stressful. Stress interferes with learning and therefore early recognition and management of stress can help prevent the undergraduate level development of stress.

This is in agreement with studies that women have higher stress from daily stressors.<sup>19</sup>

Women are more likely to use verbal expression and emotion based methods to dissipate their stress. We also found that stress coping strategy is different in males and females candidates.<sup>20</sup> This study found that though both males and females used talking to someone as most frequent strategy and females significantly utilized emotional expression of crying than their male counterparts.<sup>21</sup> Social integrated neutralizes the effects of stress. This social cushion could be from family, friends, neighbors, relatives, or formal clubs and college societies. This is consistent with our study where MCAT candidates look for these social cushions and talk to someone to reduce stress.<sup>22,23,24</sup>

## CONCLUSION

This study concludes that there is moderate level of stress present in prospective medical college students. It is mostly attributed to the examination, its preparation and competition. Social pressures do not contribute significantly to this stress. Candidates have developed coping mechanisms, however these are based on good social and interpersonal support system. Study management skills and coping through engagement in healthy activities need to be included from the start of medical education to enhance learning and prevent stress.

**Author's Contribution:**

Concept & Design of Study:	Zainab Hasan
Drafting:	Zeba Saeed
Data Analysis:	Asad Raza Jiskani, Javeria Akber
Revisiting Critically:	Zeba Saeed, Zainab Hasan
Final Approval of version:	Zainab Hasan

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

**REFERENCES**

- Fink G. Stress, definitions, mechanism and effects outlined: Lessons from anxiety. In: Fink G, editor. *Stress: Concepts, cognition, emotion and behavior*. San Diego, CA: Elsevier Academic press;2016.p. 3-11.
- Cohen S, Kamarck T, Mermelstein R. A Global Measure of Perceived Stress. *J Health & Social Behaviour* 1983;24(4):385-396.
- William C. McGaghie Assessing Readiness for Medical Education Evolution of Medical College Admission Test. *JAMA* 2002;288:1085-1090.
- Association of American Medical Colleges. AAMC History. <https://www.aamc.org/about/history>. Date of access: May, 2018
- Wikipedia. MCAT Pakistan. [https://en.wikipedia.org/wiki/MCAT\\_Pakistan](https://en.wikipedia.org/wiki/MCAT_Pakistan). Date of access: April, 2018
- Association of American Medical Colleges. About the MCAT Exam. <http://students-residents-aamc.org/applying-medical-school/taking-mcat-exam>. Date of access: May, 2018
- Khan JS, Biggs JS, Bano T, Mukhtar O, Tabasum S, Mubasshar MH. Medical colleges admission test in Punjab, Pakistan. *J Ayub Med Coll Abbottabad* 2013;25(1-2):64-7.
- Pakistan Medical & Dental Council. Recognized Medical Colleges in Pakistan. <http://www.pmdc.org.pk/AboutUs/RecognizedMedicalDentalColleges/tabid/109/Default.aspx>
- Rahbar MH, Vellani C, Sajan F, Zaidi AA, Akbarali L. Predictability of medical students' performance at the Aga Khan University from admission test scores, interview ratings & systems of education. *Med Edu* 2001;35(4):374-80.
- Wikipedia. List of Boards of Education in Pakistan. [https://en.wikipedia.org/wiki/List\\_of\\_Boards\\_of\\_Education\\_in\\_Pakistan](https://en.wikipedia.org/wiki/List_of_Boards_of_Education_in_Pakistan). Date of access: April, 2018.
- Milena Abbiati, Anne Baroffio, and Margaret W. Gerbase. Personal profile of medical students selected through a knowledge-based exam only: are we missing suitable students? *Med Educ Online* 2016;21:10.
- Khan JS, Tabasum S, Mukhtar O. Comparison of pre-medical academic achievement, entrance test and aptitude test scores in admission selection process. *J Pak Med Assoc* 2013; 63(5):552-7.
- Diab IH, Elweshahi HMT, Sheshtawy HA, Youssef AN, Eltayar S, Sharaf AEM. Screening for psychological distress among high school graduates accepted for enrollment at Alexandria Faculty of Medicine: Academic year 2016-2017. *Alexandria J Med* 2018; 54:155-159.
- Saeed AA, Bahnassy AA, Alhamdan NA, Almudhaibeya IS, Alyahya AZ. Perceived stress and associated factors among medical students. *J Family Comm Med* 2016;23(3):166-171.
- Kasa AS, Tesfaye TD. A study on perceived stress among undergraduate medical students of Bahir Dar University at Bahir Bar, North West Ethiopia 2016: Institutional based cross sectional study.
- Abdulghani HM, Alkanhal AA, Mahmoud ES, Ponnampuruma GG, Alfaris EA. Stress and its effects on medical students: a cross sectional study at a college of medicine I Saudi Arabia. *Health Popul Nut* 2011;29(5):516-522.
- Joels M, Pu Z, Wiegert O, Oitzi MS, Kruger HJ. Learning under stress: How does it work? *Trends in Cognitive Science* 2006;10(4):152-158.
- Rao AS. Academic stress and adolescent distress: The experience of 12th standard students in Channai, India. A M-Phil dissertation for University of Arizona. Library Repository. <http://hdl.handle.net/10150/194424>
- Matud MP. Gender differences in stress and coping styles. *Personality and Individual Differences* 2004;37(7):1401-1415.
- Tamres LK, Janicki D, Helgeson VS. Sex differences in coping behavior: A meta analytic review and an examination of relative coping. *Personality and Social Psychology Review* 2002;6(1):2-30.
- Gazza ZJ, Baig M, Alhendi BSMA, AlSuliman MMO, Alhendi ASA, Al Gerad MSH, et al. Perceived stress, reasons for and sources of stress among medical students at Rabigh Medical College, King Abdul Aziz University, Jeddah, Saudi Arabia. *BMC Med Edu* 2018;18:29.
- Wen Cheng, William Ickes and Lesley Verhofstadt U Gent. How is family support related to students' GPA scores? A longitudinal study. *Higher Education*. September 2012;64(3)399-420.
- Klink JL, Byars-Winston A, Bakken I.I. Coping efficacy and perceived family support: potential factors for reducing stress in premedical students. *Medical Education*. 2008 Jun;42(6):572-9.
- Mufti TS, Kifayatullah, Qayum I. Rehman Medical College admission criteria as an indicator of students' performance in uni professional exams. *J AMC Abbottabad* 2014;26(4): 564-7.