OPINION ARTICLE

Perceived stress, severity and sources of stress among female medical students in a private medical college in Pakistan

Saba Tariq[1], Sundus Tariq[2], Saffee Tariq[3], Shireen Jawed[4]

Abstract

Objective: To investigate apparent stress, severity and sources of stress among female medical undergraduate students.

Methods: The cross-sectional, questionnaire-based study was conducted at the University Medical and Dental College, Faisalabad, Pakistan, from August to December, 2016, and comprised female medical students from first year to final year. The students were divided into pre-clinical, para-clinical and clinical groups. Data was analysed using SPSS 20.

Results: Of the 514 students, 271(52.7%) were in the pre-clinical group with a mean age of 19±1 years, 111(21.6%) were in the para-clinical group with mean age 20.59±0.77 years, and 132(25.7%) were in the clinical group with mean age 21.83±1.03 years. The marks of the students were negatively related with stress scores in all groups, but they were highly significant in pre-clinical year only ($p \leq 0.001$). Severe stressors stated by respondents were, 'raised parental expectations', 'frequent examinations', 'sleeping difficulties', 'anxiety about the future', 'quality of food in the mess', and 'accommodation away from home'.

Conclusion: The subjects showed high levels of stress. Major stressors were academic and psychosocial.

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Introduction

Medical curriculum is one of the most difficult syllabus and is a continuous source of stress for medical students because of its increasingly demanding nature and as the students are promoted to the final year, their level of stress also rises.[1] Stress is becoming very common and it has many adverse effects on professional and personal life of the student.[2] Stress is one of the main reasons of anxiety, depression and suicidal ideation among medical students.[3] Although some stress during exam is a positive motivator for students to study, and students use different effective mechanisms to manage stress, but not all students are able to manage stress which adversely affects their overall performance in the examination.[4] One of the main reasons for stress is the competitive environment among the students which puts extra burden on the students to perform better. Other reasons for stress include high expectations from parents, lack of relaxation time and repeated summative and formative assignments.[5]

According to studies, the stressors are broadly divided into three categories: academic, health-related, and psychosocial.[6]

Students joining medical institutions in Punjab come from different backgrounds and have different traditions, socioeconomic statuses, educational environments and customs. The medical field is often different from their previous academic backgrounds and that is why not all students are able to manage their levels of stress.

Previously, it has been reported that female gender, obesity and increasing age are also associated with stress.[3,7] A study in Pakistan also showed that medical students exhibited higher levels of stress due to various reasons.[8] Interestingly, in one study, self-blame and denial came out to be among the positive predictors of stress.[9] A study conducted in India showed high level of stress among medical students.[4] According to a study, yoga is one of the modalities that can decrease stress in medical students.[10]

Although studies are available in other parts of the world,

[1]Department of Pharmacology, University Medical and Dental College, Faisalabad; [2]Department of Physiology, University Medical and Dental College, Faisalabad; [3]Final Year Medical Student, Allied Hospitals, Rawalpindi Medical University, Rawalpindi; [4]Department of Physiology, Aziz Fatima Medical College, Faisalabad, Pakistan.

Correspondence: Saba Tariq. e-mail: drsabatariq1@gmail.com

there is scarcity of data in Pakistan. The current study was planned to investigate perceived stress and stressors among female medical students.

Subjects and Methods

The cross-sectional, questionnaire-based study was conducted at the University Medical and Dental College (UMDC), Faisalabad, Pakistan, from August to December, 2016, and comprised female medical students from first to final years. UMDC is a constituent college of the University of Faisalabad and is affiliated with the University of Health Sciences (UHS), Lahore.

After approval ws obtained from the institutional review board, the sample size was calculated using the formula $n = (Z_{\alpha/2}+Z_{\beta})^2 *2*\sigma^2 / d^2$, where $Z_{\alpha/2}$ is the critical value of the Normal distribution at $\alpha/2$ (that is for a confidence level of 95%, α is 0.05 and the critical value is 1.96), Z_{β} is the critical value of the Normal distribution at β (that is for a power of 80%, β is 0.2 and the critical value is 0.84), σ^2 is the population variance that is taken to be 49,[8] and d is the difference that is taken to be 3.3.[8] However, the final sample size was increased to accommodate possible dropouts.

The subjects were divided into pre-clinical, para-clinical and clinical groups. At UMDC, there is annual examination system. The curriculum of Bachelor of Medicine and Bachelor of Surgery (MBBS) is covered over five years. The first two years are taken as pre-clinical because they cover mainly subjects like Anatomy, Physiology and Biochemistry. The third year is para-clinical and mainly covers subjects like Pharmacology, Pathology and Forensic Medicine. The last two years are clinical and covers subjects like Ophthalmology, Otolaryngology, Medicine and allied specialities, Surgery and allied specialities, Gynaecology, Obstetrics and Paediatric Medicine. Multiple tools of assessment, such as short essay questions (SEQs), multiple-choice questions (MCQs), viva voce and objective structured practical examination (OSPE), are used for assessment. In each class, there are about 100 to 150 students. UMDC is an exclusively female medical college.

Data was collected on a validated questionnaire that was distributed among the students who furnished written informed consent. The Perceived stress scale comprised of 14 questions (PSS-14).[11] The responses were obtained on a five-point Likert scale (0=never, 1=almost never, 2=sometimes, 3=often, 4=very often). The response of positively stated questions (4, 5, 6, 7, 9, 10, 13) were reversed and the total PSS-14 scores were obtained by summing across all 14 questions. Median value of PSS score was obtained and values above the median were considered high stress levels (≥28), while values below the median were considered low stress levels (<27). The PSS has Cronbach alpha co-efficient internal consistency of 0.85 () and test-retest reliability during a short retest interval of 0.85. The second part of the questionnaire comprised 33 stressors.[8] These were further divided into psychosocial stresses, health-related and academic stresses. The frequency of occurrence of the stressors were classified on the Likert scale of 1 to 5 as never (1), rarely (2), sometimes (3), often (4) and always (5). To determine the severity of these 33 stressors, another Likert scale (1-10) ranging from not severe to very severe was used. Higher value points in this numerical scale showed more stress and vice versa.

The study also measured the performance of the students in their last term examination. The study was carried out in the middle of the annual academic year in order to remove examination stress as a confounding factor. At this point students were familiar with their course work and were already getting adjusted to the newer environment of the class.

Data was analysed using SPSS 20. Frequencies and percentages were calculated. Chi-square test was used to compare percentages of the three groups with variables like marital status, residence, area, stress scores and marks. Comparison between mean age, marks and stress scores of the three groups were seen using one-way analysis of variance (ANOVA). Pearson correlation was used to correlate marks and stress scores in all the three groups, while Kruskal Wallis test was used to compare the severity of the stressors among the groups. $P \leq 0.05$ was considered statistically significant.

Results

Of the 514 students, 271(52.7%) were in the pre-clinical group with a mean age of 19±1 years, 111(21.6%) were in the para-clinical group with mean age 20.59±0.77 years, and 132(25.7%) were in the clinical group with mean age 21.83±1.03 years. The academic performance of students in the pre-clinical group was significantly different than the rest ($p \leq 0.001$). PSS scores were not significantly different among the groups ($p=0.632$). Significant association of the groups was found with marital status, residence status and marks (Table 1).

Table-1: Comparison between means and proportions of groups.

		Pre-Clinical	Para-Clinical	Clinical	*p*-value
Mean age (years)		19±1	20.59±0.77	21.83±1.03	<0.0001
Mean marks		74.55±9.37	70.85±5.92	70.01±5.37	<0.0001
Mean PSS		27.9±7.44	27.62±7.87	28.5±7.18	0.632
Marital status n (%)	Married	5 (2)	2 (1.9)	8 (6.8)	0.031
	Unmarried	248 (98)	106 (98.1)	109 (93.2)	
Residence n (%)	Boarders	159 (63.3)	70 (70.7)	64 (54.2)	0.041
	Non-boarders	92 (36.7)	29 (29.3)	54 (45.8)	
Area n (%)	Urban	220 (88.4)	89 (89.9	100 (87.7)	0.876
	Rural	29 (11.6)	10 (10.1)	14 (12.3)	
PSS n (%)	Not stressed (<27)	136 (50.2)	57 (51.4)	64 (48.5)	0.902
	Stressed (≥28)	135 (49.8)	54 (48.6)	68 (51.5)	
Marks n (%)	Low (< 70)	104 (38.4)	64 (58.2)	71 (55)	<0.0001
	High (≥71)	167 (61.6)	46 (41.8)	58 (45)	

Table-2: Correlation between marks and Perceived stress scale (PSS).

	Pre-Clinical	Para-Clinical	Clinical
Pearson correlation	-0.263	-0.112	-0.150
p-value	<0.0001	0.245	0.089

Table-3: Comparison of severity of academic stressors.

Academic stressors	Pre-clinical	Para-clinical	Clinical	*p*-value
		Median (IQR)		
Academic curriculum (Does the vastness of your syllabus bother you?)	6 (5-7)	7 (5-7)	7 (5-7)	0.159
Performance in module examinations (a headache for you?)	5 (4-5)	7 (6-7)	7 (6-7)	<0.0001
Performance in practicals (handling cadavers/ excreta/ pricking finger - does it really matter to you?)	5 (4-5)	5 (3-6)	5 (5-5)	0.027
Competition with peers (Does good performance of your friend put you under stress?)	3 (2-3)	4 (3-6)	4 (3-4)	<0.0001
Lack of special guidance from faculty (Do you look for any special attention other than regular classes?)	4 (4-5)	5 (4-5)	5 (4-5)	0.002
Dissatisfaction with the class lectures (Are you really benefited by those?)	4 (4-6)	5 (4-6)	4 (4-6)	0.382
Does non-availability of adequate learning materials bother you? (Notes/ books/internet search)	5 (3-6)	5 (3-6)	5 (4-6)	0.399
Becoming a doctor (Do expectations on all fronts put you in stress?)	5 (3-7)	5 (3-8)	5 (3-7)	0.010
Frequency of examinations (Do frequency of examinations bother you?	5 (4-8)	5 (5-8)	5 (4-8)	0.898
Difficulty in reading the text books (For the presentation, scientific language, medical terminology, superficiality etc.)	3 (3-5)	5 (3-5)	4 (3-5)	0.047

Marks of the students were negatively related with stress scores in all groups, but they were highly significant in pre-clinical year only (p≤0.001) (Table 2).

Regarding severity of stressors, the student's response regarding "performance in module examination is a headache for you" was significantly higher in para-clinical (p≤0.001) and clinical groups (p≤0.001) compared to the pre-clinical year. "Performance in practicals: does it really matter to you" was significantly low in para-clinical compared to the other groups (p<0.05). "Does good performance of your friend put you under stress" was significantly higher in para-clinical (p≤0.001) and clinical groups (p≤0.001) compared to the pre-clinical. "Lack of special guidance from faculty" was significantly low in pre-clinical (p=0.002) compared to the other groups. "Do expectations form all fronts put you under stress: was significantly higher in para-clinical compared to pre-clinical group (p=0.01). "Difficulty in reading the text books" was significantly higher in para-clinical compared to the pre-clinical group (p=0.047) (Table 3). "Does having uncomfortable relations with the opposite gender bother you" was significantly low in the pre-clinical group compared to the others (p=0.047). "Difficulty in journey back home bothers you" was significantly low in pre-clinical compared to the other groups (p=0.046) (Table 4). The most severe stressor for students were "high expectations of parents" , but the subjects would not like to take any drug or indulge in smoking even in stressful conditions (Table 5).

Discussion

In our study, PSS was 27.9% in pre-clinical year whereas in para-clinical and clinical groups it was 27.62% and 28.5% respectively. It was observed that pre-clinical students scored higher marks with respect to percentage compared to the other groups. This is an important finding as increased pressure in studies with advancing classes and stress leads to decline in students' performance. Our results are in line with a study conducted in the United States where academic performance of pre-clinical students was better than the rest.[12] According to the current study, students in pre-clinical year utilised active coping mechanisms such as 'engaging others for help and advice', 'formulating and executing a specific action plan' and 'positive reappraisal' to overcome stress whereas students from

Table-4: Comparison of severity of psychosocial stressors.

Psychosocial stressors	Pre-clinical	Para-clinical	Clinical	*p*-value
		Median (IQR)		
Family problems	3 (3-5)	3 (3-7)	3 (3-5)	0.062
Lack of time for recreation	5 (3-7)	6 (3-8)	5 (3-6)	0.243
Living condition in hostel	8 (3-9)	8 (3-9)	5 (4-9)	0.932
Loneliness	5 (3-8)	5 (3-8)	5 (3-8)	0.958
Inability to socialize with peers	3 (3-5)	3 (3-4)	3 (3-3)	0.111
Accommodation away from home	8 (8-8)	8 (7-8)	8 (8-8)	0.683
Worrying about the future	4 (4-6)	4 (4-8)	4 (4-6)	0.417
Relations with the opposite sex	3 (3-3)	3 (3-4)	3 (3-4)	0.047
Adjustment with the roommate/s	5 (5-5)	5 (5-5)	5 (4-6)	0.540
Does Lack of entertainment in the institution bother you?	5 (5-5)	5 (5-5)	5 (3-6)	0.578
Does difficulty in the journey back home bother you?	2 (2-2)	2 (2-4)	2 (2-4)	0.046
High parental expectations	5 (5-7)	5 (5-8)	5 (3-6)	0.248
Member of the fraternity or sorority	3 (3-3)	3 (3-3)	3 (3-5)	0.585
Lack of personal interest in medicine	6 (6-6)	6 (5-6)	6 (5-6)	0.715
Financial strain	5 (5-5)	5 (5-5)	5 (5-8)	0.556
Political situation of this place/ City/ Country	8 (6-8)	8 (6-8)	8 (3-9)	0.420

IQR: Interquartile range

Table-5: Comparison of severity of health-related stressors.

Health related stressors	Pre-clinical	Para-clinical	Clinical	*p*-value
		Median (IQR)		
Does not having drugs/ smoking bother you?	1(1-1)	1 (1-1)	1 (1-1)	0.169
Does quality of food in the mess bother you?	8 (8-8)	8 (8-8)	8 (8-8)	0.068
Does over / under eating bother you?)	5 (5-5)	5 (5-5)	5 (5-5)	0.226
Has class attendance affected your performance in class and examinations?	7 (7-7)	7 (6-7)	7 (6-7)	0.749
Do sleeping difficulties have an impact over you?	5 (5-5)	5 (5-6)	5 (5-6)	0.865
Does having a Physical disability (highly myopic/ migraine/ asthma) bother you?	4 (4-4)	4 (4-4)	4 (4-4)	0.518
Does having inadequate exercise bother you?	4 (4-4)	4 (4-5)	4 (4-5)	0.480

IQR: Interquartile range

clinical years shifted from active coping mechanism towards emotional strategies which adversely affects their academic performance.[12,13]

Another interesting finding in our study was that stress had significantly negative relationship with academic performance in pre-clinical years. A study found that students with higher levels of perceived stress earned lower grades in their academics than those who reported lower levels of stress.[14] Contrary to our results, few studies found no association between stress and academic performance.[15,16]

While comparing academic stressors, it was interesting to note that individual academic stressor was a source of stress for different classes. Regarding severity of the stressors, our study found significant association between performances in examination as a major cause of stress, especially in para-clinical and clinical years. Similarly, pressure of peers' good performance was also a major source of stress in para-clinical and clinical years. In a study, all 33% students felt stress which adversely affected their performance in examination.[4] A recently published study also found frequency of examination and performance in examination as a major contributing factor in stress and also most severe in all academic stressors.[6]

An interesting finding in comparing the severity of academic stressor was that students of all the years endorsed the fact that lack of special guidance from faculty is one of the contributing factors of stress. However, it was significantly low in pre-clinical years compared to the other groups. This is because students in pre-clinical years are novices and teachers are already giving them special guidance and instruction so they can settle down and become well aware on how to study, whereas students in higher classes are expected to do self-study as they are well aware of the system and the facilitators usually don't give them as much attention as the learners expect from their teachers. Similar to our results, students in another study did not get any special guidance from the faculty.[4,6] In contrast to our results, a special programme was designed for students of first and second years to increase their clinical reasoning levels.[17] In another study, the faculty introduced journal club to pre-clinical students and were of the view that this increased critical thinking in students and will result in good academic performance.[18] While comparing severity of academic stressors, we also found that reading of text books is more stressful for students of para-clinical years. The reason could be that in para-clinical years, the subjects are totally different in our setup from pre-clinical years. Usually it consists of General Pathology, Pharmacology and Therapeutics, Forensic Medicine and Behavioural sciences. In addition to these subjects, the learners are also expected to know clinical subjects related to their clinical rotations. Due to vastness of subjects and different textbooks, this is an important academic stressor in para-clinical years compared to the

other stressors. Our results are in line with another research in which students felt more stress during their transition between pre-clinical to clinical years.[19]

While studying psychosocial stressors we found that students of pre-clinical years do not have any botheration about relationship with opposite gender compared to the other groups. The reason might be that in our study all, the participants were female and in pre-clinical years they have least interaction with males whereas as they move towards the clinical years they meet with both males and females patients and as they have no male colleagues they felt difficulty in interacting with male patients. Another major psychosocial stressor for our students was high parental expectations. This is because many students come in the medical college due to the wishes of their parents.[20] Another study found significant association between choice of medicine as a career and parental expectations.[21]

Although we did not see association between religion and stress, different studies found that students having firm faith on their religion were able to cope with stress more effectively. These students have low level of anxiety, depression and suicidal thoughts.[22] Similarly an Indian study showed that one of the best coping mechanisms of stress is to have firm faith in religion.[23]

Early detection of stress among students is important. By diagnosing stress early we can do proper counselling of the students and tell them different coping strategies to manage stress. Students should know how to positively deal with the stress so that their day-to-day activities are not affected by stress and in this matter university, teachers and parents can be of help. They should provide psychosocial and academic support systems so that the level of stress can be decreased. Higher levels of perceived stress should be a matter of concern for policy-makers and there is an urgent need to develop strategies to cope with this stress and to provide a conductive learning environment for students so that they can perform better in their examination and become leaders in their fields.

We recommend proper counselling of students And reduction in the frequency of examinations. Chronic stress might affect students' performance in annual examination. Students should be involved while designing different educational strategies.

Conclusion

The subjects showed high levels of stress. Major stressors were academics and psychosocial. Medicine is a difficult field and the start of study in a medical school is a stressful phase in life due to tough education tenure, separation from family, friends and surrounding attachments.

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