

Perceived stress and sources of stress among first-year medical undergraduate students in a private medical college – Tamil Nadu

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ABSTRACT

Background: Medical education throughout the world poses the incoming student with many challenging situations and demands. This forms an ideal environment for the student to be under stress as he/she adapts to these stress-inducing conditions. Factors both psychosocial and otherwise, vary widely between institutions of learning, the demographic studied, the external influences of the environment/country, and the stage of learning of the student, among other factors. **Aims and Objective:** To assess the prevalence of stress among first-year medical undergraduate students and to segregate the potential stressors derived from the study. **Materials and Methods:** This is a cross-sectional study involving the first-year medical students. Prevalence of stress was assessed using Cohen's Perceived Stress Scale (PSS-10), which is an internationally validated 10-item questionnaire. The effect of potential stressors was assessed using a 33-item questionnaire. The stressors were categorized as academic, psychosocial, and health-related. **Result:** Of the 147 respondents, the mean PSS score was 21.09 (SD: 4.7). Of them, 105 students (71.4%) reported moderate stress, 16 students (10.9%) had high stress, and 26 students (17.7%) reported low/no stress. The top five stressors were all academic or psychosocial stressors. **Conclusion:** The vast majority of students perceived moderate stress and analysis highlighted a greater association with academic factors compounded by psychosocial ones. Preventive mental health measures on the basis of this and further studies into the occurrences of stress in the early academic years of a medical professional, followed by effective management tools and programs could go a long way in counteracting the harmful long-term effects of stress on their careers, producing happier and more productive and efficient medical professionals.

KEY WORDS: Perceived stress; undergraduate; students

INTRODUCTION

Stress in humans results from interactions between persons and their environment that are perceived as straining or exceeding their adaptive capacities or threatening their well-being. Where stress enhances function (physical or mental, such as through strength training or challenging work), it may be considered eustress and persistent stress that is not resolved through coping or adaptation, deemed distress, may lead to anxiety or withdrawal (depression) behaviour.^[1] The first-year medical students and the demands of medical school form a perfect stress-inducing combination.

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This study aims to provide studies toward this notion and also segregate, categorize, and analyze the specific stressors responsible.

The MBBS course in India is a four and a half-year course of study followed by a year of Internship- Compulsory Residential Rotatory Internship (CRRRI). Past studies have shown that the prevalence of stress was highest among first-year medical students adversely affecting their physical and cognitive capacities.^[2-5] During their first year, the students study anatomy, physiology and biochemistry for which they are examined at the end of the year. Over the course of the year, the students are subject to multiple written and practical tests to ensure their competency and keep track of their progress. The scores in these tests account for a small percentage of marks in the final exam although, if they fail to maintain a minimum average score through these tests, they might well be barred from attending the final examination. In India, the first-year medical student most often enters college fresh from high school. This implies that compared to an older student at a more advanced stage of study, the skill set or the emotional tools required to deal with a brand new and task-saturated environment may not yet be fully developed. This creates a baseline level of stress that the students may not be accustomed, or be able to adapt to. The inability of the student to cope with the vast amount of content compounded by the high expectations of parents and peers, cooks up an ideal pressure situation and subjects the students to stress right from the word 'go'. In our medical college, there are students from different states of India and from other countries. These students come from diverse cultural, socioeconomic, and educational backgrounds. All these students are exposed to a new learning environment, making new social circles and also adapting to a different world during their training at the institute. This may be a very stressful experience especially during the first year of their course. The scarcity of information relating to the studies of stress in first-year medical students in our state and considering the severity of the limited results available encouraged the conduct of this study.

Previous studies have revealed high rates of psychological morbidity in medical students and have found that stress is associated with anxiety and depression,^[6,7] interpersonal conflict,^[8] sleep disturbances,^[9] and poor academic or clinical performance.^[10]

So in this study we aimed to assess the prevalence of stress among first-year medical undergraduate students and to segregate the potential stressors and categorize them under academic, psychosocial, and health related.

MATERIALS AND METHODS

First-year medical students of SRM Medical College Hospital & Research Centre, Kattankulathur, Chennai, Tamil Nadu formed the study sample. Institutional Ethical Committee permission and approval obtained. Written informed consent was obtained from all the subjects.

It was a cross-sectional study using a self-administered questionnaire, which was conducted 6 months after the admission of the students in first year. Students were briefed about the

purpose of study and the questionnaire. The students were assured of confidentiality of the information provided and had the option of refusal to participate in the study. The questionnaire was distributed to students and collected by the administrators a short while after. The questionnaire consisted of three parts: demographic information, Cohen's Perceived Stress Scale (PSS-10) questionnaire, and a 33-item list of potential stressors.

Demographics mainly included family history and personal information of student such as age, gender, home town (state), local staying place, mode of travel, and medium of past education (whether regional language or English). These questions were intended to know about the background of each student. Stress was assessed using PSS-10 questionnaire, which is a reliable and valid assessment instrument for the study of stress in college students.^[11] The PSS-10 taps into the student's life as a whole more than the past 1 month and does not just pertain only to academics. The PSS-10 had demonstrated good internal (intra-observer) reliability with Cronbach's alphas ranging from 0.78 to 0.91 and test-retest reliability coefficients ranging from 0.55 to 0.85.^[11] Roberti *et al.* also found that the PSS-10 was a reliable and valid instrument for assessment of perceived stress in college students.^[12]

The score ranges from 0 to 40. The answers are graded on a 5-point Likert Scale ranging from never = 0, almost never = 1, sometimes = 2, fairly often = 3, to very often = 4. Positively framed questions 4, 5, 7, and 8 are reverse scored, that is never = 4 to very often = 0, and the scores are summed, with higher scores indicating more perceived stress.

The levels of stress were arbitrarily divided as: low perceived stress: 0-13, moderate perceived stress: 14-26, and high perceived stress: 27-40. The levels of stress divisions were selected in accordance to a similar study from Bangalore.^[13]

The list of potential stressors categorized under academic, psychosocial, and health-related stressors in the questionnaire were based on previous studies.^[4,14] For each potential stressor, the frequency of occurrence was classified as never, rarely, sometimes, often, and always and scored as 1, 2, 3, 4, and 5, respectively. The severity of each stressor was rated using a Likert scale (1-10) ranging from not severe to very severe. The students were asked to indicate if any of the stressors had been affecting them. The data were analyzed using Microsoft Excel 2007 and Statistical Package for Social Sciences (SPSS) Version 18 for Windows.

Data Analysis

Factor analysis was used to reduce the variable pool to significant factors and subsequent analysis was carried out to retrieve individual factors and present them as significant, along with the statistical methods and results used for the same.

This study not only uses an adequate sample size of 147, but also makes use of Factor Analysis' built-in reliability checks such as Kaiser-Meyer-Olkin (KMO) and Bartlett's test to lend statistical credence to items such as the sampling adequacy as well as the strength of relationships between variables, respectively. Our study has produced KMO values of greater than 0.6 for all three assessed categories, which are acceptable for factor analysis. Bartlett's test values for the corresponding categories were all zero.

Factor analysis in general is a helpful tool to analyze and reduce a large number of variables into significant factors capable of representing the changes in a larger number of variables.^[15] The analysis itself is carried out using SPSS Version 18 software producing outputs in several stages, the first being a descriptive statistics table, followed by KMO and Bartlett's test values. The rotated component matrix is analyzed and the variables most highly loaded onto their respective significant factors were taken. The cutoff value was arbitrarily set at 0.6. These significant variables derived from the rotated component matrix (RCM) were also subsequently checked using the Pearson's χ^2 -values from crosstabs of the respective variables with the PSS Score. Those variables whose RCM values appeared greater than 0.6 and also displayed significant Pearson's χ^2 -values in their respective crosstabs are eventually presented as significant in our study. The results and discussion section of the study deal with the individual outputs and a brief description of the tables themselves.

RESULTS

Response and PSS Scores

Of the 147 respondents, the response produced the following outcomes: 26 (17.7%) were under mild or no stress, 105 (71.4%) students were under moderate stress and 16 (10.9%) were under severe stress. The mean PSS Score was 21.09 (SD 4.74). Males had a higher mean PSS Score of 21.23 (SD 5.18) compared to female's mean PSS score of 20.74 (SD 4.38). *Note:* The demographic details are given in Table 1.

Significant Stressors

The most statistically significant stressors can be categorized under academic, psychosocial, and health-related stressors. The most significant academic stressors were frequency of examinations, performance in examinations, academic curriculum, lack of time for recreation, competition with peers, becoming a health professional/engineer, and performance in practicals. The corresponding KMO value for academic factors was 0.671. Bartlett's test of sphericity value for the same was 0.

The most significant psychosocial stressors were loneliness, living conditions in the hostel, adjustment with roommates, type and method of food preparation in mess. The corresponding KMO value for psychosocial factors was 0.742. Bartlett's test of sphericity value for the same was 0.

The most significant health-related stressors were sleeping difficulties, class attendance, and nutrition. The corresponding KMO value for health-related factors was 0.654. Bartlett's test of sphericity for the same was 0. The rotated component matrices of the various stressors are given in Tables 2–4. The Pearson χ^2 -value of the significant factors cross-tabbed with their PSS scores is provided for reference in Table 5.

DISCUSSION

The mean PSS Score of all the students was 21.09 (SD = 4.74). This was less when compared to the mean PSS Score of 30.84 by Shah et al [4] and was higher when compared to similar studies in

Table 1: Demographic details of the students

Variables	Subdivision	PSS Score		
		Low	Moderate	High
Age (years)	17 +	6(10.3%)	47(81.03%)	5(8.62%)
	18	13(17.8%)	54(73.97%)	6(8.21%)
	19	4(44.4%)	2(22.2%)	3(33.3%)
	20	3(42.8%)	2(28.57%)	2(28.57%)
Gender	Male	12(16%)	53(70.7%)	10(13.3%)
	Female	14(19.4%)	52(72.2%)	6(8.3%)
Nationality	Indian	6(4.2%)	123(85.4%)	15(10.4%)
	Other	0(0%)	2(66.7%)	1(33.3%)
Medium of teaching in school	English	6(4.2%)	121(84.6%)	16(11.2%)
	Tamil	0(0%)	3(100%)	0(0%)
	Other	0(0%)	1(100%)	0(0%)
Residence	Day-scholar	3(3.4%)	76(86.4%)	9(11.2%)
	Hostler	5(8.5%)	50(84.7%)	4(6.8%)
Family details	Parents together	6(4.3%)	118(84.9%)	15(10.8%)
	Parents separated	0(0%)	8(100%)	0(0%)
Parents in health related profession	Yes	1(3.4%)	25(86.2%)	3(10.3%)
	No	5(4.2%)	101(85.6%)	12(10.2%)
On financial aid scholarship	Yes	0(0%)	7(77.8%)	2(22.2%)
	No	6(4.4%)	119(86.2%)	13(9.4%)
Self-reported academic performance	Satisfactory	4(6.9%)	45(77.6%)	9(15.5%)
	Unsatisfactory	2(2.3%)	81(91%)	6(6.7%)

Table 2: Rotated component matrix of academic stressors

Academic stressors	Factor 1	Factor 2	Factor 3	Factor 4
Frequency of examinations	0.159	0.728	-0.030	0.313
Performance in examinations	0.484	0.506	-0.318	0.079
Academic curriculum	0.149	0.715	0.120	-0.143
Dissatisfaction with class lectures	0.266	-0.061	0.726	0.076
Non-availability of adequate learning material	0.156	-0.031	0.583	0.305
Becoming a health professional/engineer	-0.314	0.372	0.603	-0.320
Lack of time for recreation	-0.095	0.083	0.143	0.883
Competition with peers	0.636	0.253	0.257	0.066
Performance in practicals	0.775	0.045	0.026	-0.083
Lack of special guidance from faculty	0.503	0.201	0.342	-0.028

Bangalore^[13] (Mean PSS Score- 20.29(SD = 6.24) and Malaysia^[16] with a mean PSS Score of 20.4.

In our study totally 82% students were under stress – 71.4% under moderate stress and 10.9% were under severe stress. This was significantly lower than Indian studies carried out by Solanky *et al.*^[17] (96.8%). Shaikh *et al.*^[18] in a study at Agha Khan University, Pakistan has reported that more than 90% students felt stressed at one time or the other during their course. A similar study from Government Medical College, Maharashtra, India by Ranade *et al.*^[3] reported that 85% first-year medical students had stress and a study by Supe *et al.*^[19] in Seth G. S. Medical College at Mumbai showed that 73% had perceived stress. Saipanish^[20] reported that 61.4% students in a Thai Medical School had experienced some degree of stress as measured by the Thai stress test.

Studies from the UK,^[21] Australia,^[22] and Singapore^[23] that have used GHQ have reported different rates of psychological morbidity among medical students. The difference can be attributed to the various social aspects of students living in those regions, which differ notably from those living in Tamil Nadu.

In our study we had 75 males and 72 females. The mean PSS score in males was slightly higher than females, however, the difference was not statistically significant. Another study has shown the mean PSS for females was 31.94 as against males' score of 28.60.^[4]

Studies by Saipanish *et al.*^[20] suggested that the most frequently occurring sources of stress were academic. Shah *et al.*^[4] suggested that the most significant stressors affecting medical undergraduates included high parental expectations, frequency of examinations, sleeping difficulties, loneliness, performance in examinations, and becoming a doctor.

In our study, the academic factors emerging as significant were frequency of examinations, performance in examinations, academic curriculum, lack of time for recreation, competition with peers, becoming a health professional, and performance in practicals. Solanky *et al.*^[17] in a separate study also reported broadly similar factors responsible for stress identified in first-year students increased load towards exam, vast syllabus, not getting expected marks, less time for repeated learning, and procrastination.

Table 3: Rotated component matrix of psychosocial stressors

Psychosocial factors	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
High parental expectations	0.645	0.142	0.259	0.238	-0.125
Loneliness	0.773	0.129	-0.036	-0.070	0.106
Family problems	0.703	-0.017	-0.084	0.288	0.154
Accommodation away from home	0.173	0.561	-0.276	0.064	0.278
Political situation in the country	-0.006	0.140	0.066	0.072	0.743
Relations with the opposite sex	0.152	0.062	0.193	0.640	0.347
Difficulty reading textbooks	0.465	0.045	0.349	0.130	-0.445
Lack of entertainment in the institution and city itself	-0.148	0.018	0.734	0.157	0.062
Difficulty in the journey back home	0.068	0.101	0.032	0.742	-0.133
Type and method of food preparation in the mess	-0.081	0.618	0.097	0.334	0.089
Financial strain	0.374	-0.223	0.182	0.572	0.209
Inability to socialize with peers	0.388	-0.033	0.451	-0.027	0.504
Living conditions in the hostel	0.027	0.769	0.191	0.011	0.127
Member of fraternity/sorority	0.113	0.300	0.203	0.141	0.514
Lack of personal interest in subject	0.280	0.068	0.742	0.096	0.168
Adjustment	0.132	0.728	-0.044	-0.183	-0.023

Table 4: Rotated component matrix of health-related stressors

Health-related stressors	Factor 1	Factor 2	Factor 3
Sleeping difficulties	0.215	-0.131	0.777
Class attendance	-0.002	0.271	0.823
Nutrition	0.723	0.078	0.285
Exercise	0.843	0.019	-0.004
Type and method of food preparation in mess	0.621	0.477	0.046
Physical disability	0.209	0.675	0.132
Alcohol/drug abuse/smoking	-0.020	0.828	-0.024

The frequency of examinations was indicated to be a stressor sometimes or often/always by 94.6% respondents, of which half (51%) reported it as always being a stressor. This may be due to the fact that internal assessments are quite frequent, each one being counted toward a small percentage in the final exams.

Performance in examination, being quoted as sometimes/always a stressor by 89% respondents, of which quite a large (40%) have indicated it to be always a stressor. Although the performance in examinations fell below the cutoff 0.6 value on analysis from the rotated component matrix, we felt it to be a valuable result considering the overwhelming positive stress responses discussed above, as well as a significant Pearson's χ^2 of 0.037.

The vast amount of material in the three subjects taught in this first year form the foundation on which a student's further medical knowledge will rest. The subjects taught and period of study have evolved over time but the students have perceived the academic curriculum as a significant stressor. Knowledge about time management can help to overcome this problem. We feel that stress-reduction measures would contribute more positively than an attempt at changing the curriculum in any manner.

Table 5: Pearson χ^2 -value of significant factors * PSS Score

Significant factors	Pearson χ^2 -value
Frequency of examinations	0.006
Performance in examinations	0.037
Academic curriculum	0.002
Lack of time for recreation	0.006
Competition with peers	0.026
Becoming a health professional/engineer	0.036
Performance in practicals	0.016
Loneliness	0.001
Living conditions in hostel*	0.000
Adjustment with roommates*	0.019
Type and method of food preparation in mess *	0.001
Sleep difficulties	0.039
Class attendance	0.011
Nutrition	0.036

Cross-tabbed with residence as these are hostel-based problems.

Students have also reported a lack of time for recreation, which also can be easily coped by effective time management. Competition with peers has emerged as a significant stressor that might be due to the nature of the profession and the fact that highly meritorious students usually end up in the field of medicine. An interesting correlation was seen on comparing the competition with peers with the residence status of respondents. About 21% of day scholars reported it to be often/always a stressor, whereas only 8% of hostellers did the same. This could be due to the camaraderie resulting from sharing living premises in the hostel, although the difference was not statistically significant.

Becoming a health professional also emerged as significant stressor considering the long-winded career path taken by students, through 5.5 years of under-graduation followed by highly competitive examinations to qualify for the limited number of post-graduate seats available in India. This could also be compounded by the responsibility and social weightage given to the profession.

Of the psychosocial factors analyzed in our study, loneliness, living conditions in the hostel, adjustment with roommates, and the type of food were significant. Loneliness could be due to difficulty in mingling with multiethnic and multilingual people of different socioeconomic status. The combined effect of these stressors could leave students with little time to socialize. We also analyzed the cross-tabs of the respective variables with residence to try and isolate the responses of hostellers from day scholars. These cross-tabs proved to be significant with Pearson's χ^2 -values of a maximum of 0.019.

Another such factor that was significant on both factor analysis and Pearson's χ^2 was adjustment with roommates. Most first-year hostellers are exposed to the hostel environment for the first time. This drastic transition from the comfort of their home, hinges to a great extent on their adjustment with their roommates. This could prove a major stressor where compatibility does not exist. Wolf et al.^[24] also found that stress in first-year medical students was higher and suggested that this was due to entry into a large professional college, which was making students feel insecure during the initial period.

As indicated by this study, the problems of loneliness and adjustment with roommates, we feel, could be addressed in part by organizing more group-oriented activities during the course. Also, an introductory session for fresher to meet and greet one another prior to the course itself, would enable initial interaction to begin outside of an academic setting, giving students a head start to forming what could be important relationships. In case of non-compatibility between roommates, students must also be given effective recourse, either in the form of counseling or a change of allotted rooms.

The health-related stressors reported were nutrition, sleeping difficulties, and class attendance. Sleeping difficulties was reported as a significant stressor by 64% respondents, of which 26% reported it as often/always. The probable reasons for sleeping difficulties could be explored in another study. Students have also perceived class attendance to be a significant stressor. Students are supposed to maintain an attendance percentage of 80% and above to be eligible to appear for the

final exam. This, compounded by the allotment of three back-to-back 1-h theory lecture classes following a 2-h dissection class in the morning could prove to be tasking the students mentally. Allotment of appropriate breaks between classes could go a long way in increasing the attentiveness and effective learning of the student from these classes.

CONCLUSION

Majority of the students have perceived moderate levels of stress. The most frequently occurring stressors among the students were related to academic and psychosocial domains. Promoting mental health services as an integral part of the curriculum should be included to identify and manage different stressors and to improve the coping strategy for them.

Future Research

Although each year of medical education is characterized having unique stress, it was reported by many researchers that students of first year are more prone for stressful situations. The reasons include academic pressure, unfamiliarity in a new environment, and unrealistic expectations.^[25,26]

Yusoff *et al.*^[27] showed that psychological distress was different depending on the stages of medical training. So a prospective study to monitor the perceived stress among these students in the forthcoming years is necessary to study the associations between occurrence stressors and incidence of stress.

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