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## Undergraduates or Under Stress: A Study from an Indian Medical School's Perspective

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### Abstract

**Background:** Medical students experience considerable academic challenges which make them vulnerable to stress and depression. Parental pressure and the traditional educational system with curriculum overload also keep stress snowballing among them with little time for co-curricular activities. It is imperative to determine the prevalence and sources of stress and identify the coping strategies adopted by the students to handle stress.

**Methods:** 250 medical students participated in the study. Constructs from three questionnaires were used to formulate the self-reporting questionnaire. Mean and bivariate regression analysis were performed to examine the association between stressors and incidence of stress. The COPE Inventory was used to examine the coping strategies.

**Results:** The prevalence of stress among medical students was 59.3%. Mean scores: high for academic pressure, mild to moderate for inter, intrapersonal and financial factors while mild for clinical environmental factors. Academic pressure was significant among females, increasing years of education. Intra and interpersonal issues caused stress in Year 4. Coping strategies used did not exhibit any relationship with stress.

**Conclusion:** Academic pressure appears to have a strong influence on medical students' stress. Coping styles did not show a significant influence on stress.

### Key Words

Medical Students; Stress; Coping Styles

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### Introduction

Stress is described as perception of a stressor and response to it. For medical students, it is an ongoing process commencing from admission to medical school, continuing in clinical practice<sup>1</sup>. It is a major social and mental health concern that needs to be addressed.

Rigorous academic and clinical work compounded with high tuition fees and long hours of study make medical education stressful<sup>2</sup>. Students perceiving stress in the learning environment may or may not resort to appropriate coping strategies. Coping strategies are of two types. Problem-focused coping addresses the source of stress and emotion-focused coping underpins the emotional response to it<sup>3</sup>. In this study we resort to find out the prevalence and sources of stress with coping strategies adopted by medical students.

### The purpose of this study:

1. To examine the prevalence of stress among undergraduates in a private medical institute in India.
2. To identify the important stress factors among medical students in India.
3. To identify the coping styles of students and the effects on stress.

### Methods:

The study was conducted among 250 undergraduate medical students aged 18 years and above in a private medical institute in Tamil Nadu, India. The study and questionnaire were in accordance with the ethical guidelines outlined by the University (Ethics number: INBS366). Students were briefed about the study, informed consent was obtained, confidentiality of information and anonymity were assured with freedom to withdraw from the study at any given point.

This study is unique in terms of the nature of defining and grouping of variables. Therefore, no one suitable validated questionnaire could be used. An indigenous, descriptive research questionnaire was devised by adapting statements or constructs from various available stress survey questionnaires.

The constructs focusing on academic pressure and inter and intrapersonal issues were adapted from the Medical Student Stress Questionnaire (MSSQ) by<sup>4</sup> constructs examining the effect of financial problems were derived from Students' Stress Study Questionnaire<sup>5</sup> and Student Stress Questionnaire<sup>6</sup> to examine the prevalence of stress among students in clinical environment. The COPE Inventory<sup>7</sup> was used to examine the coping strategies among medical undergraduates.

The reliability and validity of the constructed questionnaire was tested prior to the study. Pearson's correlation was used to evaluate the strength of the relationship between the variables. A multiple regression was carried out to examine the relationship between the proposed stressor factors and the stress. A p-value of less than 0.05 was considered to be significant.

A questionnaire with 58 questions in two sections was used to achieve the research objectives. The first included demographic information, while the second section comprised statements on academic related stressors<sup>13</sup>, interpersonal and intrapersonal stressors<sup>7</sup>, financial problems<sup>4</sup> and environmental factors<sup>6</sup>. In total, 30 statements encompassed four variables and were graded on a Likert scale from 0= no stress, 1= mild stress, 2= moderate stress, 3= high Stress and 4= severe stress. The average family income of students was categorized as 1= < Rs 10000, 2= Rs 10000 – 50000, 3= Rs 50000 - Rs100000 and 4= > Rs 100000.

In addition, a COPE inventory measured coping strategies with 28 constructs, 9 for problem-based coping and 19 on emotion-based coping. The dependent variable, stress was measured using 4 constructs. Nominal, ordinal and interval scale were used in the questionnaire.

### **Significance of Stress scores**

A high score in a category indicated that medical students perceive events or activities in that respective category as stressful. Perceived stress was categorized under four major groups, ranging from mild, moderate (reasonable stress but manageable), high (disturbed emotions with mild compromise in daily activities) and severe stress (disturbs emotions badly with much compromise in daily activities.)

Statistical Package for the Social Science (SPSS) software was utilised to perform the data analysis. P-value of 0.05 was considered significant. Therefore, in order to ascertain reliability and validity, Cronbach Alpha, Kaiser -Meyer-Olkin (KMO) and the Bartlett's Test were performed. Prior to analysis, data was checked for normality. Frequency distribution was used to analyse the demographic details of respondents and descriptive mean analysis was used to analyse the factors influencing stress. The level of stress was determined from the cumulated stress score of the four separate constructs measuring stress as whole. Pearson's correlation was done to evaluate the strength of the relationship between the variables. Next, a multiple regression was carried out to examine the relationship between the proposed independent variable and the dependent variable. In addition, One-way ANOVA was also performed to examine the relationship between the demographic variables and the independent variables.

### **Results:**

#### **Mean Analysis**

The likert scale employed in this study was from 0-4 where 0 indicated no stress, 1 denoted mild stress, 2 referred to moderate stress, 3 equated to high stress and 4 implied severe stress. The highest overall mean stress score was observed with academic pressure, Interpersonal/intrapersonal issues recorded mild to moderate stress and financial problems caused mild stress in these students. Interestingly, clinical environmental issues imposed the least stress. The frequency of coping strategies used was tested in a separate inventory with 0-3 scale, where 0 referred to 'not at all doing' and 3 corresponded to 'doing very frequently'.

#### **Relationship between variables**

Pearsons' Correlation was used to analyse the strength of a linear relationship between variables. The coefficient values were statistically significant between all variables (p -value < 0.01) indicated positive, mediocre relationship between the variables (Table 2).

Multiple regression analysis revealed that academic pressure, interpersonal and intrapersonal issues, financial problems and clinical environmental pressure have a strong influence on stress. Interestingly, the findings also show that financial pressure has the strongest influence on stress followed by interpersonal and intrapersonal issues, academic pressure and clinical environmental pressure (Table 3).

Variables	Mean	Standard Deviation	Rank	Skewness	Kurtosis
Academic Pressure (AR)	2.23	0.72	1	-0.22	0.30
Interpersonal and Intrapersonal Issues (IR)	1.31	0.85	3	0.58	0.29
Financial Problems (FP)	1.16	1.00	4	0.69	0.32
Clinical Environmental Pressure (EP)	0.99	0.78	5	0.85	0.30
Coping Strategy (CP)	1.33	0.43	2	-0.22	0.16
Stress (S)	1.38	0.67	-	0.92	0.49

**Table 1:** Descriptive Analysis of Tested Variables.

Variables	AR	IR	FP	ER	CP	Stress
AR	1	0.536**	0.308**	0.404**	0.250**	0.480**
IR	0.536**	1	0.338**	0.379**	0.349**	0.516**
FP	0.308**	0.338*	1	0.335**	0.239**	0.614**
ER	0.404**	0.379**	0.335**	1	0.325**	0.446**
CP	0.250**	0.349**	0.239**	0.325**	1	0.311**
Stress	0.480**	0.516**	0.614**	0.446**	0.311*	1

\*\* Correlation significant at 0.01 level (2-tailed)

AR, Academic Pressure; IR, Interpersonal and Intrapersonal Issues; FP, Financial Problems; ER, Clinical Environmental Issues; CP, Coping Strategies

**Table 2:** Pearsons' Correlation Coefficient Analysis.

Independent Variables	Model 1		Model 2	
	Standardised coefficients $\beta$	t statistics	Standardised coefficients $\beta$	t statistics
AR	0.160	3.05**	0.149	3.07**
IR	0.212	3.97**	0.176	4.27**
FP	0.434	9.24**	0.290	9.37**
ER	0.149	3.02**	0.137	3.26**
CP	0.048	1.02 <sup>ns</sup>	-	-
Constant	0.271	2.29*	0.345	3.713**
R <sup>2</sup>	0.537		0.535	
Adjusted R <sup>2</sup>	0.528		0.528	
F test	59.31**		73.87**	

\*\* p-value < 0.01 ; \* p-value <0.1 ; ns p-value >0.1

**Table 3:** Regression Analysis.

	AR	IR	FP	ER	CP
Gender	20.753**	1.411	0.040*	0.075	0.318
Age	3.689*	2.008	6.735*	1.466	0.021
Marital Status	3.408*	0.347	11.201**	2.743	0.382
Nationality	0.902	1.867	1.368	0.520	0.319
Year of study	4.560**	2.940*	4.670**	1.157	0.083
Average family income	2.301*	1.630	8.882**	0.679	4.749**

\*\* p-value < 0.01; \* p-value <0.1; ns p-value >0.1

AR, Academic Pressure; IR, Interpersonal and Intrapersonal Issues; FP, Financial Problems; ER, Clinical Environmental Issues; CP, Coping Strategies

**Table 4:** Summary of one-way ANOVA results.

Variables	Classification	AR	IR	FP	ER	CP
Gender	Male	2.00		1.15		
	Female	2.40		1.17		
Age	18 – 20	2.17		1.05		
	21 – 23	2.35		1.39		
Marital Status	Single	2.22		1.15		
	Married	3.16		3.50		
Nationality	Indian					
	Others					
Year	Year 1	2.16	1.44	1.24		
	Year 2	2.14	1.13	0.88		
	Year 3	2.32	1.33	1.23		
	Year 4	2.56	1.54	1.50		
Average Family Income	< 10 000	2.10		1.95		
	10000 -50 000	2.40		1.58		
	50000–100 000	2.24		1.07		
	Above 100 000	2.11		0.89		

\*\*  $p\text{-value} < 0.01$  ; \*  $p\text{-value} < 0.1$  ; ns  $p\text{-value} > 0.1$

**Table 5:** Summary of Post-hoc Bonferroni Test.

**Relationship between demographic variables and stressor factors**

An additional one-way ANOVA was conducted on gender, age, marital status, nationality, year of study and average family income and results are shown in Table 4. One-way ANOVA indicated a significant difference between academic pressure experienced by males and females. However, for variables with more than two categories such as Year of study and average family income, the relationships which were found to be significant were further individually tested using a post-hoc Bonferroni's test (Table 5).

Note: Values representing individual means for categories within the listed variables indicate significant difference between respective groups AR, Academic Pressure; IR, Interpersonal and Intrapersonal Issues; FP, Financial Problems; ER, Clinical Environmental Issues; CP, Coping Strategies. Academic pressure appears to be a very interesting variable for further exploration. This test suggests that female students or students aged 21 to 23, students in Year 4 and students from lower family income experienced significantly more pressure. Intrapersonal and interpersonal issues led to stress with increasing year of education, highest being in Year 4.

**Discussion**

**Prevalence of stress:** The prevalence of stress in undergraduate medical students in this study was an appalling 59.3%. Among the stress factors, financial pressure was high, interpersonal, intrapersonal pressure and academic pressure was mild to moderate and clinical environmental pressure was mild.

The learning environment in a medical school often imposes psychological strain for students. Several studies across the globe have reported stress, burnout, anxiety and psychological morbidity among students<sup>8,9</sup>.

The prevalence of stress in this study was high and similar to the findings of other researchers<sup>10, 11, 1, 12</sup>. The challenges specific to medical undergraduates include a rigid educational structure, taxing curriculum, long training hours, expectations of the society and chronic exposure to emotionally stressful situations such as death<sup>13</sup>. In Singapore, it was found that 49.6% of medical undergraduates encountered significant stress and 64.6% reported that more than 60% of their total life stress was due to medical school<sup>14, 15</sup>. From India, it has been reported that stress culminating in suicidal ideation in students. These alarming facts indicate that there is increased prevalence of physiological and psychological morbidity in medical students.

**Factors affecting stress in medical students:**

Among these factors, financial pressure was found to be the strongest variable contributing to stress. This is in confirmation with the findings of other researchers<sup>16, 17, 18</sup>. Upsurge in the number of medical students in classrooms has resulted in competition for the limited financial aid available. In addition, tuition fees and living expenses have escalated steadily adding to the burden<sup>19</sup>.

The second most influential variable on stress was interpersonal and intrapersonal issues. This was in agreement with authors reporting that psychosocial problems are often a major concern contributing to stress in medical students<sup>13, 20, 21</sup>. Competitive, arrogant classmates, insulting and rude residents are among the causes of interpersonal stress. In addition, interaction with patients can also be stressful to students. Not all patients give consent to be examined by medical students. Often, their credibility are questioned and cynical remarks are passed. Interestingly, in this study, among the statements measuring stress due to interpersonal and intrapersonal issues, communication, presentations and discussions held in class recorded the lowest mean, implying that these activities did not impose a significant stress. Communication or language was not a barrier in these students and explained their participative and peer-learning involving discussions and presentations.

**Academic pressure:** It was also found to be significantly inducing stress in medical students in India. This was akin to several studies emphasizing that academic pressure was an important stressor occurring in medical students<sup>22, 21</sup>. Medical education in India follows the traditional curriculum with no apparent mechanism for horizontal and vertical integration of disciplines. Didactic lectures are verbose conveying facts with no emphasis on broader concepts often leading to failure of understanding the subject<sup>23</sup>.

**Clinical environmental pressure:** Interestingly in this study, this recorded the lowest mean (Rank 5) indicating mild stress to students. This could be due to inclusion of students from Year 1 to Year 4 and not focussed on a particular year. Reduction in stress owing to clinical environment is possible over time as students who initially expressed marked distress eventually deliberated adjustment to the experience and tended to be more reflective and less reactive at a later stage<sup>24</sup>.

**Coping strategies:** The frequency of coping strategies however did not have a significant effect on stress in medical students. This was contradictory to prior studies with a strong positive

relationship between the effectiveness of coping strategies and stress<sup>25,26,27</sup>. This was probably due to absence of awareness of available active coping strategies. Coping among students was mostly emotion-focussed and had only served as a temporary measure to allay stress. Seeking counselling is often associated with a negative connotation in the general population. Therefore, medical students resorted to conservative coping strategies such as family, friends and religion.

#### **Limitations:**

1. The sample population of medical students may not be representative of the whole medical students' community in India.
2. The questionnaires were self-reported.

#### **Conclusion**

Stress in medical education may generate an impetus to learn or could translate into an unbearable mental burden. This study emphasises that academic pressure, interpersonal and intrapersonal issues, financial pressure and clinical environmental issues led to significant stress. Financial pressure demonstrated the strongest influence on stress. Coping strategies resorted to, did not appear to alleviate stress. Therefore, it is imperative that students be made aware of coping strategies to transform to a healthier learning environment. Counselling should advocate a more problem-focussed approach where the situation is analysed, problem identified and necessary action taken to mitigate stress.

#### **Recommendations**

Stress reduction efforts in medical schools is utmost important to prevent burnout among students and to make the course more attractive in the eyes of the younger generation.

#### **Personal-level**

- Mindfulness-based stress reduction.
- Medical schools often educate students how to care for their patients, but does not equip them with the knowledge of caring for themselves. Physicians and students can share coping strategies in Ballint groups.

#### **University administrators**

- "REACHOUT" programs to primarily incorporate counselling service as well as stress reduction classes.
- A 24-hours hotline should be available for students who intend to seek help.
- A wellness elective should be incorporated into their medical curriculum, preferably into the Year 1 curriculum to facilitate in their adaptation into the new environment alleviating initial shock.

#### **Medical Education Board**

- Revamp the traditional curriculum.
- Focus on blending education strategies with the curriculum to achieve both horizontal and vertical integration. This underpins the basis for a spiral curriculum model suggested by University of Dundee which aims to mould medical students into better individuals by the time they leave medical school with better attitude, cognitive thinking and skills.

#### **Government & Financial institutes**

- Pragmatic solutions through proposals where physicians pays for medical school education after completion of residency or fellowship over a 10-year time interval.
- The Government scholarships should also be extended to deserving candidates on merit basis.

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