Are Medical Students Stressed Out?: A Study of Gender Differences and Coping in Undergraduates

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Abstract

Introduction: Medical education is seemingly an endless sequence of demanding schedules and a vast course compacted in a short duration with an alarming increase in stress, depression and anxiety among medical students. A need to study gender differences in stress, response to stress and coping among the students was the aim of the study.

Methods: 303 medical students of the total 425 belonging to first, second and third year of the medical school responded to the specially prepared questionnaire. The level of stress was assessed with the help of the student life stress inventory and the coping strategies with the help of the brief cope inventory.

Results: The sample consisted of 150 males and 153 females which were analysed for group differences. Females exhibited higher levels of stress on areas of conflicts and pressures and were also more emotional than males in terms of physiological and emotional responses as reactions to the stressors. While females used more of self-blame as a coping strategy, males resorted to substance use.

Conclusion: Two-thirds of the medical students were stressed-out and though males and females showed similar responses, females were more emotional and could be at a risk for developing psychopathology.

Keywords: Medical Students, Gender, Stress, Coping

Introduction

It is a well observed fact that along with the laurels of a respected and promising career as a professional, medical education brings along the seemingly endless sequence of demanding schedules; vast course compacted in a short duration with an inevitable state of stress and anxiety among the young aspiring students. Medical education being physically and emotionally demanding can inadvertently lead to physical and psychological problems in students. A moderate degree of stress is often said to promote creativity but intense pressures may result in impairments in the students social, educational and personal areas which then ultimately also have an impact on patient care\(^1,2\).

There have been several studies which have reported that medical students suffer more stress than other groups\(^3-9\), whereas some have refused the claim\(^10\) while still others have reported a high prevalence of depression and alcohol-related problems in medical students\(^11-13\). Studies considering gender differences in stress perception have also not been conclusive\(^7\).

Challenges are a part of medical education and whether they are taken positively or negatively depend on various factors like personal resources, social support available, examinations and workload pressures, study skills, transition to clinical curriculum, staying away from home, change of language, etc\(^7,14\). All this leads to lifestyle changes like diminished leisure and recreational activity, decreased physical activity and sleep deprivation which then has an impact on the emotional well-being of the medical student\(^15\). High level of stress may have a negative effect on cognitive functioning and learning of students in the medical school\(^16\).

Several studies have highlighted that causes of stress vary with emotional causes seen more in first-year students while academic stresses are reported in later years\(^17,18\). Medical students exhibit various coping strategies to combat stress by using either active or avoidance coping strategies. The undergraduate medical training in our
country is of 41/2 years duration followed by 1 year of internship. This study was therefore designed to address the broader issues of utilizing the student’s views and experiences to look at the grave but potentially correctable loopholes of the medical studentship. This study investigated the gender differences of medical students with respect to the stressors in their student life, their reactions to the stressors and the coping behaviors used by them during stressful situations so that preventive measures can be considered to make the undergraduate training less stressful.

Methods

The study was initiated after institutional review board approval, in a tertiary care hospital in the metro city of Mumbai, over a period of 3 months. All students studying in their 1st, 2nd, 3rd year of undergraduate training in a metro city tertiary care public hospital & medical college were included in the study after informed consent.

This survey was conducted with one of the investigators addressing the students of each year in one of the lecture classes with prior permission from the respective teachers. A total of 425 students were addressed in their respective classes by the investigators (First Year: 144, Second Year: 102, Third Year:179 Each lecture class was of 1-hour duration. Hence, initially the investigator informed the students about the nature of the study & gave the informed consent document. Those who consented for the study were included in the survey. A self-administered proforma was given & then collected by the investigator after 30 minutes before the next lecture class.

Tools

Semi-Structured Proforma

A semi-structured proforma was designed to collect information on the socio-demographic variables, with closed and open-ended questions on staying in hostel, place of residence, place of education prior to medical schooling, medium of school and junior college education, stress if experienced, stressful activities and relationships and questions pertaining to the aims of the study with self-administered scales.

Student Life Stress Inventory (SSI)\textsuperscript{19,21}

The SSI was used to assess the stress, which the medical students perceived during their undergraduate training. The SSI is a self-report, paper and pencil 51 item questionnaire consisting of 9 categories i.e. 5 stressors and 4 reactions to stress. The 5 stressors are frustrations, conflicts, pressures, changes, and self-imposed. Frustrations (7 items), assesses experiences dealing with delays in reaching goals, daily hassles, lack of sources, failure to reach set goals, socially being unacceptable, dating disappointments, and denials in opportunities. Conflicts (3 items), assesses one’s choices between two or more desirable alternatives, between two or more undesirable alternatives, and with both desirable and undesirable alternatives. Pressures (4 items) assess one’s competitions, deadlines, overload of activities, and interpersonal relationships. Changes (3 items) assess one’s experiences to numerous changes at one time, and disruptive life and goals. Self-imposed (6 items) assess one’s desire to compete, to be loved by all, worries about everything, procrastinations, the solution to problems, and anxiety in test-taking. The 4 reactions to stressors are a physiological, emotional, behavioral, and cognitive appraisal. Physiological (14 items) assess one’s experiences with sweating, stuttering, trembling, rapid movements, exhaustion, stomach problems, breathing problems, backaches, skin reaction, headaches, arthritic pains and weight losses or weight gains. Emotional (4 items) assess one’s experiences with fear, anger, guilt and grief. Behavioral (8 items), assesses one’s experiences with crying, abuse of others, abuse of self, smoking excessively, being irritable towards others, attempting suicide, using defense mechanisms and, separating oneself from others. Cognitive Appraisals (2 items), assesses whether one analyzes the stressful situations and use appropriate strategies to solve stressful situations. The overall view of stress is rated as mild = 1, moderate = 2, severe = 3

Participants were asked to indicate the option that best described their experience of stress using a 5-point frequency Likert scale with the anchors of Never (0), Seldom (1), Occasionally (2), Often (3) and Most of the Time (4). Items 50 and 51 are reverse scored. Value rating for each item in each category was added to give a category score and total SSI was a summation of the 9 category value ratings.
**Brief Cope inventory**

The medical student’s ways of coping with stress in their life was assessed using the Brief Cope inventory. Brief Cope Inventory is a 28 item questionnaire which assesses coping while dealing with problems. Each item is rated on a 4 point Likert rating. Coping is measured on the various subscales of self-direction, active coping, denial, substance use, use of emotional support, use of instrumental support, behavioral disengagement, etc.

**Statistical analysis**

The data was analyzed using the Microsoft Excel & Graph Pad Instat version 3.10 for Windows. Group differences were analyzed using students “t” test and chi-square test wherever applicable and two-tailed ‘p’ values were obtained for all analyses. P value of < 0.05 was considered as significant for all analysis.

**Results**

**Response rate:** A total of 425 medical students were given the questionnaires of whom only 303 medical students returned the completely filled questionnaires and were considered for analysis. The remaining 122 students had either not returned or had given incomplete questionnaires which were then discarded from the study. Of the 303 students, 72 students were from the first year, 67 students were from the second year and 164 students were from the third year of the medical school.

**Demographic Data:** The mean age of all the students was 19.9 years (range 18-21.5 years). Of the 303 students, 150 were males and 153 females. 48% of them had education in Mumbai 55% were hostilities, 47% were residing in Mumbai, 80% were educated in English and 92% were Hindus.

**Stress experienced by students:** When all the medical students were assessed for their overall level of stress on the closed-ended questions relating to experiencing stress and its severity was 66.1% (n=200) of the students admitted to being stressed out as compared to 33.9% (n=103) who denied any stress. On further assessing those students who were stressed for the severity of stress 36% (n= 73) experienced mild levels of stress, 57.7% (n=115) had a moderate degree of stress while 5.97%, (n=12) experienced severe stress. No significant gender differences were seen between the groups on the basis of severity.

When the students were assessed for gender differences on the 9 categories of 5 stressors and 4 reactions to stress as per SSI then, on the 5 stressors of frustrations, conflicts, pressures, changes and self-imposed significant differences were seen on conflicts (t = 2.72, p < 0.006) and pressures (t = 2.223, p < 0.026) with the females exhibiting more stress than the males. On the other categories of frustrations, changes and self-imposed stressors no significant differences were seen.

Both the male and female students had perceived more of the self-imposed stressors of the need of compete, need to be noticed and loved, worrying about self, others and exams followed by frustrations in reaching goals, failures or financial burden, pressures in terms of workload, deadlines, family expectations, competitors on grades followed by conflicts in taking decisions. Changes i.e. change of residence, place, language, friends or things is happening at the same time were not considered very stressful by them. (Table 1)

<table>
<thead>
<tr>
<th>Stressors</th>
<th>Mean S.I.</th>
<th>S.D.</th>
<th>Mean S.I.</th>
<th>S.D.</th>
<th>t Test</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males (n=150)</td>
<td></td>
<td></td>
<td>Females (n=153)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frustrations</td>
<td>14.8</td>
<td>4.26</td>
<td>14.62</td>
<td>3.87</td>
<td>0.3971</td>
<td>0.6915</td>
</tr>
<tr>
<td>Conflicts</td>
<td>7.46</td>
<td>2.53</td>
<td>8.24</td>
<td>2.45</td>
<td>2.727</td>
<td>0.006 **</td>
</tr>
<tr>
<td>Pressures</td>
<td>10.59</td>
<td>3.39</td>
<td>11.41</td>
<td>3.05</td>
<td>2.223</td>
<td>0.026 *</td>
</tr>
<tr>
<td>Changes</td>
<td>7.10</td>
<td>2.72</td>
<td>7.48</td>
<td>2.88</td>
<td>1.189</td>
<td>0.235</td>
</tr>
<tr>
<td>Self-imposed</td>
<td>20.40</td>
<td>4.60</td>
<td>19.88</td>
<td>4.64</td>
<td>0.209</td>
<td>0.834</td>
</tr>
</tbody>
</table>

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**Table 1. Student Life Stress Inventory**
Reactions to Stressors

<table>
<thead>
<tr>
<th>Stressor</th>
<th>Males Mean</th>
<th>Males S.D.</th>
<th>Females Mean</th>
<th>Females S.D.</th>
<th>t Test</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physiological</td>
<td>23.70</td>
<td>6.86</td>
<td>26.32</td>
<td>7.17</td>
<td>3.23</td>
<td>0.0013  **</td>
</tr>
<tr>
<td>Emotional</td>
<td>9.93</td>
<td>3.78</td>
<td>11.37</td>
<td>4.14</td>
<td>3.15</td>
<td>0.0018  **</td>
</tr>
<tr>
<td>Behavioral</td>
<td>14.03</td>
<td>4.00</td>
<td>14.91</td>
<td>4.23</td>
<td>1.86</td>
<td>0.063</td>
</tr>
<tr>
<td>Cognitive Appraisal</td>
<td>4.75</td>
<td>2.07</td>
<td>5.11</td>
<td>2.30</td>
<td>1.418</td>
<td>0.157</td>
</tr>
</tbody>
</table>

* p<0.05
** p<0.01

When the students were evaluated on the relationships and activities which they found stressful then no significant gender differences were seen. However, most of the students (79%) felt handling exams and another day to day activities more stressful than their relationships with teachers (39.2%), family (34.6%) and friends (36.6%).

Reactions to Stressors: The reactions to stressors viz. physiological, emotional, behavioral and cognitive appraisal revealed significant differences with females experiencing more physiological (t = 3.23, p < 0.001) and emotional (t = 3.15, p < 0.001) changes as compared to males. On the other categories of behavioral and cognitive appraisal, no significant differences were seen.

Both the genders experienced similar reactions to the stressors which were predominantly physiological with panic-like reactions, muscle aches and pains and weight loss or weight gain followed by emotional reactions of fear, anger etc. Behavioral disturbances like crying and irritability were also expressed by the students. (Table 1)

Coping of students: When the gender differences for coping strategies used by the students were studied then, a highly significant difference was seen with males resorting to substance use (t = 3.37, p < 0.008) whereas females used self-blame (t = 1.98, p < 0.04).

Both the genders, however, seemed to make use of problem-solving coping strategies like planning, active coping, accepting and positive reframing. This was followed by the avoidance strategies like self-distraction, self-blame, venting, human behavioral disengagement, denial, substance use, etc. (Table 2)

Table 2. Brief Cope Inventory

<table>
<thead>
<tr>
<th>Coping Style as per Brief Cope Inventory</th>
<th>Males (n=150)</th>
<th>Females (n=153)</th>
<th>t Test</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self Distraction</td>
<td>Mean 5.52</td>
<td>S.D. 2.67</td>
<td>Mean 5.52</td>
<td>S.D. 1.95</td>
</tr>
<tr>
<td>Active Coping</td>
<td>Mean 6.16</td>
<td>S.D. 1.38</td>
<td>Mean 5.88</td>
<td>S.D. 1.46</td>
</tr>
<tr>
<td>Denial</td>
<td>Mean 3.19</td>
<td>S.D. 1.38</td>
<td>Mean 3.20</td>
<td>S.D. 1.43</td>
</tr>
<tr>
<td>Substance use</td>
<td>Mean 2.36</td>
<td>S.D. 0.89</td>
<td>Mean 2.09</td>
<td>S.D. 0.464</td>
</tr>
<tr>
<td>Emotional Support</td>
<td>Mean 4.88</td>
<td>S.D. 1.67</td>
<td>Mean 5.11</td>
<td>S.D. 1.58</td>
</tr>
<tr>
<td>Behavioral Disengagement</td>
<td>Mean 3.30</td>
<td>S.D. 1.33</td>
<td>Mean 3.50</td>
<td>S.D. 1.59</td>
</tr>
<tr>
<td>Venting</td>
<td>Mean 4.15</td>
<td>S.D. 1.34</td>
<td>Mean 4.32</td>
<td>S.D. 1.52</td>
</tr>
<tr>
<td>Instrumental Support</td>
<td>Mean 5.06</td>
<td>S.D. 1.67</td>
<td>Mean 5.15</td>
<td>S.D. 1.65</td>
</tr>
<tr>
<td>Positive reframing</td>
<td>Mean 5.79</td>
<td>S.D. 1.55</td>
<td>Mean 5.71</td>
<td>S.D. 1.58</td>
</tr>
<tr>
<td>Self blame</td>
<td>Mean 4.227</td>
<td>S.D. 1.58</td>
<td>Mean 4.59</td>
<td>S.D. 1.68</td>
</tr>
<tr>
<td>Planning</td>
<td>Mean 6.09</td>
<td>S.D. 1.449</td>
<td>Mean 5.97</td>
<td>S.D. 1.56</td>
</tr>
<tr>
<td>Humor</td>
<td>Mean 3.86</td>
<td>S.D. 1.78</td>
<td>Mean 3.68</td>
<td>S.D. 1.79</td>
</tr>
</tbody>
</table>
Like headaches and body aches. The reactions also demonstrated strong physiological In response to the higher prevalence of stress curriculum as compared to males and incompetence for learning in the new f when worried (71.0%) happy (78.8%) and problems in sleeping complained being of not feeling reasonably with the most common symptoms psychological distress as compared to males female doctors expressed higher rates of though during postgraduat... Some UK studies found no gender medical curriculum espec... difficulties in achieving their go... changes, females are also experiencing the difficulties in achieving their goals in a male dominated the world. Several researchers have corroborated the increased pressure on medical curriculum especially the academic achievements. Some UK studies found no gender differences in medical students on psychological distress questionnaires, though during postgraduate training more female doctors expressed higher rates of psychological distress as compared to males with the most common symptoms complained being of not feeling reasonably happy (78.8%) and problems in sleeping when worried (71.0%). Some studies have found women to experience more frustration and incompetence for learning in the new curriculum as compared to males and a higher prevalence of stress.

In response to the stressors, female students also demonstrated strong physiological reactions like panic attacks, weight loss or weight gain, multiple somatic complaints like headaches and body aches. The emotional responses of fear, anger, guilt and depression were also high. It could be that these reactions are the prodrome of a major mental illness like depression and the female students could, therefore, be at a risk for developing psychiatric morbidity. This is in keeping with the fact that depression is more common in female than male students. Several studies have reported alarming symptoms of depression associated with high levels of stress which may often go unnoticed and unrealized during the medical training. In our study however none of the medical students gave any suicidal ideations or attempt.

Personal problems or social factors like staying away from home, hostel and canteen facilities, language barriers or dealings with teachers, friends, family, etc. were not considered very stressful by our group of subjects. Despite the fact that in India, many adolescents lead a sheltered life and usually may venture out of their house for the first time when pursuing professional courses, none of the subjects considered this to be stressful. However, academic factors like examinations, competition and academic achievements were considered to be more stressful. Researchers have found a change of language, moving away from time, the transition from pre-clinical to clinical training to be highly stressful. The main factors identified as contributing to stress levels were heavy workloads and coping with academic studies, which was also reflected in our findings. According to Stewart et al. and LeBlanc, stress was also associated with poor academic performance. It was reassuring to find that the medical students used active coping strategies like planning, active coping, accepting and positive reframing. Avoidant coping strategies like talking to friends, seeing television, not believing, making fun of the stressful situation, etc. were also seen in both the groups. It could be because this option is readily and easily available and was seen in both genders without any statistical significance. Coping skills that were considered ineffective by the undergraduates included acting angry, complaining, thinking about the worst and

| Acceptance | 5.84 | 1.55 | 5.79 | 1.47 | 0.320 | 0.74 |
| Religion   | 4.56 | 1.98 | 4.74 | 2.01 | 0.804 | 0.422 |

* p<0.05
** p<0.01
altering eating habits. Several studies have reported that commonly used coping strategies by students were talking to friends, exercising, talking to family, watching T.V. of movies and play or recreation. Sandover et al in their study found that undergraduate students coped by using confrontative and escape avoidance mechanisms whereas graduates primarily preferred planful problem solving. An et al in their study identified that medical students using an avoidant coping processes experienced high levels of academic stress.

Seeking social support i.e. emotional support from friends and family and instrumental support i.e. seeking advice from friends to handle the stressful situation were the coping skills used more by females than the males in our study. Students’ lifestyles play an important role in their coping skills. The male students in our study resorted to substance use i.e. alcohol which was statistically significant. Studies across the globe have reported use of alcohol, recreational drugs or other illicit drugs as a coping strategy used by nearly 50% of the medical students, especially males. One would have to discern whether the increased alcohol consumption is related to stress or psychological morbidity or is a part of the students lifestyle where they are under the influence of peers, have social expectations and the other factors which then mediates the substance use.

As is predominant with the female temperament the female students in our study significantly used self-blame, where they criticized and blamed self for the situation they were in. Excessive use of self-blame as a coping skill could also be a precursor for psychological morbidity like depression and anxiety.

The findings of this study suggest that though two-thirds of the medical students experienced stress, they were able to cope and would probably benefit from improvements in the educational system and establishment of social facilities to stimulate the relationships between the students, teachers and family so as to improve their coping. Medical schooling and stress probably go hand in hand and it may not be possible to identify possible predictors of stress. Gender differences in coping may enlighten in handing of the stressful situation by the use of the appropriate coping strategy. All this is an area for further investigation, and can be made use of in ‘stress-buster’ workshops conducted for the medical students. Creating awareness amongst students and teachers regarding health promotion measures, a change of in teaching styles and examinations may help to alleviate some of the distress experienced by students in their medical career. Longitudinal studies that focus on stress, motivation, and academic performance in medical students are needed to confirm our results.

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