Stress, Stressors and Undergraduate Students: A Mini-Review

Ruchi Kothari¹,*, Snigdha Sharma², Pradeep Bokariya³

ABSTRACT
Stressors are defined as personal and environmental experiences which result in stress. Universities are considered as excellent centers for education, yet some students fail to benefit due to various reasons.¹,² Education is one of the basic needs and in turn a right of all human beings. Student life has many benefits, but it also imposes inexorable stress. The environment of medical education and practice has long been considered a stressful one.²,³ Stress in medical students is not uncommon and is process orientated. After entering a medical college, a student for the first-time experience so closely so many peoples ‘joy as during child birth and sorrow as during death of a patient in a place which may cause some emotional disturbance to the student also for the beginning phases of student life.⁴ In this review, we have tried to gauge some of the reasons behind it and caste a glance on the various studies conducted so far. Though we have tried majorly to include researches pertaining to Stress and stressor amongst medical students across the globe, we have also evaluated the role of stress in other faculties too. A few introductory remarks on role of parents in coping with this burning issue along with concept of Burnout have also been incorporated.

Key words: Academic stress, Medical education, Role of parents, Stressors, Undergraduate medical education.

INTRODUCTION
Universities are considered as excellent centers for education, yet some students fail to benefit due to various reasons.¹,² Education is one of the basic needs and in turn a right of all human beings. Student life has many benefits, but it also imposes inexorable stress. The environment of medical education and practice has long been considered a stressful one.²,³ Stress in medical students is not uncommon and is process orientated. After entering a medical college, a student for the first-time experience so closely so many peoples ‘joy as during child birth and sorrow as during death of a patient in a place which may cause some emotional disturbance to the student also for the beginning phases of student life.⁴ Several educationists and sociologists pointed out that various student problems severely affect their learning process. A high level of stress is known to have a negative effect on cognitive functioning and learning of students in a medical school which affects their studies and mental health.⁴ Studies show that one exposure to acute stress affects information processing in the cerebellum which is the area of the brain responsible for motor control and movement coordination and is involved in learning and memory formation. The results show that emotional stress affects motor coordination and other cognitive functions.⁶ Various studies conducted so far. We tried to include researches pertaining to Stress and stressor amongst medical students across the globe. We began with background reading about the topic, tracing the specific resources, we extensively searched the literature and analyzed the shortcomings and strengths of various workers. Methodologies and findings of the different studies were tabulated in chronological manner and an attempt was made to derive at an inference incorporating the previous, recent and finally our own perspective regarding the relationship of stress and students. Multiple database searches using MedLine, Google scholar, EMBASE and PubMed were conducted to identify all the previous as well as the recent studies and publications pertinent to this issue. All identified documents were examined and those that involved study of stress in medical students were retrieved for inclusion in the review. The relevant reports were compiled and important conclusions from the studies were laid down in proper chronology. The methodologies and findings of various authors were tabulated for a quick glance and to make easy comparisons between them. Reference lists of retrieved documents were hand searched to identify the additional publications followed by a critical analysis of the relationship among the different works.

Concept of Stress
Hans Selye discovered Stress in 1935 as a syndrome occurring in laboratory rats. In the modern world,
Stress has become a universal explanation for human behavior. Selye described stress as a nonspecific response of the body to change.[6] It is described as wear and tear our bodies experience in order to adjust to our changing environment. On one hand, stress compels us to take action while on the other hand, it results in feelings of rejection, anger and depression, leading to health problems such as headaches, upset stomach rashes, insomnia, ulcers, high blood pressure, heart disease and stroke. Stress affects our personal as well as professional lives and how can we expect proficient doctors when they are themselves a robot operated by stress?

Everyone has to cope with different kinds of pressure laid down by the society and family. On the verge of coping with the factors, an individual himself unconsciously frames a trap and is caught in the vicious cycle. Several studies have been performed to evaluate the level of stress and various stress factors affecting a medical student having an impact on his/her personal as well as professional life.

Stressors and their relation to stress
Personal and environmental events that lead to stress are referred to as stressors.[7] Depending upon their cultural backgrounds, personal traits, experience and coping skills, medical students may perceive the same stressors differently. Many studies have described the stressors of medical training and the associated negative consequences on the mental and physical health of medical students.

The stressors don't cause anxiety or tension by themselves. Instead, stress results from the interaction between stressors and the individual's perception and reaction to those stressors. In short, stress includes the emotional disturbances or changes caused by stressors. As per Linn and Zeppa, some stress in medical school training is needed for learning but how true is it? Is stress necessary for students to perform better or is this just the way they are programmed over the years?

An attempt to have a deeper insight on the different stressors influencing a medical student's life, a cross-sectional anonymous questionnaire-based survey was conducted including all students from first to fourth year of a medical college in India by Singh A et al. using Beck depression inventory to assess the level of depression with a score of 12 or higher considered depressive. A total of 336 students participated giving a response rate of 88% out of which, 49.1% students were reported to have depressive symptoms. It was seen to be significantly higher in 1st year (59.3%) and 2nd year (65.6%), as compared to 3rd (34.4%) and 4th year (37.2%) students (p<0.05). Substance abuse (p<0.0001), first and second year of study, female sex and language of instruction other than English at 10+2 level were found to be associated factors for the development of depressive symptoms (p<0.05). Symptoms suggestive of depression were found in 49.1% of the medical students.[8]

A cross-sectional study by Sarkar D et al. was conducted in the department of Physiology at Pt. Jawahar Lal Memorial Medical College Raipur. Medical Students Stressor Questionnaire 24 (MSSQ) was used to identify sources of stress. After Analysis, it was stated that, the Academic Related Stress (3.10), Intrapersonal and interpersonal related stress levels (2.96), Teaching and learning related stress (2.45) was high among the first-year undergraduate students. So, the Academic, Intrapersonal and interpersonal, Teaching and learning related stress (2.45) were stated to be the major sources of stress among the students. Social related stress (2.15), was the next high source followed by motivation related (1.92) and group activities related stress (1.71) in that order, in all of whom the stress levels was mild.[9]

In the same time span, studies have been performed in other countries to assess the level of stress and different factors responsible for inducing stress. Their comparative account has been elaborated in Table 1. A comparison has been done in this review as an attempt to understand better the common stress factors among students across the globe.

PREVIOUS RESEARCHES ON STRESS IN MEDICAL STUDENTS
In a qualitative research conducted by Supe AN et al. at Seth G S medical college, Mumbai, (India) medical students at various stages of MBBS course majority of medical students 175/238 i.e., (73%) perceived stress which implied that stress in medical students is common and is process oriented. It was reported to be high in second and third year.[11] Academic factors were the grander perceived cause of stress in medical students of the college. Emotional factors were found to be significantly more in First MBBS. It was believed to be dependent on person's ways of coping and social support.

Another study conducted by Dahlin M et al. assessed the exposure to different stressors and the prevalence of depression among medical students (including males and females). A total of 342 students from 1, 3 and 6th year were included in the study. The response rate was 90.4%. First year students showed high ratings to the workload and lack of feedback stressors. Third year students gave high ratings to factors like 'Worries about future endurance/competence' and 'Pedagogical shortcomings'. In 6th year, both these factors were rated highly, but Year 6 students also showed higher ratings than the 2 other groups to 'Non-supportive climate'. It was also observed that medical students had higher depression rates than the general population and women students were found to have a higher rate than men.[12]

A descriptive cross sectional study was performed on all the registered and studying undergraduate medical students of S. Nijalingappa Medical College, Bagalkot in by Mannapur B which showed a higher level of stress in repeaters. The study was performed using a specially designed Self Reporting Questionnaire (SRQ) schedule which contained a set of questions which were related to 1) Socio-demographic profiles 2) Psychological stress and 3) Unhealthy habits. The dietary pattern of the study subjects was mainly the mixed type (62.95%). 71.71% of the students were performing physical exercises. 9.16% and 11.55% of the students had a habit of smoking and alcohol intake, respectively. 42.63% of the study subjects were found to have experienced less/moderate stress and 47.01% of them had experienced severe stress. A total of 89.64% of the study subjects had experienced stress.68.57% of the repeaters had experience of stress compared to 30.4% among non-repeater. The stress was found to be more among repeaters as compared to the non-repeaters.[13]

Another study carried out during academic examination in final year medical students at Sri Aurobindo Institute of Medical Sciences, Indore by Sharma B et al. Assessed stress and its effect on vital parameters. The final MBBS students of academic year 2010-11 were selected for the study using Zung's scale for assessment of Stress. Out of 68 students 39 (57.4%) were boys and 29 (42.6%) were girls. Major proportion of population 38.2% was found to have mild stress, 32.4% were normal while 19.1% suffered from marked major stress and 10.3% were in extreme major stress category in total studied subjects. The major proportion of boys 43.6% and girls 31.0% had mild stress, 33.3% boys and 31.0% girls were normal, 15.4% and 24.1% boys and girls suffered from marked major stress and 7.7% and 13.8% boys and girls were in extreme major stress category respectively. A significant difference between before and at the time of examination observations in vital parameters (Pulse Rate, Systolic Blood Pressure and Diastolic Blood Pressure) due to examination stress was also observed also, a positive and very high degree of correlation (p<0.01) was seen between weight, height and BMI both at the time of examination and before examination.
<table>
<thead>
<tr>
<th>Year</th>
<th>Authors</th>
<th>Aim</th>
<th>Tool</th>
<th>Result</th>
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</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>Dyrbye LN et al. (U.S.A)</td>
<td>• Identify prevalence of burnout</td>
<td></td>
<td>• response rate (50%)</td>
<td>Personal life events demonstrated a strong relationship with risk of burnout (p&lt;0.0160)</td>
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<tr>
<td>2006</td>
<td>Zaid ZA et al. (Malaysia)</td>
<td></td>
<td></td>
<td>• Burnout seen in 45%</td>
<td></td>
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<td>2006</td>
<td>Dyrbye LN et al. (U.S.A)</td>
<td>• Variation of its prevalence during medical school</td>
<td>General Health Questionnaire (GHQ)</td>
<td>• Frequency of burnout increased in senior students (p&lt;0.03)</td>
<td></td>
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<tr>
<td>2005 and 2006</td>
<td></td>
<td>• Impact of personal life</td>
<td></td>
<td>• Personal life events demonstrated a strong relationship with risk of burnout (p&lt;0.0160)</td>
<td>39 % of the students stated friends as their main preference for consultation of any emotional problem.</td>
</tr>
<tr>
<td>2008</td>
<td>Dyrbye LN et al. (U.S.A)</td>
<td>To assess the frequency of suicidal ideation among medical students and explore its relationship with burnout</td>
<td></td>
<td>50% of students were observed to experience burnout and 10% experience suicidal ideation during medical school</td>
<td>Recovery from burnout was associated with markedly less suicidal ideation</td>
</tr>
<tr>
<td>2009</td>
<td>Goebert D et al. (Multisite study)</td>
<td>To assess depressive symptoms and suicidal ideation in medical trainees</td>
<td>Epidemiologic Studies–Depression scale (CES-D) and the Primary Care Evaluation of Mental Disorders (PRIME-MD)</td>
<td></td>
<td></td>
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<tr>
<td>2010</td>
<td>Roh MS et al. (Korea)</td>
<td>possible risk factors of major depressive disorder (MDD) among medical students and pervasive association of depression with poor functioning</td>
<td></td>
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**Table 1: Comparative Account of research on factors affecting Stress.**
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<td>2014</td>
<td>Saravanan C et al. (Malaysia)</td>
<td>To examine the relationship between gender, year of study or stage of training and depression, anxiety and stress</td>
<td>Depression, Anxiety and Stress Scale</td>
<td>The total mean value of depressed students’ stressors level was higher, while some level of anxiety was reported by 44% of the sample. The total mean value of non-depressed students’ stressors level was found to be 39.6%.</td>
<td>No significant relationship between gender and anxiety and a non-significant relationship between gender and depression was reported. There was no significant difference between anxious and non-anxious medical students’ experiences of and reactions to stressors.</td>
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| Remarks: a) Many of the above studies have reported a limitation of being a single centered study. b) Participation of maximum possible students from a single study and analysis using latest modalities of IT were the strength in some. |

In India, taking a break of a year or two to prepare for various entrances examinations has become a trend over the years. Students join coaching institutes which teach the how to compete with lacs of other students aiming for the same goal. A combination of low number of seats in colleges and a huge number of students giving the examination has been a major concern as it leaves a large fraction of students who fail to claim a seat in their desired course disheartened. This can leave an impact on the student and not everybody is able to cope with it.

While talking about stress in medical students, other fields are often left out. To have a better comparison of level of stress among students, an anonymous cross-sectional questionnaire-based survey of 100 randomly selected students each from Medical College, Engineering College and 50 Nursing College was done by Behere SP et al. It was conducted, out of which, most of the medical students (58%) were in the age group of less than 20 years, while those of nursing (54.2%) and Engineering (75%) were in the age group of 20 to 25 years. It was observed that Seventeen medical students and 11 of engineering students showed denial regarding existing stress, while 35 nursing students showed such trait. Twenty-six medical students, 32 engineering students and 13 nursing students were experiencing normal level of stress and were not blind riding their problems. Five students each from medical and engineering college were having stress of such a degree that requires clinical attention.

A review of the available literature revealed that there had been no published reports directly comparing medical and dental student stress as a focused inquiry using a common survey instrument or theoretical framework. Murphy RJ et al. carried out a comparative study which highlighted differences in the potential stressors affecting each of these groups. The study included a group of 290 medical and dental students to compare alleged stress levels encountered by them. The survey question responses were grouped into five causal categories:
academic performance, faculty relations, patient and clinic responsibilities, personal life issues and professional identity. A modified version of the Dental Environmental Stress questionnaire compiled by Westerman et al. was used as the original template for the survey. The overall findings of the investigation showed that dental students perceived that they experienced greater levels of stress than medical students in three of the five measured categories. Medical students demonstrated greater stress levels than dental students in the category of professional identity. It also came into light that increasing costs of a professional education have added a new and very significant stressor for both medical and dental students with increasing student debt, in conjunction with increasingly uncertain earning potential, students are concerned about their long-term financial security. medical schools in the United States Cross-sectional 2007 and longitudinal 2006 to 2007 cohort study.

**Setting**

7 medical schools in the United States

**ROLE OF PARENTS**

Parents have a big role to play in a child’s career choice. Parental interference has also been recognized as a reason for stress in children. With the development of the society, there is no doubt that the way we live has changed completely. However, this change is now receiving complaints, especially from children, who are under high pressure to meet the expectation of their parents. Conflicts in family also affect a student’s life. Being raised by a single parent is still to an extent frowned upon and yet, it’s effect on a child is contradicting. On one hand it is seen that kids who are raised by a single parent can cope with staying alone in hostel while on the other hand, it is also believed to have a negative impact on the child. Focusing on the influence of family background of a student. A questionnaire-based research by Ajay T Shendarkar et al. was conducted which found that child rearing and parenting have a significant influence (P<0.05) on the stress found amongst the medical students. The reason being, one parent is always available at home for taking care of the offspring when the need arises, thereby providing a sound mental foundation for battling the outer world and newer situations. Other factors being independent living for the first time, families where both parents were working, the students were used to stay on their own and were able to cope with the hostel environment more effectively than those who had a parent always to take care of them.

**Burn out**

Occupational burnout results from long-term, uncountable job stress. Herbert Freudenberg used the term burnout for the first time. It is defined as the exhaustion of physical or emotional strength usually as a result of prolonged stress or frustration. On comparing the result of prevalence of depression and anxiety among students attending a private university in Malaysia to that of different studies, this percentage was found to be higher than a study of medical students attending an American private university (19%) but lower than was found in studies of medical students attending private universities in India (49.1%) and Pakistan (60%).

**CONCLUSION**

Medical schools are expected to produce graduates as competent and healthy physicians, but upon taking a glance at several studies existent in the available literature reflect that plentiful students experience depression during medical schools across the globe. In various studies reviewed, the factors common in them is the high prevalence of stress, anxiety and depression in female gender and first year students also, a variable stress level is seen in students raised by single parent. On comparing with general population, medical students show a higher level of stress which suggests that medical education and training may be partly responsible for students’ depression. The stress experience was more common due to academics and seen among all year of medical students with high prevalence in first year students which then declined over the later years of medical education. Other factors that are found to act as stressors are exam stress, repeating a year (or more), staying in hostel, being raised by working parents or financial stress. To resolve this issue, medical schools should provide psychiatric services to assist students in need, consider reforming curricula to reduce stress in medical training and develop programs for mental health and wellness to help students recognize personal distress and promote well-being.

**ACKNOWLEDGEMENT**

This article would not have been possible without the kind support and help of all the individuals who participated in the survey.

**CONFLICT OF INTEREST**

The authors declare no conflict of interest.

**SUMMARY**

Education is one of the basic needs and in turn a right of all human beings. Student life has many benefits, but it also imposes inexorable stress. The environment of medical education and practice has long been considered a stressful one. Stress in medical students is not uncommon and is process orientated. In this review, We began with background reading about the topic, tracing the specific resources, we extensively searched the literature and analyzed the shortcomings and strengths of various workers. The relevant reports were compiled and important conclusions from the studies were laid down in proper chronology. Many studies have described the stressors of medical training and the associated negative consequences on the mental and physical health of medical students. The stressors don’t cause anxiety or tension by themselves. Instead, stress results from the interaction between stressors and the individual’s perception and reaction to those stressors. In short, stress includes the emotional disturbances or changes caused by stressors. A comparison has been done in this review as an attempt to understand better the common stress factors among students across the globe. A review of the available literature revealed that there had been no published reports directly comparing medical and dental student stress as a focused inquiry using a common survey instrument or theoretical framework. Parental interference has also been recognized as a reason for stress in children. The stress experience was more common due to academics and seen among all year of medical students with high prevalence in first year students which then declined over the later years of medical education. Other factors that are found to act as stressors are exam stress, repeating year/s, staying in hostel, being raised by working parents or financial stress. It is observed that reforming curricula to reduce stress in medical training, and develop programs for mental health and wellness to help students recognize personal distress and promote well-being.