Sources and Severity of Stress in Various Domains among First Year Medical Students and its Relationship with their Academic Performance: A Cross Sectional Study

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Abstract

Background: First year medical students are the most vulnerable group to experience stress in their new environment in the field of medicine. The present study evaluated perceived stress among them along with its correlation with academic performance.

Method: An Indian adaptation of the Medical Student Stressor Questionnaire (MSSQ) was used to determine the effect of stress on the academic performance of students. Responses were correlated with their respective 1st professional exam marks.

Results: Stress due to examinations was reported by 24.5% students and due to excess syllabus by 33%. Some students (11.8%) experienced severe stress due to relationship issues, due to unjustified grading process (10.4%) and health issues. Females had more academic and group activity related stress as compared to males. The students who participated in sports or cultural societies had higher Drive and Desire related stress levels in contrast to the non-participants. The interpersonal & intrapersonal relatedstress (IRS score) of students was negatively correlated with their academic performance. The increased stress among female participants was related to an improved academic performance in them.

Conclusions: Too much stress negatively interfered with student's preparation, concentration and performance while positive stress helped student achieve peak performance.

Keywords: *Stress, Medical students, Academic performance, MSSQ, Academic related stressors.*

Introduction:

Stress is a process by which we perceive and cope with environmental threats and challenges.[1] Medicine is one of the most desired careers among students, but along with its pros comes a tremendous amount of challenges and stress that one has to deal with. Persistent stressful conditions are reported to be associated with mental and physical health problems in medical students atvarious stages of their training.[2-7] This may lead to conditions of anxiety, depression,alcoholism and drug abuse, ultimately ruining one's career and social life. The worst case scenario for a medico is to end his life by committing suicide. Various statistics have revealed that in India, every hour, one student commits suicide and a major proportion of such humiliating cases are of medical students. As a result, it is of great importance to control this alarming situation since the nation's future is on stake.

According to the first model of stress published by Hans Selye,[8] stress can bedivided into eustress and distress. The stress which enhances function (Physical or

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mental,such as through strength training or challenging work) is called eustress, while persistent stress that is not resolved through coping or adaptation and may lead to anxiety or withdrawal(depression) behaviour is known as distress.

First year medical students are the most vulnerable group to experience stress in their new environment in the field of medicine. This year of medical school imparts a great transition in the lives of students. Students from varied cultural and socioeconomic strata get admitted in Government medical colleges of India. These students in addition to bearing the burden of vast medical syllabus, face social, emotional and family problems. All these factors affect their learning ability and academic performance.[9-12]Most of the stress assessment studies in medical students focus either only on academic stressors or just predict the generalised stress levels among students. Therefore it is essential to analyse the degree of stress in all the domains in Indian medical students. We hypothesize that analyzing stress levels among medical students would prove to be a predictor of their academic performance.

The present cross sectional study wasthus planned to assess the sources and severity of stress in various domains among first year medical students. Considering that stress can either negatively or positively influence academic achievements, it also explores the relationship between stress and academic performance among medical students.

Methodology

Setting and participants: Study was conducted in the Department of Physiology at our institute (Name concealed as per instructions). As this study is focussed on first year medical students, sample size was not calculated. A batch of 150 students admitted in 2018 for MBBS course in our college were invited to participate in this study. of these 106 students willingly consented and hence were the participants of this study which was conducted within the college premises. During this one year these students study basic subjects i.e. Anatomy, Physiology and Biochemistry. At the end of first academic year the students appear for their professional examinations, held by Delhi University, toqualify for the next academic year.

Study Design: This cross sectional study was approved from Institutional Ethics Committee-Human Research (IEC-HR No 2019/39/4) of UCMS. All the first year MBBS trainees were invited for the study and their participation was completely voluntary. A written informed consent was obtained from all the participants.

Work plan: The Questionnaire was self administered to the 1st year MBBS students before their first professional examination and then the responses were correlated with 1st professional exam marks.

Questionnaire: For the present study, the Medical Student Stressor Questionnaire (MSSQ) was used to determine the effect of stress on the academic performance of students.[13] It is a valid and reliable instrument which consisted of 25 items representing six stressor domains:

1. Academic related stressors (ARS)
2. Intrapersonal and interpersonal related stressors (IRS)
3. Teaching and learning-related stressors (TLRS)
4. Social related stressors (SRS)
5. Drive and desire related stressors (DRS)
6. Group activities related stressors (GARS)

These six domains are the basic stressors identified for medical students by various researches. Respondents were asked to rate each source by choosing from five responses ranging from Causing no stress at all to Causing severe stress. The scoring method assigns marks from zero (i.e. causing no stress) to four (i.e. causing severe stress) to each of the responses respectively.

The data obtained from the survey was processed and then correlated with the student's respective academic performances.

Academic performance: Academic performance was measured from the total score of first professional marks available online after the declaration of University exam (final) result. The total university examination score (marks) was outof 600. The possible range of examination score could have been from 0 to 600.

Statistical Analysis: The data was analysed using Statistical Package for Social Sciences (SPSS) 20.0 for Windows (SPSS, Inc.,Chicago, IL, USA). Percentage frequency of occurrence for different grades of stress levels in each domain was calculated. Unpaired t-test was used to compare means of continuous variables and results were reported as mean (M) ±standard deviation

(SD). Non parametric data was analysed by Mann Whitney test. Pearson's coefficient analysis was used for correlating the level of stress with individual academic performance.. A p-value< 0.05 was considered as significant.

Results

A cross sectional study was conducted on 106 first year MBBS students of Batch 2018 in University College of Medical Sciences. The data was then collected and analysed using SPSS software.

Table 1 presents percentage of students experiencing different grades of stress levels (ranging from no stress at all to severe stress) in academic domains of the MSSQ i.e. Academic Related Stressors (ARS) and Teaching and Learning Related Stressors (TLRS). According to Table 1 and 2, 24.5% students reported high stress due to examinations and 33% due to excess syllabus. 11.8% of students experienced severe stress related to relationship issues which is a social related stressor. This was followed by, 10.4% of students who experienced severe stress due to unjustified grading process (an academic related stressor). A similar comparison was done for the non academic domains of the MSSQ i.e. IRS, SRS GARS and DRS. About 10.4% of students experienced severe stress due to health issues such as headache/sleep/fatigue which falls in the domain of Interpersonal and Intrapersonal related stressors. While mild stress was reported on other parameters like feeling of incompetence, lack of time for family and friends, hesitation in communication, language problems and peer pressure.

Table 1: Percentage of students experiencing different grades of stress levels in academic domains of the MSSQ

	Causing no stress at all	Causing mild stress	Causing moderate stress	Causing high stress	Causing severe stress
Academic Related Stressors					
Tests/Examinations	3.80%	24.50%	40.60%	24.50%	6.60%
need to do well (self expectation)	7.50%	29.20%	36.80%	17.90%	8.50%
Heavy workload/Excess syllabus	2.90%	15.10%	39.60%	33%	9.40%
Difficulty in understanding content (books/ lectures)	21.70%	42.50%	25.50%	6.60%	3.80%
Falling behind in reading schedule	7.50%	34.90%	37.70%	15.10%	4.80%
Unjustified grading process	22.60%	30.20%	28.30%	8.50%	10.40%
Teaching/Learning Related Stressor					
Lack of guidance from teachers/lack of teaching skills	32.10%	39.60%	17.90%	7.50%	2.90%
Lack of recognition for work done	32.10%	37.70%	23.60%	6%	1.60%

Out of the 106 study subjects, 81 (76.4%) students were male and 25 (23.5%) were females. Fig 1 represents comparison of stress scores on the basis of gender. From this graph, it is evident that females had more academic related stress (p value = 0.009) as compared to males. Also they had a higher level of Group Activity Related stress (p value = 0.011) than males.

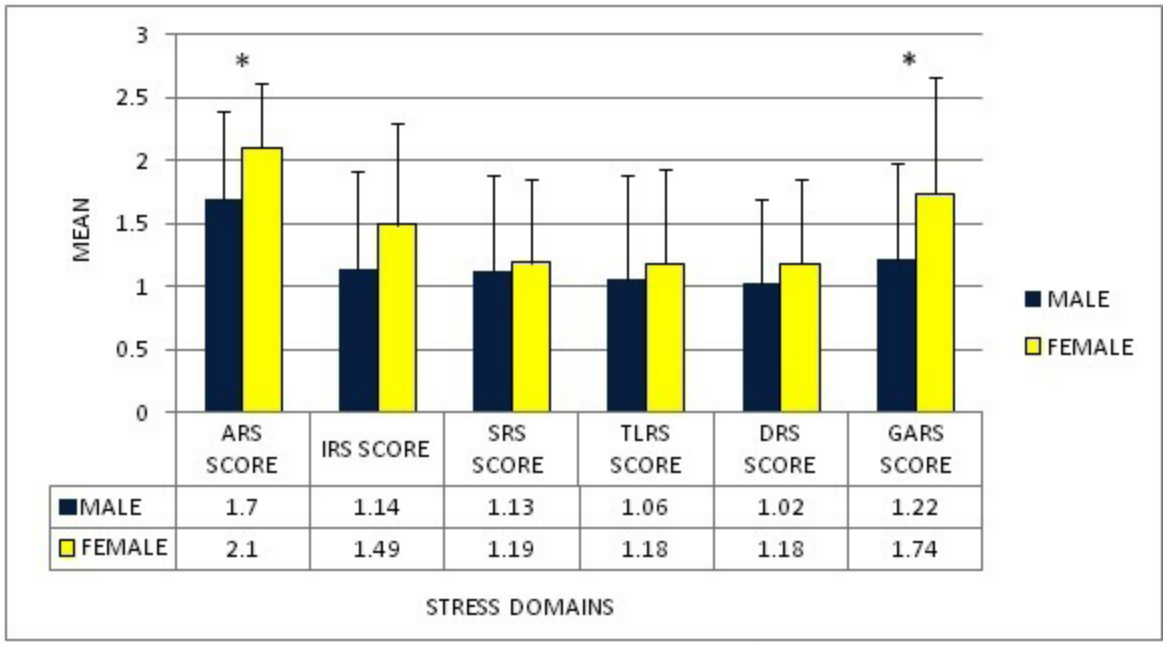

Figure 1: Comparison of stress scores on the basis of gender

In our study, 63 (60%) students were hostellers and the rest 43 (40%) students were day scholars. Fig 2 depicts comparison of stress levels experienced by hostellers to that of day scholars. According to this data, both the comparison groups were almost equally effected by all sorts of stressors and thus did not show any significant differences.

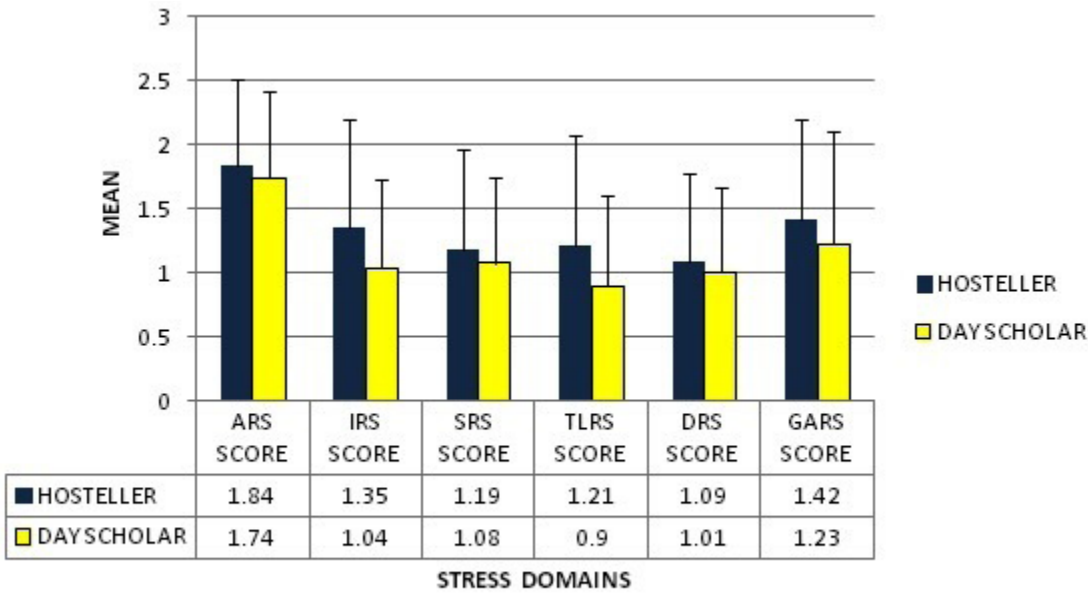

Figure 2: Comparison of stress levels between hostellers and day scholars

Fig 3 is a representation of stress level differences among students who actively participated (44%) in sports and cultural activities and the non participating (66%) section of students. This graph shows that, students who participated in sports or cultural societies had higher Drive and Desire related stress (p value = 0.045) levels in contrast to the non-participants.

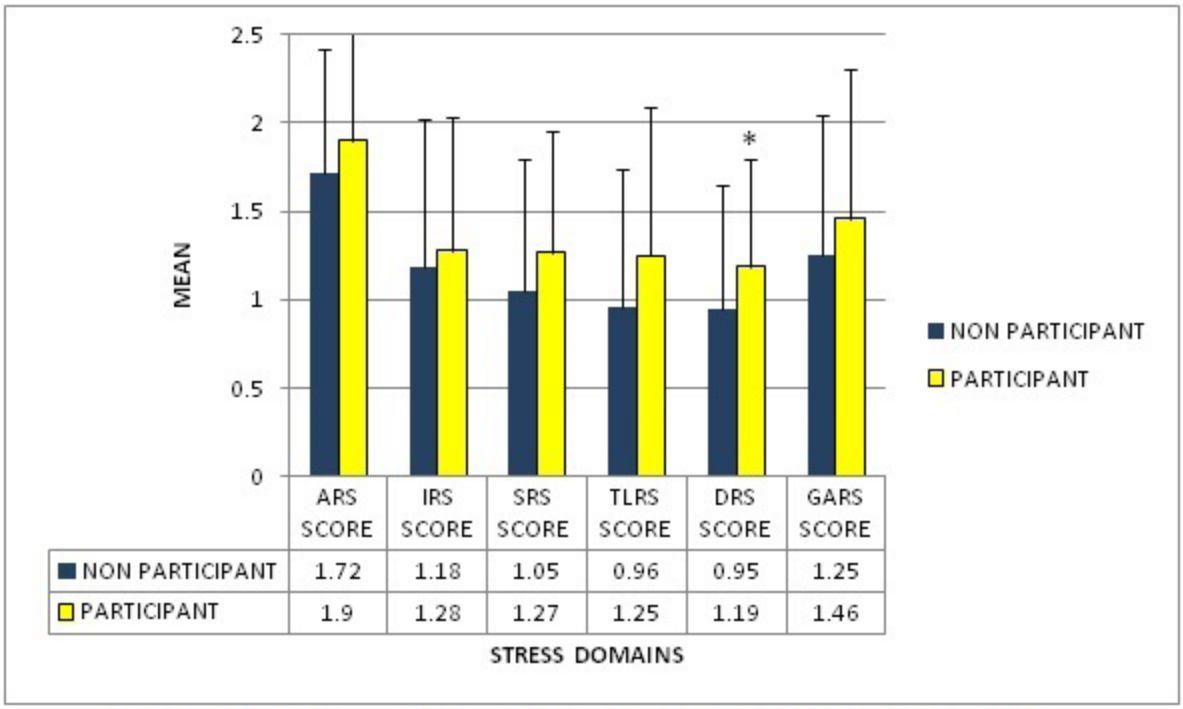

Figure 3: Comparison of Stress levels between students who actively participated in sports and cultural activities and the non participating students

Finally we correlated the stress scores of each domain with the student's academic performance (total score of first professional marks available online after the declaration of University final exam result). And on analysis, it was found that the IRS score of students was negatively correlated with their first professional exam marks, i.e. when the Interpersonal and Intrapersonal issues related stress was high, the student's academic performance tended to decrease. Also despite of higher stress levels among females, they still had a better academic performance (p value = 0.005) as compared to their male counterparts.

Discussion

The present study evaluated perceived stress among medical students including its sources and severity along with its correlation with academic performance.

In our study, students reported high academic related stress mainly due to examinations and excess syllabus. Some experienced severe stress due to unjustified grading process. Earlier studies from medical schools in different countries have reported varying levels of stress.[2-7,14,15] These studies have used different instruments to measurestress. Most of the other stress scales for medical students focuses only on academic stressors, and lack inclusion of personalor psychosocial issues. This limits the comparability among these studies. We chose the MSSQ scale since this instrument has been documented for its reliability and validity. [13] All its components have shown a measure of high internal consistency. In addition to analysing academic related stressors, it includes questions pertaining to intrapersonal, interpersonal, social, drive, desire and group activities related stressors.

The amount and severity of stress experienced by medical students may vary according to the settings of the medical school, the curricula, evaluation (examination) system etc. The beginning of academic studies in a medical school may be a particularly stressful new stage of life. It was observed that students found medical training stressful during the first year, but the level of stress minimized in subsequent years. A new environment which is generally influenced by new people and work settings could be the predominant reason for this finding. Some students experience social and organizational challenges.[16,17] In terms of personal challenges, the failure to achieve previous school performance levels was reported as distressing by our study participants. Academic studies may be associated with chronicand high stress exposure, and prior evidence has shown

that such stress is linked to worse performance,poorer satisfaction, intentions to quit, and elevated depression, anxiety, higher risk of suicidal ideation or physical problems. Overall prevalence of stress in our study is less than that reported earlier.[6,14,15] A plausible reason of this could be the Counselling in form of mentorship system practiced in our college. Most of the other places lack academic counselling.

In the present study, females had more academic related and group activity related stress as compared to males. This is in agreement with earlier studies. [18]However, Cohen has reported that there was no significant difference in stress using PSS between male and female students.[19] The increased stress among female participants of our study was related to the improved academic performance in them. This contrasting finding in case of female students maybe explained on the basis the phenomenon of 'eustress' where an individual is motivated high enough because of stress to move to action to get things accomplished. Adlard have reported the similarresults where the stress has been associated with improvement in performance. [20] This concept of Eustress, which enhances function was first published by Hans Selye.[12]

Coping strategies related to active and adaptive styles play a buffering role in mitigating stress experienced in medical studies (e.g., social networks). In our study, the students who participated in sports or cultural societies had higher drive and desire stress levels in contrast to the non-participants. This could possibly be due to lack of student's interest in the field of medicine and inability to freely pursue their hobbies due to academic burden. Devoting a part of their routine might lead to divided attention of students towards studies, as a result of which they are not able to fulfil what is actually expected from them, leading to a feeling of incompetence. Thus insufficient time forsocial demands is probably the cause of enhanced perceived stress in medical students. This finding is in line with earlier study where more than onethird of medical students report not to have time to pursue individual interests.[16] Additional supportive evidence was reported by Kholoud[21] and Siraj et al.,[22] that high level of stress in the medical students can be attributed to the course workload, lack of leisure time, shortage of learning materials, and frequent examinations.

The IRS score of students in our study was negatively correlated with their first professional exammarks, i.e. when the Interpersonal and Intrapersonal issues related stress was high, the student's academic performance tended to decrease. Chronic stress is reported to interference with aperson's capacity to encode memory and to retrieve information.[23,24]During times of stress, the body reacts by secreting stress hormones into the bloodstream,which affects memory negatively. In particular,the hippocampus, prefrontal cortex, and the amygdala are affected by cortisol. Under normal circumstances, the hippo campus regulates the production of cortisol through anegative feedback mechanism, because it has many receptors that are sensitive to cortisol. However, excess cortisol in case of chronic stress impairs the ability of the hippocampus to both encode and recall memories. Deterioration of higher cognitive functions like concentration, retention, recall and mental fatigue are also reported with high level of stress. Different studies show different impact of stress on academic performance. It was observed that too much stress negatively interfered with student's preparation, concentration and performance while positive stress helped student achieve peak performance.[25]

The pre-Medical School academic performance could have an influence both on the predictor as well as the outcome. Academic performance at the time of admission varies among our students based on reservations. Students from varied socioeconomic strata get admitted in a government medical college in India. These factors could not be controlled in the present study.

In view of the increased propensity of medical students to be under stress, it was proposed that stress management in the form of incorporating and inculcating coping mechanisms should be included in medical curriculum.[25,26] The much needed reforms in the Medical Education in the form of Competency Based Undergraduate Medical Curriculum/Education (CBMC/E) were introduced by Medical Council of India (MCI) recently.[27] One-month, immediately after the admission, it is assigned to orient new students about the teaching program, help them adapt, learn language (English and local language), computer use, communication skills, time management, handling stress as well as adequate amount of time for sports and extra-curricular activities has been incorporated in the revised curriculum. These de-stressing techniques if properly implemented throughout the medical studies duration can improve the functioning and academic performance of the students.

Limitations: This a cross-sectional study conducted only in one medical college and lacks generalization of results. Since the information was obtained from a self-administered questionnaire, information bias cannot be ruled out. Due to the limited sample-size, the analyses were not powered to control for multiple potential confounders. As 44 out of 150 students did not willingly consent for the study, this could have affected the overall prevalence of stress in our students.

Conclusions

Too much stress negatively interfered with student's preparation, concentration and performance while positive stress helped student achieve peak performance. Coping strategies related to active and adaptive styles can play a buffering role in mitigating stress and improve academic performance of the students.

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