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## RESEARCH ARTICLE

# STRESS IN UNDERGRADUATE MEDICAL EDUCATION: A CROSS-SECTIONAL STUDY

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### ABSTRACT

**Background:** Though a few studies have been carried out in India on exploring the stressors and coping styles of Indian medical under graduates there is a dearth of more extensive.

**Aim & objectives:** This study is aimed to identify various stressors leading to stress & determine the level of stress among various academic years & gender variations.

**Study design and methods:** Cross-sectional questionnaire based study carried out among 402 Undergraduate students of Government Medical College from 01 Jan to 01 Feb 2015.

**Results:** The major source of stress was academic related factors among which female students perceived more stress than male across all domains. It was observed that the difference in stressors among first year & final year students were Interpersonal & Group activity related factors respectively

**Conclusion:** The major contributors for stress were academics, followed by group – activities, teaching & learning and intrapersonal & interpersonal related.

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## INTRODUCTION

In the Indian scenario, too much content is delivered in a short span of time and the students are required to undertake too many examinations [1].

Compounded to this is the prospect of being away from home and the need to develop a whole new set of social and interpersonal support. Stress in the medical field can have detrimental effect on health, academic performance, memory and learning, problem solving abilities, medical decisions, and ultimately, patient care[2].

The perception of stress and the ways in which it is managed is largely determined by the coping strategies adopted. Coping style employed also predicts psychological distress, poor adjustment and coping to result in poor academic performance among students[3].

Though a few studies have been carried out in India on exploring the stressors and coping styles of Indian medical under graduates [4, 5] there is a dearth of more extensive work. While some studies show that medical students who use active coping styles tend to have lower psychological distress, [6] others opine that stress is more in students who use dominant coping strategies such as positive reappraisal and planned problem solving[7].

In India, getting into the medical school is considered to be very prestigious, but the accompanying challenges of being in medical school are largely overlooked. The stress of medical training stems from academic pressure, perfectionist standards, and demanding nature of medical practice which involves the most personal or emotionally draining aspects of life (human suffering, death, sexuality, fear, and medico- legal issues)[8].

This study is aimed to identify various stressors leading to stress & determine the level of stress among various academic years & gender variations. It is also aimed at comparing the level of stress among various academic years and suggest probable recommendations to overcome them.

## MATERIALS AND METHODS

### Study Design

A cross-sectional questionnaire based study was done from 01 Jan 2015 to 01 Feb 2015. The Medical Student Stressor Questionnaire MSSQ is a validated instrument used to identify sources of stress (Yusoff *et al.*) [9,10]. The items in MSSQ represent 20 possible sources of stress in medical students identified from the literature grouped into six main domains; Academic Related Stressor (ARS), Intrapersonal and Interpersonal Related Stressor (IRS), Teaching and Learning Related Stressor (TLRS), Social Related Stressor (SRS), Drive and Desire Related Stressor (DRS), and Group Activities

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Related Stressor (GARS). Respondents were asked to rate each source by choosing from five responses, “causing no stress at all”, “causing mild stress”, “causing moderate stress”, “causing high stress” and “causing severe stress”. The scoring method assigns marks from 0 to 4 to each of the responses respectively.

### Place of study

Government Medical College at a metropolitan city of India.

### Study subjects

All the under graduate medical students in the study college are invited for the study. Inclusion criteria are all those who have given the consent. Exclusion criteria are all those who have not given the consent.

### Analysis of data

Analysis of data is done using Micro Excel Sheet & SPSS version 22 in windows 8. Descriptive analysis of levels of stress in all six domains were stratified by gender and presented as frequency & percentages of subjects having that level of stress.

Reliability analysis was performed to determine the reliability of the MSSQ questionnaire for any demographic variations. Internal consistency of the items was measured by using Cronbach's alpha coefficient.

Mann Whitney “U” test of significance was used to see the difference between the genders with respect to levels of stress across all domains with levels of significance set at 0.05. Kruskal Wallis test was used to compare the level of stress among various academic years. Pearson's Chi-Square test was done to compare the results of above two tests.

### Procedure

All the undergraduate medical students (540) of the study college were invited to the study and details regarding the study in respect to purpose, confidentiality & results was explained to the students & print form of ‘patient information sheet’ was also handed to each student.

Written consent was obtained from the participants. Completion of the questionnaire was voluntary. The students were requested to respond to all the statements with no time limit imposed. However majority of them took only half an hour to finish with all questionnaires. During the questionnaire administration, the investigators gave proper assistance and directions whenever needed.

## RESULTS AND DISCUSSION

A total of 402 students responded for the study i.e., response rate is 74%. Out of which 23% were female students. The demographics according to each year are as in (Table 1)

**Table No. 1** Demographics of Study Population

S.No	Academic Year	Male(frequencies)	Female(frequencies)
1.	First year	102(25.4%)	25(6.2%)
2.	Second year	77(19.1%)	25(6.2%)
3.	Third year	66(16.4%)	21(5.2%)
4.	Fourth year	66(16.4%)	20(4.9%)
	Sub-total	311	91
	Total	402	

The total Cronbach's alpha value of the MSSQ is 0.813. Table below shows the Cronbach's alpha for each stressor group, ranged from 0.734 to 0.902. This analysis suggested that the items of the stressors group were reliable as having high internal consistency (Table3) and proves to be a reliable tool to identify sources of stress among undergraduate medical students. (Downing SM, 2004; Streiner & Norman, 2008)

**Table No 3** Domain Score & Descriptive Statistics

Domain	N	Mean	Std. Deviation	Minimum	Maximum
ARS	402	2.7567	.50776	1.17	4.00
IPRS	402	2.1994	.69314	.86	4.00
TLRS	402	2.2317	.62805	.86	4.00
SRS	402	2.2648	.64396	.33	4.00
DDRS	402	1.9718	.80369	.67	4.00
GARS	402	2.3787	.75118	.75	4.00

Score interpretation: 0.00 - 1.00 = Mild; 1.01- 2.00 = Moderate; 2.01- 3.00 = High; 3.01- 4.00 = Severe.

Based on the results, it appeared that the major source of stress experienced by the students was related to academic requirements that were represented by ARS domain

The highest mean degree of stress was led by “Need to do Well (Self-Expectation)” with mean degree of stress of 2.98 (which is causing moderate to high stress), followed by “Learning context – full of Competition”, “Lack of time to review what have been learnt” & “Having difficulty understanding the content”. Top ten stressors belong to the ARS domain (Aktekin *et al.*, 2001; Saipanish, 2003; Dyrbye *et al.*, 2005; Yusoff *et al.*, 2010). The lowest mean degree of stress was “Unwilling to study Medicine” with the mean degree value of stress 1.90 indicating it to be causing mild to moderate stress. (Yusoff *et al.*, 2010, Kaufman, Day, Mensink, 1996 & 1998)

Overall, the mean stress level ranged between 1.00 to 3.00 indicating that the stress level among students ranged between mild and high. This result demonstrated that stress was mostly contributed by the academic requirements as perceived by the students.

Interpreting the result according to stress domains separately, the analysis is as follows:-

**ARS Domain:-** It is the leading cause of stressor of all the domains & the leading cause among them is “Need to do Well (Self-Expectation)” as discussed above and the least among it is “Unjustified grading process.”

**IPRS Domain:-** The leading cause of stress among this domain is “Verbal or Physical abuse by Teachers” and the stressor with least effect is “Verbal or Physical abuse by others.”

**TLRS Domain:-** “Uncertainty of what is expected from me” seems to be the maximal cause of stressor in this domain and

the stressor with minimal effect is “Lack of Guidance from Teachers.”

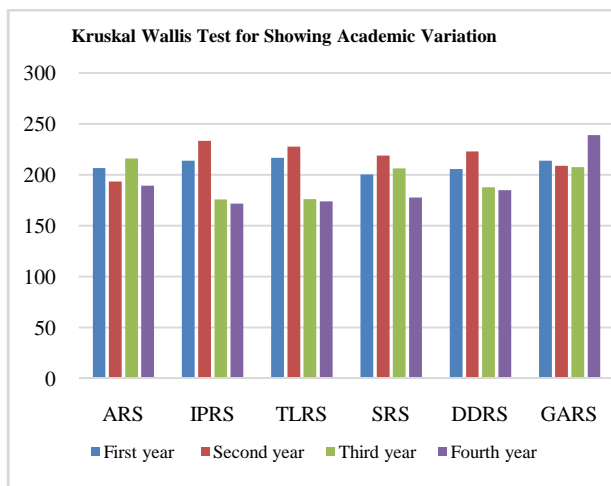
**SRS Domain:-** This has shown some interesting results, as “Lack of time for family & friends” is the leading stressor in this domain and it is the leading stressor among UG students other than Academic Related stressors. The least effective stressor in this domain is “Working with Computers.”

**DDRS:-** This is the least stressor domain among all & they did not contribute much to the stress level of the students.

**GARS Domain:-** This is the second leading cause of stressor domain among the students. “Need to do well (imposed by others)” is the leading contributor of stress in this domain & “Feeling of Incompetence” was the minimal contributor.

The data was also analyzed to compare the level of stress among students of various academic years by using Kruskal-Wallis (Graph 2) and also to determine the gender variation by using Chi-Square & Mann-Whitney U tests.

**Graph No 2 Kruskal-Wallis Test**



From the above tests it is clearly evident that, there is a significant difference ( $P < 0.05$ ) in level of stress among students with respect to 3 domains – IPRS, TLRS & GARS and the other 3 doesn’t pose any academic variation and continue to exist almost similarly in all academic years & these results were in comparison to Miller, PM, Surtees, PG et al.

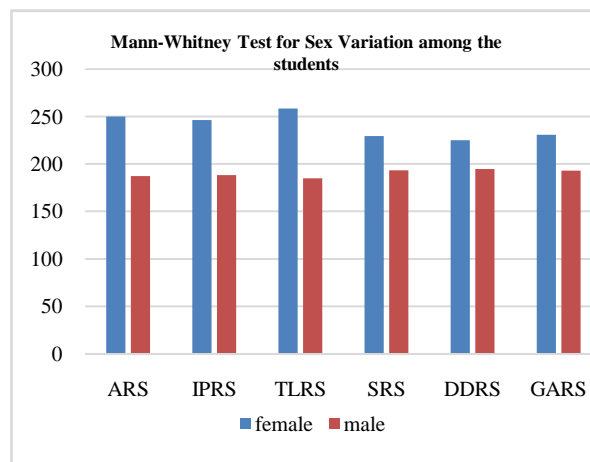
Both the tests have shown the similar results and with respect to IPRS ( $P$ -value is 0.015), first & second year students faced high level of stress in comparison to clinical year students. The main contributor of stress among these first & second (Pre-Clinical) year students in IPRS domain is “Conflict with other students & Personnel.”

TLRS domain also showed significant ( $P$ -value is 0.011) variation among academic years in which first year students faced more stress with a major contribution from, “Uncertainty of what is expected from me” than the rest other academic year students.

With respect to GARS domain with  $P$ -value 0.003, there is a significant variation in various academic years. Final year

students faced more stress in this domain in comparison to other academic years & the main contributor towards it is “Need to do Well (imposed by others).” (G.M. Koochaki et al). Both Mann-Whitney & Chi-Square were used to find the significant sex variation in the level of stress among students (Graph no 3 and Table 5)

**Graph no 3 Significant sex variation in the level of stress among students using both Mann-Whitney & Chi-Square**



**Table No 5 Chi-Square Test for each Domain Vs Sex**

Domain	Pearson Chi-Square		Likelihood Ratio		Asymp Sig. (2 - sided)	No. of Valid cases
	Value	Df	Value	Df		
ARS	83.071	38	89.031	38	0.00	402
IPRS	60.253	22	61.216	22	0.00	402
TLRS	50.321	20	55.782	20	0.00	402
SRS	33.115	23	40.00	23	0.047	402
DDRS	21.587	10	22.599	10	0.017	402
GARS	33.838	13	37.406	13	0.001	402

According to the Mann-Whitney test rankings, clearly females perceive more stress than male across all domains. There is a less significant variation in the level of stress perceived by the male & female students with respect to SRS & DDRS domains. The remaining four domains showed a high significant variation between male & female students. (Dahlin M et al)

**The major contributing factors for this sex variation are**

**ARS Domain:-** Females perceived “Tests/ examinations” and “Falling behind in reading schedule” as more stress than males.

**IPRS Domain:-** Females perceived that “Poor motivation to learn” is leading to severe stress among them than rest others in comparison to males.

**TLRS Domain:-** “Lack of recognition for work done” and “inappropriate assignments” seems to be the major contributors for stress among the females in comparison to males.

**SRS & DDRS Domains:-** There is a mild significant variation in level of stress among these domains with respect to gender but no major contributing factors had been found.

**GARS Domain:-** A significant gender variation is found in this domain with females perceiving “Participation in Class-discussion” to be more stressful than others in comparison to males.

## CONCLUSION

This study found that Undergraduate medical students experienced moderate to high level of stress. The major contributors for stress were academics, followed by group – activities, teaching & learning and intrapersonal & interpersonal related. According to M. Meenakshisundaram & Dr. Sunil Kumar *et al*, a type of stress (some authors describe it as Good Stress) to some level is beneficial until it has the positive re-enforcement effect. Any type of stress which crosses its threshold limit may lead to detrimental effects both physically & psychologically on the students.

Stress on the academics is essential as it is core & line of the Medical Education Training but not at the cost of high level stress induction. In my opinion moderate level of stress in academics can have a positive re-inforcement effect and anything which crosses this limit may lead to high stress & its consequential impacts on the life of medical students.

## Recommendations

1. An emphasis should be made on the academics & their assessment processes, which can be more friendly to the psychological health of students. This should ensure that the curriculum & the activities set for students fall in their range of coping limits.
2. As the pre-clinical year students perceived more stress on intra & inter personal related stresses, a separate module on personality development should be taught in their initial days of college.
3. As final year students perceived, “Need to do Well (imposed by others)” as a contributor for stress, a teaching capsule on career development can be beneficial.
4. As females perceived more stress than males across all domains, it is recommended to plan a ‘Woman Development Cell’ in the college to cope up this gender variation in levels of stress.

## Limitations

This cross-sectional study was based on self-reported information provided by students. Therefore, there is some potential for reporting bias which may have occurred because of the respondents’ interpretation of the questions or desire to report their emotions in a certain way or simply because of inaccuracies of responses. Another longitudinal study could be carried out with a cohort of students to investigate the levels of stress among students in all the four years of undergraduates.

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