RESEARCH ARTICLE

EFFECT OF GENDER ON SIX DOMAINS OF STRESS IN MEDICAL STUDENTS

**[1]Pushpanathan Punita, [2,]*Kuppusamy Saranya, [3]Chandrasekhar, M.
and [4]Subramanian Senthil Kumar**

[1,3]Department of Physiology, Meenakshi Medical College and Research Institute, Kancheepuram, India
[2]Department of Physiology, Indira Gandhi Medical College and Research Institute, Puducherry, India
[4]Department of Physiology, Pondicherry Institute of Medical Sciences, Puducherry, India

ARTICLE INFO	ABSTRACT
	Background: Medical students are considered to be under more stress than the general population. Stress affects an individual both physiologically and psychologically. Stress is not an objective phenomenon but a subjective phenomenon. Hence, a self-reporting and self-evaluating questionnaire to assess the stress would be an ideal tool to quantify the stress. The Medical Student Stressor Questionnaire (MSSQ) is valid in measuring the stress in medical students. MSSQ categorizes stressors into 6 domains: Academic Related Stressors (ARS), Intrapersonal and Interpersonal Related Stressors (IRS), Teaching and Learning Related Stressors (TLRS), Social Related Stressors (SRS), Drive and Desire Related Stressors (DRS), Group Activities Related Stressors (GARS). **Objective:** To quantify the stressors distinctively under the six domains in the medical students and to elucidate the sex difference in the intensity of stress experienced. **Materials and methods:** The level of stress was assessed using the Medical Student Stress Questionnaire under six domains; academic related stressors (ARS), intrapersonal and interpersonal related stressors (IRS), teachingand learning-related stressors (TLRS), social related stressors (SRS), drive and desirerelated stressors (DRS), and group activities related stressors (GARS). **Results:** Academic stress and teaching learning stress are the two highest stress in the medical students irrespective of sex. Stress of other domains such as intra/inter personal stress, social activity stress, group activity stress and drive and desire stress has also to be addressed in medical students. The level of stress is more in female students than male students in terms of academic stress, intra/interpersonal stress and teaching and learning activity stress. **Conclusion:** More than 97% of medical students are under some kind of stress and the proper action has to be taken to address the issue.

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INTRODUCTION

Stress is not only the body's non-specific response to demand made on it (Selye, 1974) but is also a process by which we cope with the environmental challenges (Snyder and Lefcourt2001). Medical students are considered to be under more stress than the general population (Dyrbye *et al.*, 2006). Stress affects an individual both physiologically and psychologically. Many studies have studied various psychological morbidity such as stress, anxiety, depression, interpersonal problems, and suicidal tendency in Medical

*Corresponding author: Kuppusamy Saranya,
Department of Physiology, Indira Gandhi Medical College and Research Institute, Puducherry, India.

students (Dyrbye *et al.*, 2006; Aktekin *et al.*, 2001; Bayram and Bilgel, 2008; Chandavarkar *et al.*, 2007; Eller *et al.*, 2006; Shah *et al.*, 2010). However, only few studies have tried to assess various types of stressor encountered by the medical students (Firth, 1986; Saipanish, 2003; Dyrbye *et al.*, 2005). The main stay of stress in medical student is considered to be the highly demanding medical curriculum; students have to learn massive amount of new information and have to face exams with little time to review (Yusoff *et al.*, 2013). An optimal level of stress may be necessary for the students to learn (Linn and Zeppa, 1984) and to develop coping abilities (Rizvi *et al.*, 2010). However, stress is not an objective phenomenon but a subjective phenomenon as different people may behave differently in the same environment.

Hence, stress in the medical students cannot be assessed based on the curriculum but how the students respond to the curriculum. Therefore, a self-reporting and self-evaluating questionnaire to assess the stress would be an ideal tool to quantify the stress.

Further, stress experienced by the medical student is because of not only academic stress, but also other factors. Mohammed *et al*. has considered all the stressors that can be experienced by the medical students and categorized them under six domains; academic related stressors (ARS), intrapersonal and interpersonal related stressors (IRS), teaching and learning-related stressors (TLRS), social related stressors (SRS), drive and desire related stressors (DRS), and group activities related stressors (GARS) and has formulated the Medical Student Stress Questionnaire (MSSQ) (Yusoff *et al*., 2010). Most of the studies conducted earlier have assessed the response to acute stress conditions like partial sleep deprivation, during exams, clinical postings, mental or physical exercise. However, there are not many studies that aim to assess the stress in their routine day-to-day activities (Saito *et al*., 2008; Jain *et al*., 2010; Pradhan *et al*., 2014). Therefore, we designed the present study to quantify the stressors distinctively under the six domains in the medical students and to elucidate the sex difference if any, in the intensity of stress experienced.

MATERIALS AND METHODS

Study design

This was an analytical cross sectional study, conducted in the Department of Physiology, Meenakshi Medical College, Kancheepuram, Tamil Nadu, and India. The approval of the Institute Research Council and Institute Ethics Committee for human studies was obtained prior to the commencement of the study.

Subjects

One hundred and fifty medical first year MBBS student volunteers (Male = 72, Female = 78) were included in the study. The participants included students in the age group of 18-24 years. Students on medication, known history of Diabetes mellitus, hypertension, and hormonal disorders were excluded. Written informed consent was obtained from all the subjects prior to the commencement of the study.

Questionnaire

The level of stress was assessed using the Medical Student Stress Questionnaire (15). The MSSQ is reliable, valid and has yielded consistent results in medical students (entering to graduating) and it could be a great device to frame wellness programs including individual interventions for medical students.

This questionnaire classifies the stressors under the following six domains:

- *Academic Related Stressor (ARS)*: Academic related stressors refer to the stress caused by the academic activities such as difficulty in understanding the scientific concepts, mismatch between the huge syllabus and time available to study/revise, examination pattern, unable to perform well in exams and scoring less marks.
- *Interpersonal & Intrapersonal Related Stressor (IRS):* Interpersonal and intrapersonal related stressors refer to the stress due to difficult relationship either with others such as conflict with colleagues, teachers, and staff or with self like lack of self-motivation and poor self esteem..
- *Teaching and Learning Related Stressor (TLRS):* This is related to the stress caused by tasks givenby teachers to students and by the teachers' feedback on their competencies, support given by the teachers and lucidity regarding the learning objectives imparted by teachers to students.
- *Social Related Stressor (SRS):* Social related stressors refer to the stress due to societal and communal relationships such as with family and friends, at work place and dealing with issues pertinent to the patients.
- *Drive & Desire Related Stressor (DRS):* Drive and desire related stressors refer to the various causative factors that influence individual's affect, thought, and behavior leading tostress. In general it relates to instances such as having disinclination towards MBBS course due to varied reasons (not a course of their choice, joined due to parental pressure or by following friends, dejection after joining the course due to confrontation with reality)
- *Group Activities Related Stressor (GARS*): Group activities related stressors refer to any group activities that could cause stress like participating in group discussions, group presentations and to excel in others' expectations.

Questionnaire Procedure

It's a self-reported, self-scoring questionnaire combining 40 items which encompasses all the six domains (ARS, IRS, TLRS, SRS, DRS, and GARS) and the students have to rate the intensity of stress caused by each item on a scale of 0-4 (0 meaning no stress to 4 meaning extreme stress). The raw scores are then used to classify the quantify the stress into mild, moderate, high and severe for each domain; 'Mild' indicates that the stressor domain does not cause any stress or only mild stress, 'Moderate' indicates that the stressor causes reasonable stress however the student is able to handle it, 'High' indicates that stressor causes lot of stress, and the daily activities are mildly compromised, 'Severe' indicates the stress is so severe that the student is emotionally affected and the daily activities are severely compromised.

Statistical analysis

Within the domain analysis of raw scores was done by Friedman ANOVA tests followed by Wilcoxon signed rank test with Bonferroni correction for post hoc analysis. Sex difference of raw domain scores were analyzed using Mann Whitney U test and categorical data was analyzed using Chi-Square test.

RESULTS AND DISCUSSION

A transition from school environment to a professional course has always been a stress to the students (Saipanish, 2003;

Mohd Sidik *et al*., 2003). Linn & Zeppa have stated that some amount of stress in medical school training is essential for learning (Linn and Zeppa, 1984). Thereby, the stress could be called as 'favourable stress' when it promotes learning and 'unfavourable stress' when it suppresses learning. More so, the stress experienced by students is a subjective phenomenon, depending on their cultural background, personal traits, experience, and coping skills.

Previous studies have shown that, medical student have high level stress ranging from 30%to 50%. The level of stress, specifically in medical students can be assessed by the "Medical Students Stressor Questionnaire" which assesses the stress level characteristically under the six domains: academic related stressors (ARS), intrapersonal and interpersonal related stressors (IRS), teaching and learning-related stressors (TLRS), social related stressors (SRS), drive and desire related stressors (DRS), and group activities related stressors (GARS) (Yusoff *et al*., 2010). Studies have revealed that the stressors affecting medical students is mainly related to academic pursuits (Aktekin *et al*., 2001, Saipanish, 2003; Yusoff *et al*., 2010; Guthrie *et al*., 1995; Kaufman *et al*., 1996; Kaufman *et al*., 1998) and the main stressors were examination patterns, time constraint and huge syllabus. A small number of medical students are faced with personal problems, but the effect of this on student psychological morbidity and academic success is unclear (Saipanish, 2003; Dyrbye *et al*., 2005). In our study we have tried to assess the stress explicitly under the six domains of stressors using the MSSQ and not merely the academic stress.

Drive and desire stress was significantly lower than all other stressors. Intrapersonal/interpersonal stress, social activity stress and group activity stress were comparable. First year medical students who perceived academic related stressors as causing high stress have 7 times higher risk to develop distress compared to those who perceived it as causing mild to moderate stress. Those who perceive it as causing severe stress have 16times higher risk to develop distress compare to who perceive as causing mild to moderate stress. Our study is in accordance with other studies that have reported that the major stressors of medical students were academic related.

When we considered the stress domains separately for male and female, we found some interesting differences (Figure 2). Stress based on the social activities, group activities and drive and desire was comparable between the male and female students. However, academic stress, teaching and learning stress, and intra/interpersonal relation stress were significantly more in the female students than male students. Figure 2 shows the categorical distribution of mild, moderate, high, and severe stress levels in various stress domains. Figure 3 shows the percentage distribution of mild, moderate, high, and severe stress levels in various stress domains. We have discussed that academic stress and teaching and learning stress were significantly higher than all other stress based on raw scores alone. However, based on categorical data we can see that number of students in high and severe stress levels were also not negligible in other stressor domains too. Hence, we can safely conclude that the stress in the medical student is not only due to academic stressor and teaching and learning stressor,
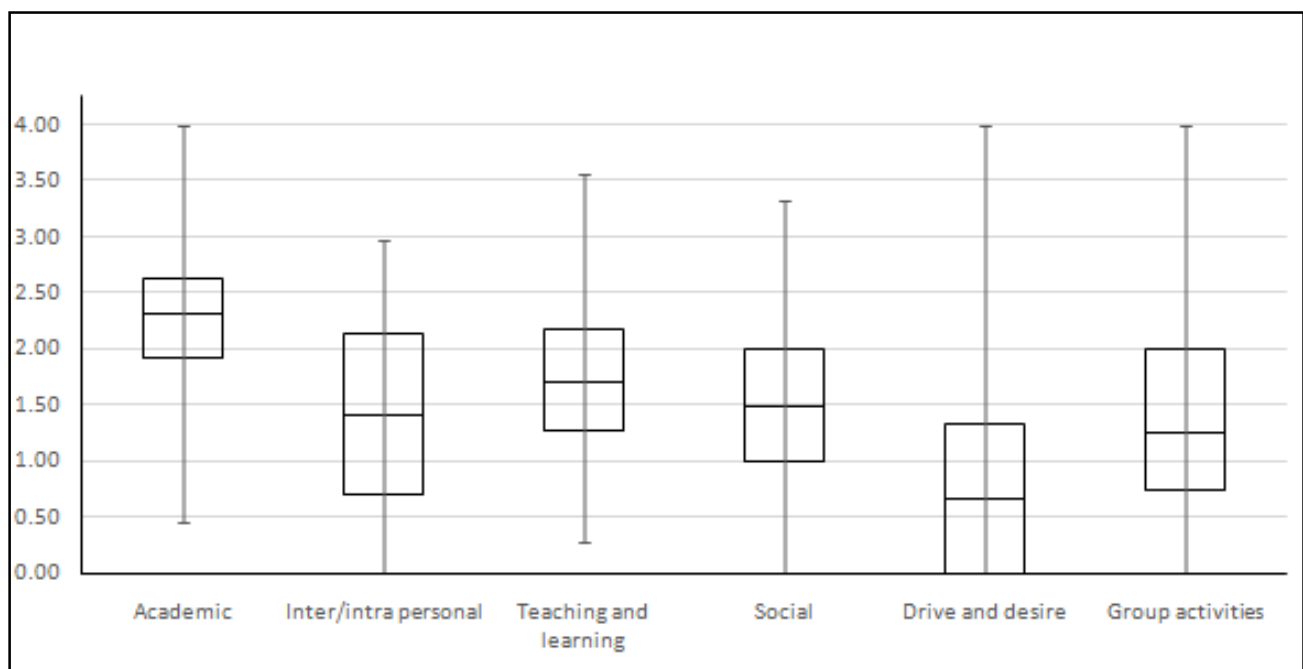
Analysis was done using Friedman ANOVA test and it showed significant difference with p vaule < .001

Figure 1. Level of stress in six domains in Medical students

Figure 1 shows the overall stress levels using raw scores in each domain considering both the sex together. Table 1 shows the posthoc analysis between the six stress domain overall raw scores. We observed that academic stress was significantly higher than all other stress followed by teaching and learning stress.

but other stressors such as intra/interpersonal stress, social activity stress and group activity stress also contribute to the stress in medical students. The main finding of our study is that, there were 27 people under severe stress, taking all the six stress domains collectively. As discussed earlier, stress of severe intensity affects the student emotionally and impairs the

student's ability to carry out their day-to-day activities normally. Hence, those students were personally called and advised to consult their mentor. Out of 27 people under severe stress, 16 were due to academic stress, 4 students were due to drive and desire stress and group stress affected 5 students.

In female students, stress level was in the following order: academic stress, teaching and learning stress and intra/inter personal stress, social activity stress, group activity stress, and drive and desire stress. In male, the order was different: academic stress, social activity stress, teaching and learning

Table 1. Post hoc analysis of overall score

Stressor	Compared with	Obtained P value	Significance based on bonferroni correction
Academic	Intra/interpersonal	.0001	sig
	Teaching and learning	.0001	sig
	Social	.0001	sig
	Drive and desire	.0001	sig
	Group activity	.0001	sig
Intra/interpersonal	Teaching and learning	.0001	sig
	Social	.059	notsig
	Drive and desire	.0001	sig
	Group activity	.950	notsig
Teaching and learning	Social	.002	sig
	Drive and desire	.0001	sig
	Group activity	.0001	sig
Social	Drive and desire	.0001	sig
	Group activity	.040	notsig
Drive and desire	Group activity	.0001	sig

Analysis was done using Wilcoxon signed rank test with Bonferroni correction (p value = .05/14 =0.004) is considered statistically significant.
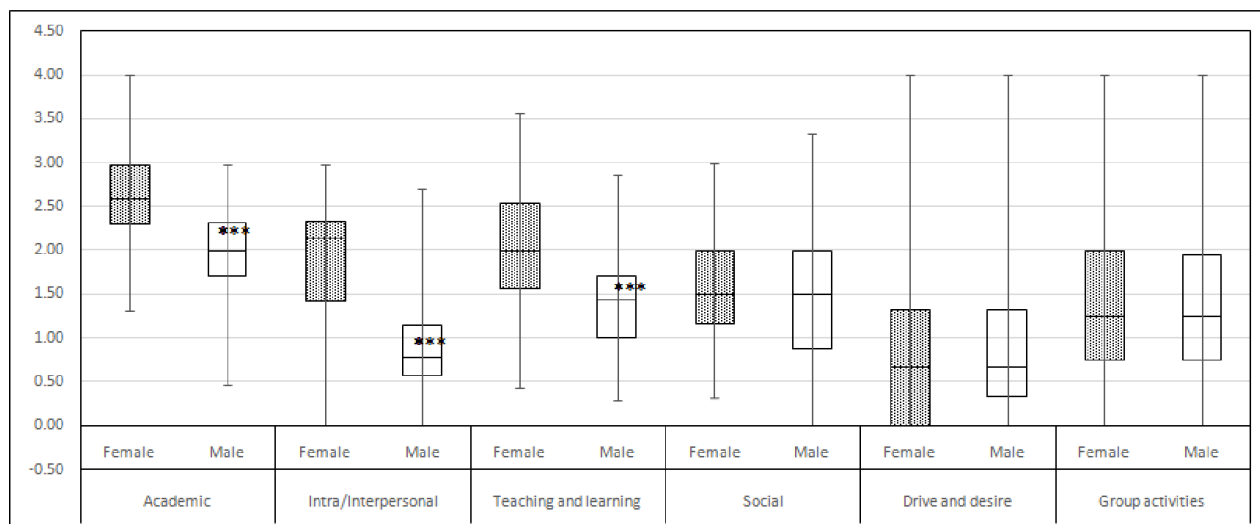
Sex difference analysis was done using Mann-Whitney U test. *p < .05, ** p < .001, *** p < .001

Figure 2.

Further in our study we observed that 97.3% (n=146) of students considered academic activities to be a stress (moderate to severe together). We also noted that all of the students who consider academic stress to be severe were female students (20.7%). In addition, the number of female students experiencing high stress due to academic domain was more than the male students.

Hence, we conclude that overall academic stress is more in medical students; especially female students consider the academic activities to be more stressful than male students. The difference between male and female were even more in intra/interpersonal domain stress and teaching and learning stress. Higher number of female students was in moderate and high level stress as compared to male students in these domains. In male students, more number of students (73%) did not consider intra/interpersonal to be stress.

stress, group activity stress, intra/interpersonal stress and drive and desire stress. We observed that drive and desire domain is the least stress for medical students. 68% of the students did not considered it to be no stress or only mild stress.

Continuous long-term exposure to hostile stressful environments has a negative effect on mental and physical well-being of students (Saipanish , 2003; Yusoff *et al*., 2010; Mohd Sidik *et al*., 2003 Zaid *et al*., 2007 Miller and Surtees , 1991). Studies have shown that such an exposure leads to decreased attention towards academics (Dyrbye *et al*., 2005; Niemi and Vainiomaki, 2006), anxiety, depression (Rosal *et al*., 1997; Shapiro *et al*., 2000), lowered self-esteem (Linn and Zeppa, 1984), sleeping disorders (Niemi and Vainiomäki, 1999), increased alcohol, and drug consumption (Flaherty and Richman, 1993; Newbury-Birch *et al*., 2000; Pickard *et al*., 2000), and suicidal attempts (Hays *et al*., 1996).
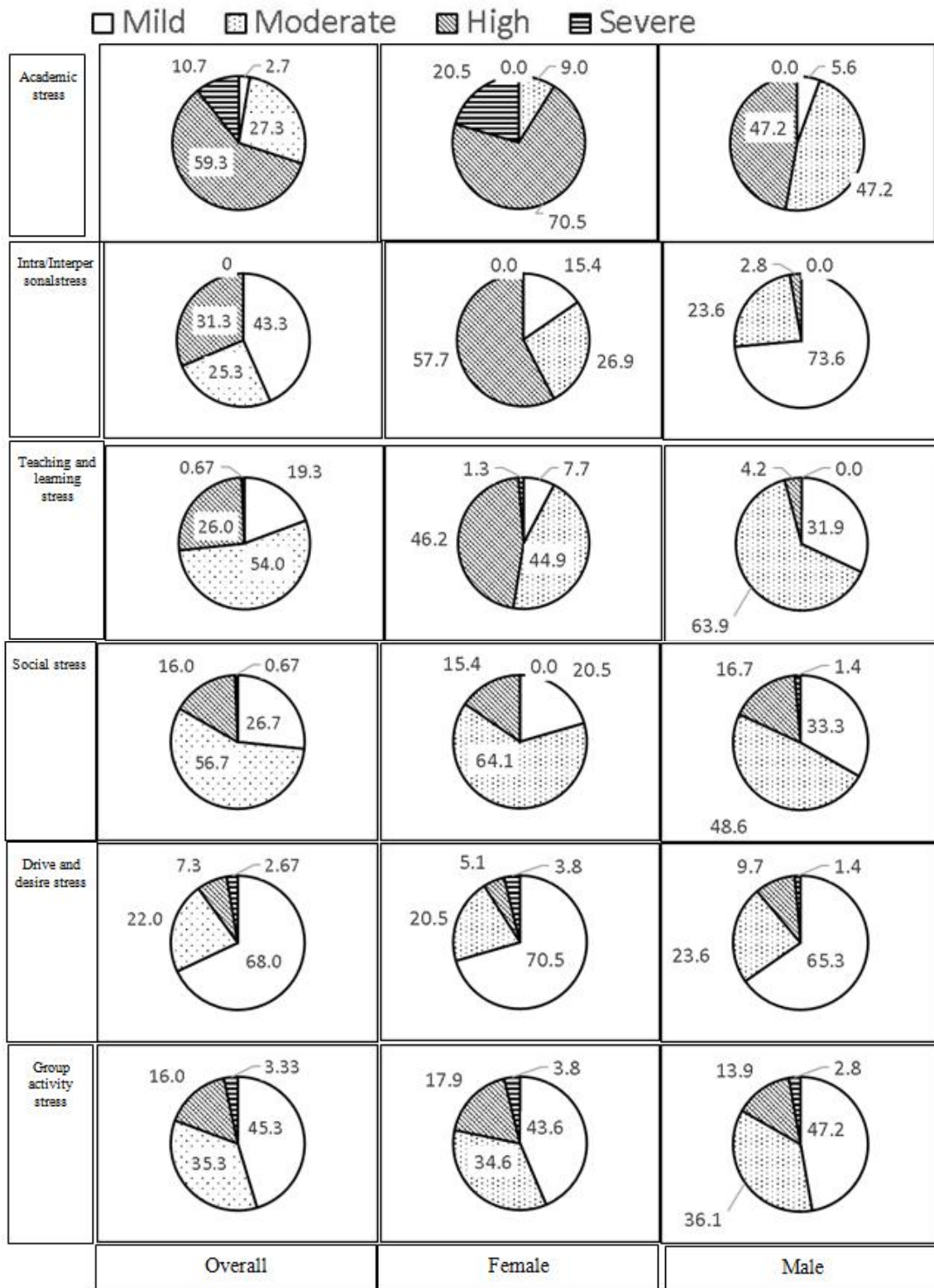
Figure 3. Percentage distribution of level of six domain of stress - sex stratified

Altogether, if the stress level is medical students could not achieve the required skills to become a medical professional (Saipanish, 2003) or even lead a normal life. This emphasizes the importance of early diagnosis and intervention programme that can prevent possible future illnesses among medical students (Aktekin *et al*., 2001; Mohd Sidik *et al*., 2003).

In our study, an attempt has been made to identify the stress level among the medical students and explore the distribution of the intensity of stress among them with respect to sex.

Conclusion

More than 97% of medical students are under some kind of stress and the proper action has to be taken to address the issue.

Table 2. Categorical distribution of stress in various domains

Severity	Overall	Female	Male	P value
Academic stress				
Mild	4	0	4	< .001
Moderate	41	7	34	
High	89	55	34	
Severe	16	16	0	
Intra/interpersonal stress				
Mild	65	12	53	< .001
Moderate	38	21	17	
High	47	45	2	
Severe	0	0	0	
Teaching and learning				
Mild	29	6	23	< .001
Moderate	81	35	46	
High	39	36	3	
Severe	1	1	0	
Social Stress				
Mild	40	16	24	.171
Moderate	85	50	35	
High	24	12	12	
Severe	1	0	1	
Drive and desire				
Mild	102	55	47	.524
Moderate	33	16	17	
High	11	4	7	
Severe	4	3	1	
Group activities				
Mild	68	34	34	.886
Moderate	53	27	26	
High	24	14	10	
Severe	5	3	2	

Sex difference was analyzed using Chi-Square test

Academic stress and teaching learning stress are the two highest stresses in the medical students irrespective of sex. Stress of other domains such as intra/inter personal stress, social activity stress, group activity stress and drive and desire stress has also to be addressed in medical students. The level of stress is more in female students than male students in terms of academic stress, intra/interpersonal stress and teaching and learning activity stress.

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