

Differences In Perceived Stress and Its Correlates Among Students In Professional Courses.

MANE ABHAY B, KRISHNAKUMAR MK, NIRANJAN PAUL C, HIREMATH SHASHIDHAR G

ABSTRACT

Background: Medical education is perceived as being stressful, with negative effects on the mental health of the students. Previous studies have shown relatively high levels of distress among medical students, such as symptoms of depression and suicidal thoughts. Only few studies have tried to explore the stress among medical students, but none have compared it with those among the paramedical and non medical students.

Objective: To explore the differences and the correlates of perceived stress among students in professional courses.

Materials And Method: The data was analyzed from 282 students who were studying different courses, by sampling with a probability proportional to size through an anonymous, self-administered questionnaire which covered socio-demographic data, stressors and a perceived stress scale.

Results: The prevalence of perceived stress by using the PSS scale was found to be 50 % in the study subjects. The mean PSS score was the highest for dental (29.5) and the lowest for pharmacy (23.2) students. The difference in the mean PSS scores among the students of different courses was statistically significant. No statistical difference was noted in perceived stress between the male and female students ($P > 0.05$). The main sources of stress were found to be related to physical and academic factors. The main coping strategies which were adopted were, talking to family members or friends (41.1%), sleeping (16%), watching TV/movies (12.6%) and listening to music. 47.2% students felt a need for professional help during stress.

Conclusion: High levels of perceived stress were found in dental students. The stressors at the campus should be identified, discussed with, and proper coping assistance should be provided to the individual students.

Key Words: Professional students, Perceived Stress Scale, Coping strategies, Psychosocial support.

KEY MESSAGE

- This study adds to the body of knowledge concerning stressors and copying strategies among professional students from India.
- It identified the differences in perceived stress among the students of various courses.
- The coping strategies are known to influence an individuals' experience of stress.
- It has important implications for the administrators and educators in helping their students to overcome stress.

INTRODUCTION

Stress is a complex, dynamic process of interaction between a person and his or her life. It is the way one reacts physically, mentally and emotionally to the various conditions [1]. The stress which is experienced by students may adversely affect their academic achievement, personal well being and long-term professional capabilities. It can lead to mental distress and it can have a negative impact on their cognitive functioning and learning [2]. Like all young adults, undergraduate students need to cope up with the academic and social demands that they may encounter in university studies in their preparation for professional careers. Therefore, the period of undergraduate education is a sensitive period in an individual's life span. The students from professional courses do feel a great amount of pressure in dealing with academic stress and anxiety. This can occur at different time periods during a semester or years in college and during the

transition of the students from an intermediate to a professional academic status. The stress in undergraduate students has many sources, including academics, personal situations, environment, time management, and economic circumstances. Although some stress is expected in college and it can be a motivation to study and learn, too much stress can deter learning [3]. In a study by Janet et al [4], a majority of students said that the stress that they experienced, strengthened their commitment to their professional education and achievement. Many studies have observed that medical students experience a high incidence of personal distress during their undergraduate course [5-7]. Previous studies have shown high levels of stress among students who were studying for professional courses [8-12]. Only few studies have compared the levels of stress among students from different courses, but there are none from India [13, 14, 11].

Several methods have been used to study the stress in college

students. Cohen and colleagues developed the original 14-item English version of the Perceived Stress Scale (PSS-14) as a global measure of stress by asking the respondents to report whether their lives seemed to be unpredictable, uncontrollable or overloaded [15]. It has been shown to be an appropriate measure of stress which is experienced by all age groups and it can be administered in a few minutes [16, 17].

It is important for educators to know the prevalence and the causes of student distress. The most challenging aspect is to measure the potential sources of stress. In the current scenario, stressors like the high cost of professional education, the realization of individual identity, career insecurity and relationship with the faculty members need to be considered. This study aimed to explore the differences and the correlates of perceived stress between the undergraduate students from different courses. We hypothesized that the level of perceived stress among students who were studying for different professional courses was the same.

MATERIAL AND METHODS

Participants

The present study was conducted on a relatively heterogeneous population of students who were studying in different professional colleges like those of medical, dental, nursing, pharmacy, physiotherapy and engineering. Ethical approval was obtained from the institutional ethics committee for this study. Written consent was obtained from all the participants. All the students who participated in the study were informed about the objectives of the study and the information about the Perceived Stress Scale was explained by a well trained postgraduate student to them. All the students were given a guarantee that their personal information would be kept confidential. The data were collected by using a self-administered, standardised, semi-structured questionnaire. The questionnaire collected information on the students' socio-demographic characteristics, the PSS scale, the sources of stress and the coping strategies which were employed.

Sample size

Based on the available data, the required sample was calculated with an allowable error of 10% and 95% confidence limits. Thus, the final sample size was 276 and it was obtained by sampling with the probability proportional to size method (PPS sampling). The sampling frame consisted of all the students who were enrolled for various courses under the Navodaya Education Trust. From each course, the required sample of students was randomly chosen from all the academic years.

Measure of Perceived Stress and Scoring:

The Perceived Stress Scale (PSS) is the most widely used psychological tool for measuring the perception of stress. It is a measure of the degree to which situations in one's life are appraised as stressful. The questions in the PSS asked about the feelings and thoughts of the students during the past month. The scale was used because of its established validity and reliability [18, 19, 14-16]. It had an internal consistency of 0.85 (Cronbach coefficient) and a test-retest reliability during a short retest interval (several days) of 0.85 [20]. The PSS consisted of 14 items (PSS-14) [15], seven positive and seven negative. The negative element was intended to assess the lack of control and the negative affective reactions, while the positive element measured the degree of the

ability to cope with the existing stressors. Each item was rated on a five-point scale from 0 = 'never' to 4 = 'very often', covering the preceding month. The PSS scores are obtained by reversing the responses (e.g., 0 = 4, 1 = 3, 2 = 2, 3 = 1 and 4 = 0) to the four positively stated items (items 4, 5, 7, and 8) and then summing across all the scale items. The scores ranged from 0 to 56, with the higher scores indicating higher levels of perceived stress and the lower scores indicating lower levels of stress.

Data Analysis

The data were entered in Microsoft Excel and were analyzed by using the SPSS version 17.0 statistical software. The levels of stress were compared between the students of various courses by using the ANOVA test for the difference in the mean scores. The Cronbach's alpha and the t-tests were computed. All the statistical tests were two-tailed, and the results were considered as significant at p values which were < 0.05.

RESULTS

Two hundred and eighty six students who were studying for various courses voluntarily completed the survey instruments. 4 students submitted incomplete questionnaires and were excluded from the analysis. Therefore, a total of 282 students formed the basis for all the analyses. The mean age \pm standard deviation (SD) of the study participants was 19.6 ± 1.4 years, with a range of 17-24 years. The summary of the socio-demographic characteristics of the sample are included in [Table/Fig-1]. Out of the 282 students, 128 (45.4%) were male students and 154 (54.6%) were female students. The students who resided in the campus hostel were 70.3 % and those who resided in the hostels outside the campus were 16.6 %, while the remaining 13.1 % were day scholars. All the students belonged to the class I and class II socio-economic status, as per the modified BG Prasad classification. 36.2 % of the students were natives of Karnataka, while the rest belonged to other states. The number of students who participated in the study from various courses, with their gender distribution and mean age in years, is shown in [Table/ Fig-2]. The Cronbach's alpha for the internal consistency of the current sample was 0.86.

The overall mean PSS score in the study population was 26.6, with a SD of 6.5 (95 % CI 25.8-27.3). The mean PSS score was higher (29.5) in the dental students, followed by the medical students (27.0), physiotherapy students (26.6), the engineering students (26.6) and it was lower in the nursing students. The lowest mean PSS score of 23.2 was found in the pharmacy students [Table/ Fig- 3]. The higher score among the dental students indicated that the perceived stress was highest among them as compared to other students. The level of perceived stress was the lowest among the pharmacy students. The findings are shown graphically in [Table/Fig-4]. A highly statistical significant association was observed between the differences in the mean PSS scores among the students who were studying for various courses, as shown in [Table/ Fig-5]. Hence, the null hypothesis was rejected and an alternative hypothesis was accepted, which stated that there was a difference between the levels of perceived stress among the students who were studying for various courses. The mean PSS score \pm SD of 26.2 ± 6.7 of the male students was slightly lower, as compared to the score of 26.9 ± 6.3 of the female students, as shown by the bar diagram in [Table/ Fig-6] and this difference was not statistically significant.

The potential sources of stress which were identified as the most stressful among the students shared a common theme of environmental factors. The overall sources of reported high stress, with the percentages of the students who identified the sources as stressful, are presented in [Table/ Fig-7]. The most frequently reported sources of stress by the students were environmental factors (16.9%), interpersonal relationship problems (13.9%), frequent examinations (12.2%), language barrier (12.1 %), more number of assignments (9.5%), sleeping difficulties (9%) and competition (8.9%). The least reported sources of stress were inadequate hostel facilities (4.4%) and financial problems which included the high cost of education (4.3%). Further analysis showed the differences in the stressors between the students of different courses [Table/ Fig-8]. The other least reported stressors were career insecurity (3.6 %) and concern of professional identity (3.9%). The interpersonal relationship problems included student-parent relationships, student- peer relationships and student-faculty relationships, which was 13.9% together.

By multivariate logistic regression analysis, the predictors for stress were, being a hostelite [OR 2.28, 95% CI 1.12-4.10], more than 4 stressors [OR 5.01 (95% CI 2.54-10.12)], academic-related stressors [OR 3.17 (95% CI 1.52-6.68)] and schooling in a non English medium institution [OR 4.27 (95% CI 2.52-9.16)].

There was a wide variation in the coping strategies which were adopted by the students among the different courses, to alleviate stress [Table/ Fig-9]. But talking to a friend/ friends was the most common coping method which was followed by all the students and it ranked as number one. The next common methods which were followed were sleeping and talking to parents/ relatives / siblings. The least followed method was the use of substances like smoking/alcohol/tobacco that ranked last among all the methods. 60.6 % of the students reported of less eating at the times of stress, 34 % had no change in their eating pattern and only 5.3 % ate more. 71.6 % of the students said that stress affected their daily functioning, but only 47.2 % expressed a need for professional help.

DISCUSSION

The findings of this study demonstrated that there were differences in the way that students from various professional courses perceived stress. The levels of stress varied between the students of different courses. Dental students reported a higher level of perceived stress, which was significantly higher than that in students from other courses. Higher stress in the dental students than in the medical students was also reported by Robert J and et al [21]. They were more likely to cite interpersonal relationships and environmental and academic factors than other students, resulting in high levels of perceived stress. The increased levels of stress among the dental students indicated a decrease in their psychological health, which could impair the students' behaviour, diminish their learning, and, ultimately, affect patient care. A study by Hernandez and et al [22] demonstrated that there were differences in the way that students from various health professions perceived stress. Overall, the prevalence of stress in this study was found to be 50%, by taking a mean PSS score of 26.5 as the cut off between the stressed and the not stressed students, based on the quartiles. The levels of stress among the students which were reported were higher in a Thai study (61.4%) [23], and lower a Malaysian study (41.9%) [20] and a British study (31.2%) [24].

No difference was found in the levels of stress among male and

Variable	NO. (%)
Gender	
Male	128 (45.4)
Female	154 (54.6)
Age	
< 20 years	206 (73.0)
≥ 20 years	76 (27.0)
Residential status	
Outside campus	47 (16.6)
Campus hostel	198 (70.3)
With family	37 (13.1)
Nativity	
Karnataka	102 (36.2)
Andhra Pradesh	40 (14.2)
Other States	140 (49.6)
Socio-economic status (Modified BG Prasad classification)	
Class I	126 (44.6)
Class II	156 (55.4)
Father's Education	
≤ Higher secondary	10 (03.6)
Graduate	138 (48.9)
Postgraduate	134 (47.5)
Mother's Education	
≤ Higher secondary	14 (05.0)
Graduate	165 (58.5)
Postgraduate	103 (36.5)
No. of Stressors	
≤ 4	122 (43.3)
> 4	160 (56.7)

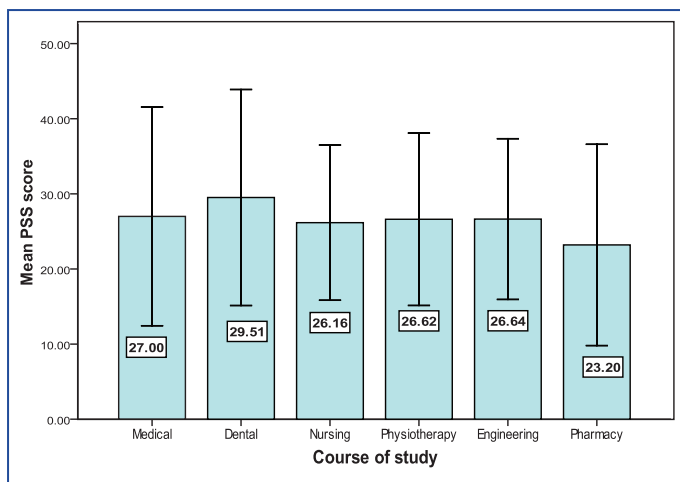
[Table/Fig-1]: Socio-demographic Characteristics of participant students.

Course	N	Male (%)	Female (%)	Mean Age (SD*)
Medical	79	43 (54.4)	36 (45.6)	19.8 (1.5)
Dental	39	6 (15.4)	33 (84.6)	19.4 (1.3)
Nursing	49	12 (24.5)	37 (75.5)	19.3 (1.5)
Physiotherapy	13	4 (30.8)	9 (69.2)	19.9 (0.7)
Engineering	67	42 (62.7)	25 (37.3)	19.0 (1.2)
Pharmacy	35	21 (60)	14 (40)	20.4 (1.5)
TOTAL	282	128(45.4)	154 (54.6)	19.6 (1.4)

[Table/Fig-2]: Distribution of the students by gender and mean age in years. *SD- Standard deviation

Course	N	Mean PSS	SD*	95 % CI†
Medical	79	27.0	7.2	(25.3 - 28.6)
Dental	39	29.5	7.1	(27.1 - 31.8)
Nursing	49	26.1	5.1	(24.6 - 27.6)
Physiotherapy	13	26.6	5.7	(23.1 - 30.0)
Engineering	67	26.6	5.3	(25.3 - 27.9)
Pharmacy	35	23.2	6.6	(20.8 - 25.5)
TOTAL	282	26.6	6.5	(25.8 - 27.3)

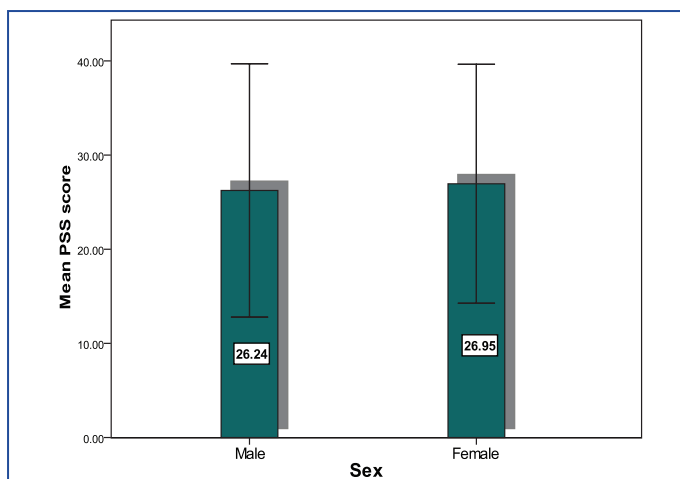
[Table/Fig-3]: Mean PSS scores of the students by course of study. *SD- Standard deviation, †CI- Confidence interval.



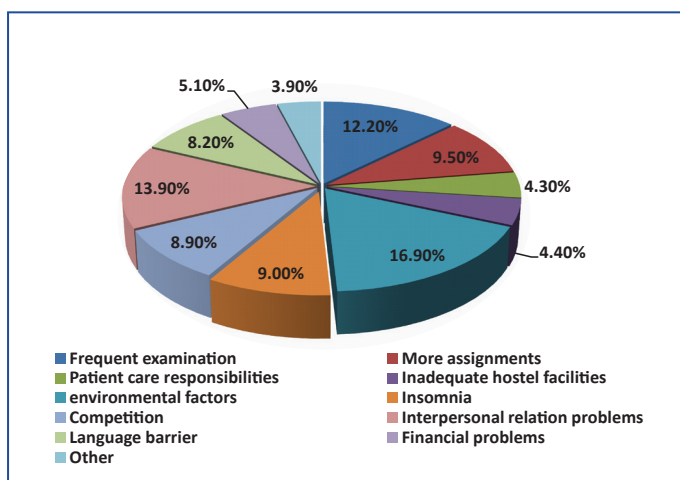
[Table/Fig-4]: Mean PSS scores between students of different courses.

		Sum of Squares	df	Mean Square	F	Sig.
PSS scores	Between groups	757.38	5	151.47	3.33	0.003*
	Within groups	11184.51	276	40.52		
	Total	11941.90	281			

[Table/Fig-5]: ANOVA of the sample PSS scores and course of study. * Significant (P < 0.01)



[Table/Fig-6]: Mean PSS scores between male and female students.



[Table/Fig-7]: Pie chart showing the sources of stress reported by all students.

Questionnaire Item	Medical %	Dental %	Nursing %	Physiotherapy %	Engineering %	Pharmacy %
Academic factors						
Frequent examination	39.0	38.2	49.0	15.4	40.3	22.9
More assignments	22.1	43.6	32.7	23.1	29.0	20.0
Patient care responsibilities	7.8	7.7	16.3	0.0	NA [†]	17.1
Physical factors						
Inadequate hostel facilities	3.4	3.8	2.5	3.2	5.7	2.9
Environmental factors	36.4	56.4	67.3	46.2	35.5	80.0
Insomnia	24.7	28.2	24.5	38.5	38.7	8.6
Social factors						
Interpersonal relation problems‡	44.2	56.4	42.9	53.8	33.9	25.7
Language barrier	14.3	25.6	32.7	46.2	16.1	40.0
Financial problems	7.8	35.9	20.4	7.7	16.1	2.9
Other factors						
Career insecurity	2.1	3.4	4.0	2.8	6.1	1.1
Professional identity	1.9	2.2	1.4	0.8	1.0	0.6
Discrimination	0.1	0.2	0.0	0.2	1.0	0.0
Others§	0.6	0.4	1.2	0.1	0.7	0.3

[Table/Fig-8]: Sources of stress* among students of different courses.

[* multiple response, † NA- not applicable]
 ‡ includes student parent relations, student peer relations and student faculty relations
 § Others- non interest in studies, no recreational facilities, fear of ragging, transport problem.

Questionnaire Item	Medical %	Dental %	Nursing %	Physiotherapy %	Engineering %	Pharmacy %
Talk to friends	56.4	46.2	60.4	61.5	47.5	54.8
Talk to parents/relative	20.5	41.0	31.3	46.2	16.9	3.2
Crying	15.4	38.5	25.0	23.1	18.6	12.9
Sleeping	35.9	33.3	8.3	46.2	32.2	35.5
Yoga/meditation/prayer	15.4	17.9	35.4	0.0	20.3	6.5
Watch TV/ Movie	29.5	12.8	14.6	30.8	27.1	29.0
Play games/sports	14.1	10.3	8.3	23.1	18.6	22.6
Smoking/ alcohol/To-bacco	1.3	0.0	6.3	0.0	3.4	0.0

[Table/Fig-9]: Coping strategies* adopted by students of different courses. [* multiple response]

female students. Similarly, Shah C and et al [25], Supe AN [6] and Mostafa AMR [26] have reported that there was no significant difference in the levels of stress between male and female students. In a study which was done in Pakistan, the mean PSS scores among the female students were found to be significantly higher than that of the male students [27]. The stressors were grouped into 4 causal categories: academic, physical, social and other factors. Differences in the stressors were found between the students of various courses. Besides educational demands, physical factors and social factors were important reasons for the psychological disturbance in our students. The findings also suggested that the participants used different coping methods. As was reported in a recent Indian study [28], the students were found to be using a mixture of coping strategies. The psychosocial support in the form of talking to friends, parents and relatives was the most preferred way of alleviating stress. Similar findings were reported by other studies [29-31]. It is also important to target prevention strategies at the students who have mild or moderate levels of psychological stress in order to prevent the development of more serious conditions. Early identification by using effective psychological services will prevent possible future illnesses. The results of the study were shared with the administration to implement a programme to alleviate stress in students.

Limitations of the study: One of the limitations of this study is that it was a cross-sectional study which was done among students in one campus; hence, caution had to be taken in generalizing the results. The findings of this study are based on the self reported information which was provided by the students and some potential for reporting bias may have occurred, as the ability of the students to understand the questions may have varied.

CONCLUSION

The findings suggested that high levels of perceived stress existed in the professional students during the period of their courses. The students employed mostly positive, but also some negative and lifestyle choices to alleviate stress. It is important for stress intervention programs to be designed to address an effective intervention and the stressors which are specific for college students must be determined. The interventions which have to be implemented in the campus are providing social and psychosocial support, stress reduction and relaxation methods, and individual counselling techniques. We recommend encouraging the college faculty and the staff to work in collaboration with the students to develop and implement the appropriate support services for the students.

REFERENCES

- [1] Gyan M. A study on perceived stress, its impact and the coping strategies. *The International Journal of Interdisciplinary Social Sciences* 2(4): 325-34.
- [2] Dahlin M, Joneborg N, Runeson B. Stress and depression among medical students: a cross-sectional study. *Med Educ* 2005; 39:594-604.
- [3] LeBlanc VR. The effects of acute stress on performance: implications on the health professionals' education. *Acad Med* 2009; 84:25-33.
- [4] Janet. The perceived stressors and the coping strategies among occupational therapy students. *AJOT* 1994; 48(11): 1022-27.
- [5] Hamza MA. Stress and depression among medical students: A cross sectional study at a Medical college in Saudi Arabia. *Pak J Med Sci* 2008; 24 (1): 12-17.
- [6] Supe AN. A study on stress in medical students at the Seth G.S. Medical College. *J Postgrad Med.* 1998; 44(1):1-6.
- [7] Radcliffe C, Lester H. Perceived stress during undergraduate medical training: a qualitative study. *Med Educ.* 2003; 37(1):32-8.
- [8] Sajjan K, Jejurkar K. A study on the stress levels in occupational therapy students during their academic curriculum. *The Indian Journal of Occupational Therapy* 2005; 37(1): 11-14.
- [9] Leisa L, Amy Allison MLS, Diane N, Lanke S. *American Journal of Pharmaceutical Education* 2008; 72 (6): 1-8.
- [10] Beck DL, Hacket MB, Srivastava R, McKim E, Rockwell B. The perceived stress levels and the sources of stress in university professional schools. *J Nurs Educ.* 1997; 36: 180-6.
- [11] Heins M, Fahey SN, Leiden LI. Perceived stress in medical, law and graduate students. *J Med Educ.* 1984; 59: 169-79.
- [12] Pau A, Rowland M, Sudeshni N, Abdulkadir R. Emotional intelligence and perceived stress in dental undergraduates: a multinational survey. *Crit Issues Dent Educ.* 2007; 71: 197-204.
- [13] Helmers KF, Danoff D, Steinert Y, Leyton M, Young SN. Stress and depressed moods in medical students, law students and graduate students at the McGill University. *Acad Med* 1997; 72:708-14.
- [14] Matheny KB, Curlette WL, Aysan F, Herrington A. The coping resources, perceived stress, and life satisfaction among Turkish and American university students. *Int J Stress Management.* 2002; 9:81-97.
- [15] Cohen S, Kamarak T, Mermelstein R: A global measure of perceived stress. *J Health Soc Behav* 1983; 24:385-96.
- [16] Cohen S, Williamson G: Perceived stress in a probability sample of the United States. In *The Social Psychology of Health*. Edited by: Spacapan S, Oskamp S. Newbury Park, CA: Sage; 1988:31-68.
- [17] Leung. Three versions of the Perceived Stress Scale: validation in a sample of Chinese cardiac patients who smoked. *BMC Public Health* 2010; 10:513.
- [18] Morrison R, O'Conner RC. Predicting psychological distress in college students: the role of rumination and stress. *J Clin Psychol.* 2005; 61:447-60.
- [19] Konduri N, Gupchup GV, Borrego M.E, Worley-ouis M. Assessment of the reliability and validity of a stress questionnaire for pharmacy administration graduate students. *College Student. J.* 2006; 40:78-90.
- [20] Sherina MS, Rampal L, Kaneson N. Psychological stress among undergraduate medical students. *Med J Malaysia* 2004; 59:207-11.
- [21] Murphy J, Gray S A, Sterling G, Reeves K, DuCette J. A comparative study of professional student stress. *Journal of Dental Education* 2009; 73 (3): 328-37
- [22] Hernandez MB, Blavo C, Hardigan PC, Perez AM, Hage K .Differences in perceived stress, depression, and medical symptoms among medical, nursing, and physician assistant students: A latent class analysis. *Annals of Behavioral Science and Medical Education* 2010; 16 (1): 35-9.
- [23] Saipanish R. Stress among medical students in a Thai medical school. *Med Teach* 2003; 25(5):502-6.
- [24] Firth J. The levels and sources of stress in medical students. *BMJ* 1986; 292: 1177-80.
- [25] Shah C, Trivedi RS, Diwan J, Dixit R, Anand AK. The common stressors and coping with stress by medical students. *Journal of Clinical and Diagnostic Research.* 2009; 3: 1621-26.
- [26] Amr M, Gilany AH, El- Hawary A. Does gender predict the medical students' stress in Mansoura, Egypt? *Med Educ Online.* 2008; 13:12 [Available from <http://www.med-ed-online.org> downloaded on 12 April 2011].
- [27] Shah M, Hasan S, Malik S, Sreeramareddy CT. Perceived stress, its sources and the severity of stress among medical undergraduates in a Pakistani Medical School. *BMC Medical Education* 2010; 10: 2 [Available at <http://www.biomedcentral.com/1472-6920/10/2> downloaded on 10 April 2011].
- [28] Ramya N, Parthasarathy R. A study on the coping patterns of junior college students. *Indian J Psychol Med* 2009; 3: 45-7.
- [29] Emily A, Pierceall, Marybelle CK. Stress and coping strategies among community college students. *Community College Journal of Research and Practice* 2007; 31(9): 703-12.
- [30] Sreeramareddy CT, Shankar PR, Binu VS, Mukhopadhyay C, Ray B, Menezes RG, et al. Psychological morbidity, sources of stress and coping strategies among undergraduate medical students of Nepal. *BMC Med Educ.* 2007; 7:26.
- [31] Sami AR, Redhwan AA, Mustafa AA, Rampal KG. Stress and the coping strategies of students in a medical faculty in Malaysia. *Malaysian J Med Sci.* 2011; 18(3): 57-64

AUTHOR(S):

1. Dr. Mane Abhay B
2. Dr. Krishnakumar MK
3. Dr. Niranjana Paul C
4. Dr. Hiremath Shashidhar G

PARTICULARS OF CONTRIBUTORS:

1. Corresponding Author
2. Assistant Professor, S.U.T Academy of Medical Sciences, Vencode.P.O, Vattappara. Thiruvananthapuram-695028
3. Professor, Department of Community Medicine Navodaya Medical College, Raichur, Karnataka. 584101
4. Professor and HOD, Department of Community Medicine Navodaya Medical College, Raichur, Karnataka. 584101

NAME, ADDRESS, TELEPHONE, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr Abhay B Mane
Associate Professor, Department of Community Medicine,
Navodaya Medical College & Hospital
Mantralayam Road, Raichur-584103,
Karnataka, INDIA
Email: drabmane@yahoo.co.in

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