Assessment of Stress, Resilience, and Coping Style among Medical Students and Effectiveness of Intervention Programs on Stress Level in South India: A Non-randomized Control Trial

Kumaripalayam Murugesan Priyadharshini, Neethu George, Dharmaraj Rock Britto, Sikkathambur Raveendran Nirmal[1], Muniyapillai Tamilarasan, Karthikeyan Kulothungan

Departments of Community Medicine and [1]Psychiatry, Dhanalakshmi Srinivasan Medical College Hospital, Perambalur, Tamil Nadu, India

Abstract

Background: Uncontrolled stress can be made at ease through resilient emotions and higher coping skills. The study aimed at assessing the level of stress, resilience, and coping among medical students and to study the effect of stress intervention programs on the stress level. **Materials and Methods:** This was a nonrandomized control trial among 526 medical students which used medical student stress questionnaire, and perceive stress scale (PSS), resilience assessment using a 25-item resilience scale, and coping using a modified Pareekh scale. After the completion of the preintervention assessment, the students were assigned nonrandomly into two groups (intervention group *n* = 272 vs. nonintervention group *n* = 254), and the stress intervention programs were done for one group without any programs for the other group. **Results:** The study concluded that 246 (46.8%), 274 (52.1%), and 277 (52.7%) showed higher stress higher resilience and lower coping, respectively. The study showed that, with stress intervention programs, stress levels by PSS got significantly reduced by 2.64 scores. **Conclusions:** The study showed the presence of higher stress and resilience and lower coping among medical students. The inclusion of programs to reduce the stress among students showed a positive result and can be replicated.

Keywords: Coping style, medical students, resilience, stress intervention program, stress

INTRODUCTION

Stress is a disproportion amid your existing coping attitudes, and the potential or load placed on you including demands that you place on yourself. Students are subjected to the heaviness of academics with a compulsion to be successful, a vague future, and problems of incorporating into the system where they face social, emotional, physical, and family problems which may influence their learning capability and academic performance.[1]

The coping mechanism is described as an effort directed to stress management including task-oriented and ego defense mechanisms, the factors that allow an individual to revert to emotional balance after a stressful encounter.[2] Resilience means the ability of the person to bounce back to his/her normal routine work or activities from his/her stress by themselves and includes capacity to make realistic plans, having self-confidence, and a rightful self-image.[3]

Many studies have shown an increasing trend in the stress level among medical students which ranges from 46% to 80%. There are studies which showed that the stress management interventions done on medical students had positive outcomes on several areas related to health including stress.[4-6]

The objectives of the study were to assess the level of stress, coping style, and resilience among students in a private medical college and to evaluate the effect of stress intervention programs on the level of stress.

Address for correspondence: Dr. Neethu George,
Department of Community Medicine, Dhanalakshmi Srinivasan Medical
College Hospital, Perambalur - 621 113, Tamil Nadu, India.
E-mail: neethumampuzha@gmail.com

Access this article online

Quick Response Code:

Website:
www.ijcm.org.in

DOI:
10.4103/ijcm.IJCM_157_21

Materials and Methods

The study was a nonrandomized, control trial done among medical students (students from first to final years – universally included) in a private medical college for a period of 3 months (June–August 2019). Institution Ethics Committee approval and Informed written consent and assent were obtained from each participant and respective guardians before the study. The trial was registered under the clinical trial registry of India (trial no: CTRI/2019/09/021068).

The participant was given a self-administered questionnaire, in which the first two parts were about sociodemographic details and personal details (age, gender, family details, and details of personal activities such as bowel habits, food intake, and mobile usage). Part 3 included a medical student stress questionnaire (MSSQ),[7] which is a 40-item questionnaire to identify the stressors in medical student's life. The mean domain score was categorized as scores of 0.00–1.00 = mild, 1.01–2.00 = moderate, 2.01–3.00 = high, and 3.01–4.00 = severe stress according to MSSQ. Part four was the perceived stress scale (PSS)[8] which is a 10-item questionnaire which includes questions about participants' stressful thoughts or feelings related to situations in their life within the last month. Part five included a resilience scale,[9] which is a 25-item scale with responses from 1 to 7 as a Likert scale. Part six included a coping scale[2,10] which is a 13-item scale which is a modification of 30-item Pareekh scale validated to use in India.

After the completion of the preintervention assessment, the subjects were divided nonrandomly into two groups (One group – stress intervention programs and other group-normal lectures) based on the years (1st–2nd year – intervention group and 3rd–4th years – control group).

The stress intervention program sessions consisted of lectures and details were given in Table 1. Practicals on stress diary were done where each participant has to create a diary about events of stress which experience in the past 1 month, and details are described in Table 1. This stress diary was asked to take up further until the intervention period and adherence level were checked using individual assessors for the groups. Practicals on breathing and stretching exercises were reinforced twice a week through quicker sessions in between the lectures and group messaging through social media. Table 1 shows the program for a single session.

The postintervention assessment with the PSS scale was done after a period of 3–4 weeks after the stress intervention programs for the first group and after 1 month of preintervention assessment for the control group. During postintervention assessment, effort was taken to obtain the responses on an individual basis. The attrition rates were more in the intervention group (272–229, 15.81%) compared to the control group (254–240, 5.51%). The possible reasons included the occurrence of university exams for the years of students in the intervention group and the difficulty to approach the students individually in a limited period. Descriptive Statistics were represented using mean, median, mode, standard deviation (SD), frequencies, and percentages. Inferential statistics was done using appropriate tests. $P < 0.05$ was considered statistically significant. Data were entered in MS Excel sheet and analyzed using SPSS software version 16 (SPSS Inc. Released 2007. SPSS for Windows, Version 16.0. Chicago, SPSS Inc).

Results

The mean (SD) age of the population (526 subjects) was 19.98 (1.35) years. The minimum age was 17 years and the maximum was 30 years. In study, 327 (62.2%) were females and (80%) belonged to the nuclear family.

The mean (SD) total PSS was 21.44 (6.19). The minimum score was 5 and the maximum was 60. The mean (SD) score among males was 20.82 (6.71) and among females was 21.83 (5.84).

The score of 21 was taken as a cutoff based on the median value. The analysis showed that 246 (46.8%) showed higher stress (>21) according to PSS.

Table 1: Stress intervention program session		
Sessions	Contents	Objectives
What is stress? Appearance and its theories Causes of stress and it effects (70 min)	What, Why, When, Where, How and Who-stress	To understand and accept the existence and need of it To assess and identify the cause and effects of stress
Creation of stress diary and group task (90 min)	Recording description of Triggers Stressful events Our reactions Effects Coping response	To Identify the main causes of stress To know how you react to a particular stress To identify the levels of pressure at which you work best To know how can you improve the way you manage stress
Sleep hygiene (30 min)	Importance of sleep Do's and don'ts in sleep hygiene Adherence strategies	To know the importance of sleep in reducing stress and maintenance of sleep hygiene
Stretching exercise (20 min)	Muscle relaxation techniques-upper body, abdomen and lower body	To know the importance of these exercise To acquire the technique of these exercise
Yoga and breathing exercise (30 min)	Asanas and Pranayamas for relaxation	

The association between the different variables and stress using independent *t*-test and one-way ANOVA test showed that subjects who skipped meals and who reported having some financial responsibility and females who reported stressful during menstrual periods had more stress.

The mean (SD) total MSSQ was 55.49 (25.89). Severe stress is mostly in academic-related domain 36 (6.8%) and group activity-related domain 15 (2.9%) according to MSSQ. The association between domains and gender was only significant in group activity domain where most of the females 149 (45.6%) were having moderate stress compared to 76 (38.2%) of males (Chi-square test, table value = 7.08, $P < 0.05$).

The association between type of family and social-related stress domain was significant, where 9 (90%) of those who had severe stress were in the nuclear family (Fischer's exact test, table value = 19.29, $P = 0.006$). The association between type of family and group activity-related stress domain was significant, where 14 (93.3%) of those who had severe stress were in the nuclear family (Fischer's exact test, table value = 13.49, $P = 0.025$).

The mean (SD) of the resilience total score was 121.76 (20.36). The mean score after dividing the whole score by the number of items was 4.87 (0.81). In the study, majority 274 (52.1%) showed a higher resilience compared to the mean value. Table 2 shows that female gender; subjects with salaried mother, and who were interested in extracurricular activities such as dance or music had higher resilience.

The mean (SD) of the total coping score was 36.06 (6.31). The mean score after dividing the whole score by the number of items was 2.77 (0.49). In the study, majority, 277 (52.7%), showed a lower coping compared to the mean value. Table 2 shows that the male gender, who were interested in extracurricular activities such as dance or sports and those who had any parent as a doctor, had a high mean coping score. The correlation (Pearson) between PSS with resilience, MSSQ, and the coping score showed that the PSS stress score showed a weak negative correlation with resilience ($r=−0.21$, $P = 0.004$) and coping score ($r=−0.2$, $P = 0.003$). Furthermore, the correlation showed a moderate positive correlation with the MSSQ stress score ($r=−0.44$, $P = <0.001$). Table 3 shows that, with the stress intervention programs, stress levels reduced in the intervention group and are statistically significant.

The loss to follow-up during poststress is more in the intervention group (272–229, 15.81%) compared to no intervention group (254–240, 5.51%).

Discussion

Based on the median 21, 246 (46.8%) showed higher stress according to PSS. There are some other reported studies with the overall proportion of stressed students ranging between 30% and 70%.[11,12] The mean perceived stress score of another study was 25.64 ± 5.44 with a median of 26.[1] The mean PSS score in a study conducted in Mangalore was 27.53 ± 7.01.[13]

Table 2: Association between resilience and coping and variables

Categories	<4.87	>4.87	*P*
Resilience categories			
Gender (%)			
Female	146 (44.6)	181 (55.4)	0.04*
Male	106 (53.3)	93 (46.7)	
Occupation of mother (%)			
Home maker	147 (51.9)	136 (48.1)	0.01**
Salaried	79 (41.4)	112 (58.6)	
Extracurricular activities (%)			
No activity	49 (59)	34 (41)	0.04*
Dance	30 (36.1)	53 (63.9)	
Music	39 (44.8)	48 (55.2)	
Bowel habits (%)			
Irregular	24 (64.9)	13 (35.1)	0.04*
Categories	**<2.77**	**≥2.77**	***P***
Gender (%)			
Female	190 (58.1)	137 (41.9)	0.01*
Male	87 (43.7)	112 (56.3)	
Any parent doctor (%)			
Yes	20 (39.2)	31 (60.8)	0.03*
Extracurricular activities (%)			
No activity	50 (60.2)	33 (39.8)	0.03*
Dance	40 (48.2)	43 (51.8)	
Sports	85 (45.9)	100 (54.1)	

*Chi-square test, **Fischer's exact test. Significant *P*<0.05

Table 3: Comparison between the two groups pre- and post-stress scores

Groups	Pre-PSS score	Post-PSS score	*P*
With stress intervention programmes (*n*=229)	21.78 (6.36)	19.14 (4.03)	<0.001*
Without stress intervention programmes (*n*=240)	20.99 (6.13)	24.08 (4.05)	<0.001*

*Paired *t*-test. Significant *P*<0.05. PSS: Perceive stress scale

Our study showed a decreased mean stress score (21.44) may be due to the presence of proficient extracurricular activities or biased information caused by lazy responses. In our study, females were having higher stress compared to males (166 [50.8%] vs. 80 [40.2%]). Males reported higher stress can be justified based on the inability of men to disclose the events to others or lack of convenient stress busters. In our study, severe stress is mostly in academic-related domain 36 (6.8%) and group activity-related domain 15 (2.9%). This severity of stress in academic-related issues was common in other studies.[11,12]

The higher resilience among students may be due to better subjective well-being and increased skill to moderate negative life events, which is supported by many other studies.[14] The mean score of resilience is similar to other studies.[2,15] The higher resilience among women may be due to the attitude of

females to disperse their feelings either to a fellow being or through defense mechanisms.

The medical students used to adapt to different coping ways in different times based on situations, and problems faced and thus coalesced to lower coping, which is also reflected in the study.[2] The mean coping score was similar to other studies.[4,15] Higher coping among male medical students can be justified with the fact that men employ more dysfunctional coping strategies such as substance abuse than women. An external support and involvement in extracurricular activities may divert their energy focus into different combat zones.

Studies have shown that the student intervention program including breathing exercises and relaxation methods such as yoga and meditation reduced distress symptoms and created awareness about stress, its effect, and management.[5,6] The reduction of stress level through the programs can be due to the improvement in psychological well-being, improved awareness regarding handling stress, and diversion of the energy generated to other activities/exercises.

As the academic stressors were perceived more, re-evaluation of academics and examination schedules and patterns, better communication with the faculty and proper guidance, intervention programs, and counseling for the stressed ones, introduction of mentors and peer-based counseling may help a lot to reduce stress in medical students. Inclusion of more problem-based assessment extracurricular activities in a productive way and its sustainment can also improve resilience and coping, thereby reduce stress. There should be programs in the current medical curriculum with a push to divert the stressors and incorporate adequate stress bouncers. Resilience and coping skills should be developed to face problems both emotionally and tactfully which matures them gracefully when they peel off the student coat. The policies should be made to extend or include more stress relieving programs as fillers in curriculum.

The limitation of the study was as follows; first, as the groups were not selected randomly leading to a bias that would have distorted the results. Furthermore, unequal participation from each level of the year and self-administered questionnaire pose some limitation. The chance of contamination bias and nonassessment of prior psychiatric illness were limitation.

CONCLUSIONS

The study concluded that medical students were experiencing higher stress and resilience and lower coping. The involvement in extracurricular activities and persistent financial support also showed significant positive findings. Stress intervention program showed a reduction in the stress after a short follow-up period.

Financial support and sponsorship

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Anuradha R, Dutta R, Raja JD, Sivaprakasam P, Patil AB. Stress and stressors among medical undergraduate students: A cross-sectional study in a private medical college in Tamil Nadu. Indian J Community Med 2017;42:222-5.
2. Kolpakwar S, Faye A. Study of mechanisms of coping, resilience and quality of life in medical undergraduates. Indian J Soc Psychiatry 2015;31:19-28.
3. Linzer M, Visser MR, Oort FJ, Smets EM, McMurray JE, de Haes HC. Predicting and preventing physician burnout: Results from the United States and the Netherlands. Am J Med 2001;111:170-5.
4. Chowdhury R, Mukherjee A, Mitra K, Naskar S, Karmakar P, Lahiri S. Perceived psychological stress among undergraduate medical students: Role of academic factors. Indian J Public Health 2017;61:55.
5. Erogul M, Singer G, McIntyre T, Stefanov DG. Abridged mindfulness intervention to support wellness in first-year medical students. Teach Learn Med 2014;26:350-6.
6. Prasad L, Varrey A, Sisti G. Medical Students' Stress Levels and Sense of Well Being after Six Weeks of Yoga and Meditation. Evid Based Complement Alternat Med. 2016;2016:9251849. Available from: https://www.hindawi.com/journals/ecam/2016/9251849/. [Last accessed on 2020 Apr 04].
7. Bahri Yusoff MS, Abdul Rahim AF. The Medical Student Stressor Questionnaire (MSSQ) Manual. Medical Education Department, School of Medical Sciences, Kelantan, Malaysia: Universiti Sains Malaysia; 2010. https://www.researchgate.net/publication/200640404_The_Medical_Student_Stressor_Questionnaire_MSSQ_Manual. [Last accessed on 2019 Oct 29].
8. Cohen S, Kamarck T, Mermelstein R. Global measure of perceived stress. Health Soc Behav 1983;24:385-96.
9. Wagnild GM, Young HM. Development and psychometric evaluation of the resilience scale. J Nurs Meas 1993;1:165-78.
10. Parikh RM, Quadros T, D'Mello M, Aguiar R, Jain RK. Mechanisms of coping and psychopathology following Latur earthquake: The profile study. Bombay Psychiatr Bull 1993;5:7-18.
11. Gade S, Chari S, Gupta M. Perceived stress among medical students: To identify its sources and coping strategies. Arch Med Heal Sci 2014;2:80..
12. Supe AN. A study of stress in medical students at Seth G.S. Medical College. J Postgrad Med. 1998;44:1-6. Available from: http://www.ncbi.nlm.nih.gov/pubmed/10703558. [Last accessed on 2019 Oct 30].
13. Brahmbhatt KR, P Nadheera , S Prasanna K, S Jayram. Perceived stress and sources of stress among medical undergraduates in a private medical college in Mangalore, India. Int J of Biomed & Adv Res [Internet]. 2013;4:128-36.Available from https://ssjournals.com/index.php/ijbar/article/view/278 [Last accessed on 2021 Mar 25].
14. Zhao F, Guo Y, Suhonen R, Leino-Kilpi H. Subjective well-being and its association with peer caring and resilience among nursing vs medical students: A questionnaire study. Nurse Educ Today 2016;37:108-13.
15. Faye A, Tadke R, Gawande S, Kirpekar V, Bhave S, Pakhare A. Assessment of resilience and coping in undergraduate medical students: A need of the day. J Educ Technol Health Sci 2018;5:36-44.