

## ORIGINAL ARTICLE

# Prevalence of Stress, and Its Impact on Academic Performance Among Undergraduate Medical Students in University of Cyberjaya

Afifah Hamdan<sup>1</sup>, Kabilan Thiagajaran<sup>1</sup>, Ashtar Roslee<sup>1</sup>, Nur Ain Mahat<sup>1</sup>

<sup>1</sup> Faculty of Medicine, University of Cyberjaya, Persiaran Bestari, Cyber 11, 63000 Cyberjaya, Selangor, Malaysia

## ABSTRACT

**Introduction:** Chronic stress among medical students affects academic performance. Among the most established source of stress is academic-related stressors, such as exams. This study aimed to evaluate the prevalence of stress level, relationship between stress levels and academic performances among medical students at University of Cyberjaya. **Methods:** A cross-sectional online survey was conducted on 216 targeted respondents based on single proportion formula for sample size calculation. Data were collected using self-administered questionnaire to obtain respondents demographic and evaluate stress level using Perceived Stress Scale Questionnaire (PSS-10) and Medical Stress Questionnaire (MSSQ). Data were analysed using IBM SPSS Statistics for Windows, Version 23.0 and Spearman correlation analysis was used to determine the association between stress level and academic performance. **Results:** Of 216 targeted respondents, 197 (91%) responded, with majority (73.6%) aged 22 years and above. The majority of students (87%) felt stress within six months, having mild stress level (45.2%), moderate stress levels (40.1%), severe stress (8.1%) and low stress level (6.6%). Academic-related was found to be the most prevalent stressor (Score 2.43, SD 0.728). The relationship between perceived stress level and GPA showed a significant correlation at ( $r = -0.95$ ,  $p < 0.01$ ) indicating the higher the stress level, the lower the academic performance. **Conclusion:** The prevalence of stress among medical students of UOC was high, and the higher stress level was significantly correlated with lower academic performance.

**Keywords:** Stress, Medical student, Stressor, Academic performances, MSSQ, PSS-10

## Corresponding Author:

Nur Ain Mahat, PhD  
Email: ain@cyberjaya.edu.my  
Tel: +603-83137144

## INTRODUCTION

Stress is a non-specific reaction to the body requests or upsetting environmental activities. There are many factors trigger stress which known as "stressor". Past study revealed six types stressors namely academics stressors, interpersonal stressors, teaching and learning stressors, social stressors, drive and desire stressors and group activity stressors (1). Among the six stressor; highest prevalence was an academic related stressors (2).

Although some stress levels are accepted in medical school and may encourage certain people, not all students can handle or treat stress. A study was done

in Singapore to assess the personality-performance relationship between medical students suggested that some stress is required for medical school learning. Facilitated-learning stress is known as 'favourable stress,' while stress that inhibits learning is considered 'unfavourable stress.'(3). Academic excellence is one of the most critical aspects of higher education for students and it can be seen from their mean grade point average (GPA). Stress is one aspect that negatively influences the mastery of the curriculum (4).

Therefore, the aim of this study is to determine the prevalence of stress among medical student and relationship between stresses on the academic performance among MBBS students at the University of Cyberjaya. The findings of this study can contribute to a better understanding of the cause and effect of their stress and academic performance.

## MATERIALS AND METHODS

### Subjects

The study design conducted for this research was a cross-sectional study, where the target population consists of the medical students that enrolled in the MBBS program at the University of Cyberjaya during the academic year of 2020-2021. It is to be noted that the population is a multiracial and international community with students of various ethnicity. Exclusion criteria is student who's having a previous primary diagnosis of depression or having any mental illness.

Sampling size was calculated based on a single proportion formula. The formula to calculate sample size was  $n = \left(\frac{Z}{m}\right)^2 \times P(1 - P)$ . The highest population proportion, which was 52.4%, therefore:  $n = \left(\frac{1.96}{0.07}\right)^2 \times 0.524(1-0.524) = 196$ . Therefore the maximum sample size, including the 10% of non-responders, was 216.

For this study, stratified random sampling based on the mentor-mentee group from all of MBBS students in UOC had been applied to determine the respondents. The approval and ethical clearance from the Faculty of Medicine (UOC) was attained upon commencement of the study. [Reference No: UOC/CRERC/ER/243].

### Study instruments

Data were collected using a self-administered questionnaire that divided into three parts. The first part asked information about demographic information such as age, gender, ethnicity, religion and year of academic study.

The second part of questionnaire was used to measure the perceived of stress level among medical students using Perceived Stress Scale (PSS) by Cohen S et al (5). Initially, PSS has been established as a 10-item scale that evaluates the interpretation of negative encounters by asking the respondent to rate the magnitude of their emotions and thoughts in connection with events and circumstances in the past month. Five of the ten elements of PSS-10 are regarded as negative and are thought to be impaired and self-effective. The five-point Likert-type scale (0 = never to 4 = very often) was used for every element. The total scores are determined after the positive scores are reversed, and all scores are added together. Total PSS-10 values are between 0 and 20. A higher score shows more pressure.

The third part of the questionnaire was the Medical Student Stressors Questionnaire, adapted from the previous research study conducted by Muhammad SBY et al (2010). The MSSQ is validated and had

a good reliability based on previous study to assess the cause of stressor and level of stress (6). The possible cause of stress among medical students was listed as 40 items in the MSSQ. The stressors were divided into six major areas i.e .academic related stressor, inter/intrapersonal related stressor, teaching, and learning related stressor, social related stressor, drive and desire related stressor, and group activities related stressor. Based on the final score of MSSQ, the level of stress for each medical student stressors will be finally determined as Mild Stressor (indicates that it does not cause any stress. Even if it does cause stress, it just causes mild stress); Moderate Stressor (Indicates that it does reasonably causes stress and can be managed well); High Stressor: (indicates that it does cause much stress. It leads to emotional disturbance, and daily activities are mildly compromised); Severe Stressor: (indicates that it does cause severe stress. It leads to severe emotional disorder, and daily activities are severely compromised). The scale is from score 0 to 4 where 0 will indicated that the stressor does not causes any stress at all, while 4 if the stressor will cause severe stress.

From previous study, it was noted that the reliability of Perceived stress scale – 10 and the MSSQ coefficients ranging from 0.78 to 0.95 while 0.64 to 0.92 respectively (5, 6).

### Data collection method

After ethical approval and permission by UOC management was obtained, the questionnaires were distributed via WhatsApp application and e-mails to all respondents. The data was collected from the months of February 2021 until March 2021. The respondents answered the questionnaires through Google Forms and they need to complete the questionnaires and submitted on the same day. The confidentiality of the personal and other information of the respondent was ensured and not shared to others and strictly used for the study purpose only.

The self-administered questionnaire comprised of three parts. The first part comprised of questions on demographic profile. The second part of the questionnaire focused on measurement of perceived stress level using Perceived Stress Scale (PSS). The third part of the questionnaire refers to questions on Medical Student Stressors Questionnaire, adapted from the previous study as mentioned before.

### Data analysis and interpretation

Data have been analysed using IBM SPSS Statistics Window, Version 23 of the Statistical Package for Social Sciences (SPSS) software. All information has been entered, verified, explored and cleaned for data input errors. Data is interpreted with p value

less than 0.05 is considered statistically significant and a confidence interval is set at 95%. Descriptive statistics were employed to analyse demographic data, the student's prevalence stress level based on PSS-10 and MSSQ questionnaires. Correlations between the CGPA and PSS variables have been analysed to identify the links, if any. The analysis was conducted using a Spearman Coefficient Correlation, a non-parametric correlation technique, since variable values were found to be ordinal values.

## RESULTS

### Sociodemographic description of medical students in UOC

A total of 197 out of 216 medical students participated in the study providing a response rate of 91%. The majority of respondents were female (69%) aged between 22-25 years old (73.6%). The majority of respondents were from Malay ethnic (68%), followed by Indian (17.8%) and Chinese (8.6%), and with most of them were Muslims (73.1%). Based on the year of academic study, participation from the fourth-year medical student was the highest (32.3%) followed by first-year (22.6%), second-year (17.9%), fifth-year (14.9%), and the lowest from the third year (12.3%) The majority of students (87%) felt stress within six months (Table I).

### Descriptive statistic of academic performances (GPA) based on year of study

GPA of every respondents were classified by the year of study which further divided into below average (GPA < 3.0), average (GPA<3.5) and above average (GPA>3.5). Based on academic performances, (GPA>3.5) was highest in fourth-year medical students (55.6%) and lowest among first-year medical students (23.2%). For (GPA<3.5), it was highest among fifth-year students (44.8%). (GPA<3.0) was highest among first-year medical students (46.7%) and lowest among fifth-year students (13.8%) (Figure 1). P value is 0.017 and there is significant association between year of study and academic performances.

### Prevalence of stress based on Perceived Stress Scale

Based on PSS-10 questionnaires to assess the perceived stress level among medical students, majority had high stress level. Most of the students had a high stress level at (48.7%) (Figure 2). In addition, summed-up the score of items in the PSS 10 Questionnaire was surprisingly high, about 21.86, from the maximum score of 40, denoting that a majority of students felt stress. When we observed into more detail in every item, among the highest mean item for PSS were students felt nervous and stressed (Score 2.56, SD 0.927), felt upset because of something that happens unexpectedly (Score 2.42, SD 0.815), and felt incapable of controlling essential things in life (Score 2.20, SD 1.015)

### Prevalence of medical student stressor using MSSQ

MSSQ was used to determine the causes of stressors. Result shown that prevalence of stressors among medical students was highest in academic-related stressors (Score 2.43, SD 0.73) and group-related activities (Score 2.23, SD 0.88). The least medical student stressor is on social-related stressor (Score 1.88, SD 0.73), and drive-and-desire-related stressor (Score 1.50, SD 1.01) (Table II).

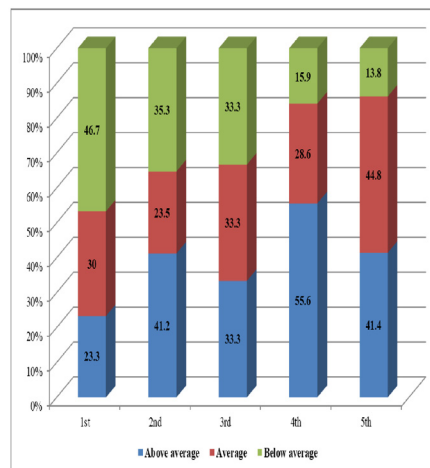


Figure 1 : GPA of medical undergraduate UOC students based on year of study

GPA of every respondents were classified by the year of study which further divided into below average (GPA < 3.0), average (GPA<3.5) and above average (GPA>3.5). There is association between both variables ( $p=0.017$ ) with chi square value is 18.617.

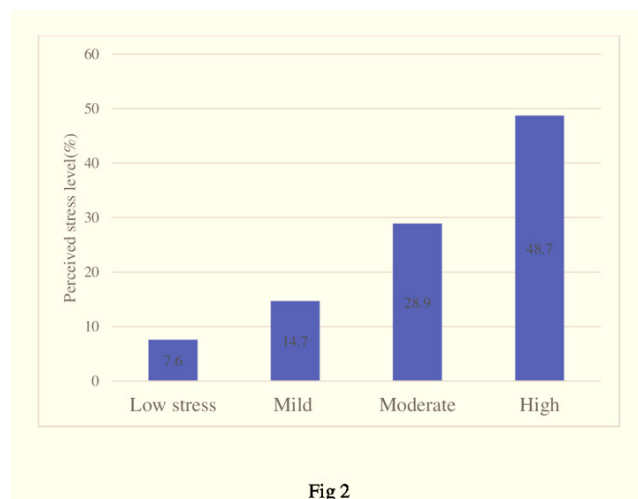


Fig 2

Figure 2 : Stress level based on PSS 10 questionnaires by the year of study among medical undergraduate students in UOC

Stress level were categorized to low, mild, moderate and high level of stress from the score obtained from answering PSS-10 questionnaires and compared by each year of study.

### Prevalence of stress level based on MSSQ

Based on MSSQ, the prevalence of stress level among medical students in UOC showed majority of them were having mild stress level (45.2%) followed by moderate stress levels (40.1%) then the severe stress level (8.1%) and finally low stress level (6.6%)

**Table I : ( Sociodemographic)**

Variable <sup>1</sup>	Category	Frequency (n)	Percentage (%)	Total n (%)
Age	17 - 21	50	25.4	50 (100)
	22-25	145	73.6	145(100)
	>25	2	1.0	2 (100)
Gender	Male	61	31	61 (100)
	Female	136	69	136 (100)
Ethnicity	Malay	134	68	134 (100)
	Chinese	17	8.6	17 (100)
	Indian	35	17.8	35 (100)
	Others	11	5.6	11 (100)
Religion	Muslim	144	73.1	144 (100)
	Christian	11	5.6	11 (100)
	Buddhist	12	6.1	12 (100)
	Hindu	29	14.7	29 (100)
	Others	1	0.5	1(100)
Year of Academic Study	First	44	22.6	44 (100)
	Second	35	17.9	35 (100)
	Third	24	12.3	24(100)
	Fourth	63	32.3	63(100)
	Fifth	29	14.9	29(100)
Feeling depressed within 6 months	Yes	171	87.0	171(100)
	No	26	13.0	26(100)

<sup>1</sup>The majority of respondents were female (69%) aged between 22-25 (73.6%). In addition, the majority of respondents were from Malay ethnicity (68%), followed by Indian (17.8%) and Chinese (8.6%), with most of them were Muslims (73.1%). Based on the year of academic study, participation from the fourth-year medical student was the highest (32.3%) followed by first-year (22.6%), second-year (17.9%), fifth-year (14.9%), and the lowest from the third year (12.3%) The majority of students (87%) felt stress within six months.

**Table II : (Mean of Medical Students Stressor)**

Medical Students Stressor	Mean	Std. deviation
Academic Related Stressor (ARS)	2.43 <sup>1</sup>	0.73
Intrapersonal and interpersonal related stressor (IRS)	1.98	0.87
Teaching and learning related stressor (TLRS)	1.94	0.78
Social Related stressor (SRS)	1.88	0.73
Drive and desire related stressor (DRS)	1.50	1.01
Group activities related stressor (GARS)	2.23	0.88

<sup>1</sup>Prevalence of stressors among medical students was highest in academic-related stressors (Score 2.43, SD 0.728)

**Table III : (Correlation between PSS level & GPA)**

Variable	GPA	
	Spearman Coefficient of Correlation ( <i>r</i> )	p-value
Perceived stress level	-0.95	0.006 <sup>1</sup>

\*significant 0.01

<sup>1</sup>The correlation analyses' summary statistics are presented in Table 2 and are discussed as follows, which showed that CGPA is negatively but correlated with PSS ( $r = -0.95$ ;  $p < 0.01$ ). To an extent, increases in perceived stress levels are associated with decreases in GPA value and vice versa

### Correlation between GPA and perceived stress level

Correlations between the GPA and PSS variables have been analysed to determine the relationship. The analysis was conducted using a Spearman Coefficient of Correlation, a non-parametric correlation technique, since data in ordinal values. The correlation analyses summary statistics are presented in Table III showed that GPA is negatively correlated with PSS ( $r = -0.95$ ;  $p < 0.01$ ). Increases in perceived stress levels are associated with decreases in GPA value and vice versa.

### DISCUSSION

From the current study it was shown that the majority of students (87%) felt stress within six months and the total average PSS score was 21.86 (SD = 9.77), which can be translated that most of the students scored more than the average score. This result showed higher prevalence of stress compared to research conducted among medical students of Universiti Malaysia Sabah by Musiun et al. In their study, the research finding showed the prevalence of stress among medical students was recorded only at 33.3% (7).

The stress level reported in the current study among the final year medical students was considerably high. About 62.1% had scores higher than average, indicating they experienced a great level of stress. This might be due to the pressure that final year students need to undergo to succeed in the medical undergraduates studies. In addition, this was in accordance with other research findings that had been done globally, showed that the stress prevalence is also the highest among the final year medical students from the research findings in Thailand, which involved medical students in the Faculty of Medicine, Ramathibodi Hospital, Thailand in the year 2013 (8).

Shah M et al (2010) suggested in their research findings that all students experienced learning difficulties as a significant source of stress. The test or examination was the most common cause of academic tension. This result was significantly greater compared to the PSS general population in the same

age range of other undergraduate students of different professions (9). While these results worry us, the high level of stress between UOC students may be due to them being in the transition phase and having a final semester examination in around two to three months.

Among the stress triggers explored based on Medical Stress Stressor Questionnaire, as expected, the most prevalent stressor was related to academic matters such as tests, examinations and insufficient skills in medical practice. Academic stressors were also regarded as triggering moderate to high stress among UOC medical students, which in parallel with studies carried out in MSU where the academic stressor put students in high stress (10). This was similar to a survey among medical students of public and private universities in Bangladesh, which revealed exams and tests as the commonest stressor (11).

In this current analysis, the prevalence of medical students' stressors was highest in academic-related stressors (Score 2.43, SD 0.728). This is in strong alignment with the study carried out to assess Thai medical students' prevalence and stress factors. They found that the four top stressors were exams, time pressures, too much material to study and getting behind in work. The other three daily stressors were contradictory requests, and tasks that were not completed on schedule, and high workload (12).

In another previous study done in India; with a total of 686 participating students; it revealed that about 61.4% of the students were stressful. Students considered academic issues as a major source of tension. Test and examination were the most common cause of academic stress (13). Moreover, academic stressor remains a major stress contributor. This was concurrent with another study in Medical College Kolkata, India, where the reason behind it was a miscommunication between students and lecturers, which most medical institutes were facing (14).

In our recent study among medical students of UOC, their PSS stress level is negative, but correlated with GPA ( $r = -0.95$ ;  $p < 0.001$ ). This may be due certain students struggling hard and lagging behind due to stressful factors, while others consider stress

a motivation to work harder (12). Moreover, our findings consistent with the study done in Allama Iqbal Medical College in Lahore Pakistan where also showed  $p < 0.001$  as the researcher applied Spearman's correlation method in determining relationship with stress level and academic performance where the author concluded that the higher the stress level the lower the academic performances and vice versa (9). The previous study was done in Universiti Kebangsaan Malaysia on the year 2014 which involved the fourth-year medical students, also showed a similar pattern where students who had a higher level of stress achieved a poor academic result. The author highlighted that the reason might be due to stress that these students become less motivated and coping style is low despite the resourceful era nowadays (15).

## CONCLUSION

Our study concluded that the stress prevalence among medical undergraduate students of UOC is high, which most of them had moderate to high levels of stress. Academic-related issues were the primary stressors. When the stress level is high, academic performance was being affected. Further research is required to evaluate the effect of medical training on stress. Incorporating stress reduction strategies could be implemented in the medical curriculum as the coping method in the future. However, this analysis has its own intrinsic limitations as a cross-sectional research. This study thus produces just a snapshot of the hardships as a whole. The limited coverage cannot research the adverse effect of stress on medical students.

## ACKNOWLEDGEMENT

This work is supported by Faculty Medicine of University Cyberjaya and passionate research supervisor profoundly and sincerely, Dr. Nur Ain Mahat.

## REFERENCES

1. Behere SP, Yadav R, Behere PB. A comparative study of stress among students of medicine, engineering, and nursing. *Indian J Psychol Med.* 2011; 33(2):145–148.
2. Firth J. Levels and sources of stress in medical students. *Br Med J* 1986;292:1177-80
3. Abdul Ghani HM, AlKanhal AA, Mahmoud ES, Ponnampereuma GG, Alfaris EA Stress and its effects on medical students: a cross-sectional study at a college of medicine in Saudi Arabia. *J Health Popul Nutr.* 2011 : 29(5):516-22
4. Stewart SM, Lam TH, Betson CL, Wong CM, Wong AM. A prospective analysis of stress and academic performance in the first two years of medical school. *Med Educ* 2014; 33:243-250
5. Cohen, S., Kamarck, T, Mermelstein, R. A global measure of perceived stress. *Journal of Health and Social Behavior*, 1983; 24, 385-396.
6. Muhamad SBY, Ahmad FAR and Yaacob M.J. The development and validity of the Medical Student Stressor Questionnaire (MSSQ), *ASEAN Journal of Psychiatry*, Jan-June 2010; 11 (1)
7. Musiun A, AL Khamisah, Jeffree MS, Robinson F et al. Prevalence of stress and its associated factors among medical students in Sabah, Malaysia Borneo. *Malaysian Journal of Public Health Medicine.* 2019: 19. 116-125. 10.37268/mjphm/vol.19/no.2/art.179.
8. Saipanish, Ratana. Stress among students in a Thai medical school. *Medical teacher.* 2013: 25. 502-6.
9. Shah M., Hasan S., Malik S. et al. Perceived Stress, Sources and Severity of Stress among medical undergraduates in a Pakistani Medical School. *BMC Med Educ* 10, 2(2010). <https://doi.org/10.1186/1472-6920-10-2>
10. Al-Dubai S, Al-Naggar R , Alshagga M , Rampal KG Gopal. Stress and Coping Strategies of Students in a Medical Faculty in Malaysia. *Malaysian J Med Sci.* 2011: 18(3) : 57-64.
11. Eva, E.O., Islam, M.Z., Mosaddek, A.S.M. et al. Prevalence of stress among medical students: a comparative study between public and private medical schools in Bangladesh. *BMC Res Notes* 8, 327 (2015). <https://doi.org/10.1186/s13104-015-1295>
12. Pitanupong, J. Stress and coping strategies among Thai medical students in a southern medical school. *Siriraj Medical Journal*, 2020: 72(3), 238-244. <https://doi.org/10.33192/smj.2020.32>
13. Anuradha R, Dutta R, Raja J D, 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
14. Iqbal S, Gupta S, Venkatarao E. Stress, anxiety and depression among medical undergraduate students and their socio-demographic correlates. *Indian J Med Res.* 2015 Mar;141(3):354-7. doi: 10.4103/0971-5916.156571. PMID: 25963497; PMCID:PMC4442334.
15. Harlina H Siraj , Salam A , Roslan R, Hasan NA , Jin TH , Othman MN . Stress and Its Association with the Academic Performance of Undergraduate Fourth Year Medical Students at Universiti Kebangsaan Malaysia. *IIUM Medical Journal Malaysia*, 2014: 13(1).