Prevalence of stress, and its impact on academic performance among undergraduate medical students in University of Cyberjaya.

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ABSTRACT

Introduction: Chronic stress among medical students affects academic performance. The most prevalent source of stress is academic-related stressors, such as exams. This study aimed to explore the relationship between stress levels and academic performances among medical students at University of Cyberjaya. Materials and Methods: A cross-sectional online survey was conducted on a sample of 216 targeted respondents. Data were collected using the Perceived Stress Scale Questionnaire (PSS-10) and Medical Stress Questionnaire (MSSQ). Data were analysed using SPSS version 23.0. Correlation analysis and Chi-square were applied to determine the association between stress level and academic performance. Results: Of 216 targeted respondents, 197 (91%) responded, with most (73.6%) aged 22 years and above. Majority of students (87%) felt stress within six months. 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 p<0.05, indicating the higher the stress level, the lower the academic performance. Conclusion: The prevalence of stress among medical students of UOC is high, and the majority had mild to moderate stress. Awareness creation is recommended.

Keywords: stress, medical student, stressor, academic performances,
MSSQ

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 studies revealed that there are six types of stressors [1] among medical students and the highest prevalence is academic related stressor. In short, stress involves internal distress or stress-related changes [2]. Although some stress levels are accepted in medical school and may encourage certain people, not all students can handle or treat stress. In Singapore, the research was done. The study assessed the personality-performance relationship between medical students which suggests 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.’ Although some stress levels are accepted in medical school and may encourage certain people, not all students can handle or treat stress. While there were still some students in the millennium field where education is open to everyone, several surveys have established student success internal and external influences [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 (GPA). While there were still some students in the millennium field where education is open to everyone, several surveys have established student success internal and external influences. Stress is one aspect that negatively influences the mastery of the curriculum [4].

The focus of this is to explore the matter of stress within the medical student population, including its prevalence, causes of stress, and the impact of stress on the academic performance among MBBS students at the University of Cyberjaya, which could help give them a deeper understanding of the cause and effect of their stress, which could improve the coping stress
This study is conducted among medical students UOC. The findings of this study provide a deeper understanding of the cause and effect of the medical student’s stress, determine correlation between stress levels and academic performance thus, could improve the coping of stress methods among the medical students.

MATERIALS AND METHODS

Samples

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. The sample size was calculated based on one proportion formula yielded. Sampling size was calculated based on a single proportion formula.

Formula to calculate sample size \( n = \left( \frac{Z}{m} \right)^2 \times P(1-P) \). The maximum sample size, including the 10% of non-responders, is 216.

We will use the highest population proportion, which is 52.4%, therefore:

\[
 n = \left( \frac{1.96}{0.07} \right)^2 \times 0.524(1 - 0.524) = 196
\]

The maximum sample size, including the 10% of non-responders, is 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.
Study instruments

Data were collected using a validated questionnaire comprised of a self-administered questionnaire divided into three parts. The first part asked information about demographic information.

The second part was the application of the questionnaire to measure the prevalence of stress among medical students. Stress was described in this study and calculated with the Perceived Stress Scale (PSS) which the author is Sheldon Cohen. 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 is applying the Medical Student Stressors Questionnaire, adapted from the previous research study conducted in University Sains Malaysia which the authors are Muhammad Saiful Bahri Yusoff in year 2010, therefore validity and reliability had been tested [7]. The previous study had demonstrated reliability of Perceived stress scale – 10 and the MSSQ coefficients ranging from 0.78 to 0.95 while 0.64 to 0.92 respectively [7]. The possible cause of stress among medical students was listed as 40 items in the MSSQ. The stressors were divided into six major areas: Academic related stressor, Inter/Intrapersonal Related Stressor, Teaching, and Learning Related Stressor, Social Related Stressor, Drive &
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: This 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.

Data collection method

Data were collected using a validated questionnaire comprised of a self-administered questionnaire divided into three parts. The first part asked information about demographic information. The second part was the application of the questionnaire to measure the prevalence of stress among medical students. Stress was described in this study and calculated with the Perceived Stress Scale (PSS). 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 is applying the Medical Student Stressors Questionnaire, adapted from the previous study. In this analysis, validity and reliability were checked where
stressors among medical students would be determined. The possible cause of stress among medical students was listed as 40 items in the MSSQ. The stressors were divided into six major areas: Academic related stressor, Inter/Intrapersonal Related Stressor, Teaching, and Learning Related Stressor, Social Related Stressor, Drive & 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: This 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.

Two months after the beginning of the academic session, data were collected from this study; however, the final year students took part in a transition to complete their final pro-examination. We choose this time to prevent a stressful exam cycle that could lead to a calculation distortion. We, therefore, argued that the calculated amount reflects medical students’ normal stress levels.

The data collection method is by giving questionnaires (self-administered questionnaires) via an online survey, which will provide informed consent and be distributed to the medical students via email through permission by UOC management after an ethical approval. The questionnaires were conducted through the application of Google Forms and emailed based on the year of study to different respondents selected from a different batch of MBBS students of UOC.
The respondents will be assured of the anonymity and confidentiality of collected information. The purpose of the study will be explained in the Google Form to the respondents. All the respondents have the choice of whether or not they want to take part in this study.

The tools to measure the stress in our research are the questionnaires of PSS -10 (Perceived Stress Scale -10) and the Medical Students Stressor Questionnaire (MSSQ), which we adopt from a previous research study by Universiti Sains Malaysia in the year 2010. Therefore, validity and reliability had been tested. The previous study demonstrated the reliability of Perceived Stress Scale -10 (PSS) and MSSQ coefficients ranging from 0.78 to 0.95 while it was 0.64 to 0.92.

It took about 10 minutes to complete the questionnaire, and they must be submitted on the same day.

**Data analysis and interpretation**

Data have been analysed using IBM SPSS Statistics Window, Version 23 of the Statistical Package for Social Sciences (SPSS). 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 (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 1).

Table 1 (Sociodemographic)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>Frequency (n)</th>
<th>Percentage (%)</th>
<th>Total n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>17 - 21</td>
<td>50</td>
<td>25.4</td>
<td>50 (100)</td>
</tr>
<tr>
<td></td>
<td>22-25</td>
<td>145</td>
<td>73.6</td>
<td>145(100)</td>
</tr>
<tr>
<td></td>
<td>&gt;25</td>
<td>2</td>
<td>1.0</td>
<td>2 (100)</td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>61</td>
<td>31</td>
<td>61 (100)</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>136</td>
<td>69</td>
<td>136 (100)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>Malay</td>
<td>134</td>
<td>68</td>
<td>134 (100)</td>
</tr>
<tr>
<td></td>
<td>Chinese</td>
<td>17</td>
<td>8.6</td>
<td>17 (100)</td>
</tr>
<tr>
<td></td>
<td>Indian</td>
<td>35</td>
<td>17.8</td>
<td>35 (100)</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>11</td>
<td>5.6</td>
<td>11 (100)</td>
</tr>
<tr>
<td>Religion</td>
<td>Muslim</td>
<td>144</td>
<td>73.1</td>
<td>144 (100)</td>
</tr>
<tr>
<td></td>
<td>Christian</td>
<td>11</td>
<td>5.6</td>
<td>11 (100)</td>
</tr>
<tr>
<td></td>
<td>Buddhist</td>
<td>12</td>
<td>6.1</td>
<td>12 (100)</td>
</tr>
<tr>
<td></td>
<td>Hindu</td>
<td>29</td>
<td>14.7</td>
<td>29 (100)</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>1</td>
<td>0.5</td>
<td>1(100)</td>
</tr>
</tbody>
</table>

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

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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.

<table>
<thead>
<tr>
<th>Year of Academic Study</th>
<th>Second</th>
<th>Third</th>
<th>Fourth</th>
<th>Fifth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>35</td>
<td>24</td>
<td>63</td>
<td>29</td>
</tr>
<tr>
<td>Feeling depressed within 6 months</td>
<td>17.9</td>
<td>12.3</td>
<td>32.3</td>
<td>14.9</td>
</tr>
<tr>
<td>Yes</td>
<td>171</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>26</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.
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.

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)

![Graph showing stress level based on PSS 10 questionnaires by the year of study among medical undergraduate students in UOC.](image)

**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 medical student stressor**

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 2).
Table 2.0 *(Mean of Medical Students Stressor)*

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

**Correlation between GPA and perceived stress level**

Correlations between the CGPA and PSS variables have been analysed to determine the relationship. The analysis was conducted using a Spearman Coefficient of Correlation, a parametric correlation technique, since variable values were found to be normally distributed.

The correlation analyses’ summary statistics are presented in Table 3 showed that CGPA 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.

Table 3.0 *(Correlation between PSS level & GPA)*

<table>
<thead>
<tr>
<th>Variable</th>
<th>GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived stress level</td>
<td>-0.95</td>
</tr>
</tbody>
</table>

*significant 0.01
Prevalence of stress level based on MSSQ

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

DISCUSSION

The majority of students (87%) felt stress within the last six months. Based on our study, the average PSS score was 21.86 (SD = 9.77), which translated that most of the students scored more than the average score were (70%) students had higher perceived stress for the past six months. This is in comparable with other research conducted among medical students of Universiti Malaysia Sabah, where the research finding from showed the prevalence of stress among medical students was recorded at 33.3% [5]. The stress level reported in the current study among the final year medical students was considerably high. About 62.1% had scores much 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 [6]. In addition, this, 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 [7]. The author suggested in the 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 [8]. 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 [9]. This was similar to a survey among medical students of public and private universities, which revealed exams and tests as the commonest stressor [10]. 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 [11]. A total of 686 participating students engaged in the previous study done in India. Results reveal that about 61.4% of the students were stressful. A high degree of stress was recorded by seventeen students (2.4%). Students considered academic issues as a major source of tension. Test and examination were the most common cause of academic stress [12]. Moreover, academic stressor remains a major stress contributor. This 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 [12].

In our recent study among medical students of UOC, their PSS stress level is negative, but lowly correlated with GPA (r = -0.170; p < 0.001). This may be due certain students struggling
hard and lagging behind due to stressful factors, while others consider stress as a motivation to work harder [13]. 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 [14]. 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 [6].

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.

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