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The perception of stress and coping styles toward stress among medical students

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ABSTRACT

Introduction: Mental health problems are considered one of the common causes of disability in young people between the ages of 15 to 44 years. Studying medicine is well established to be not easy, as medical students are subjected to greater academic and professional stress for a longer duration compared to the general population. *Objective:* Our study aims to assess the primary coping styles and their association with the levels of perceived stress among medical students. *Methods:* It is a cross-sectional study, conducted via a self-administered online questionnaire on 341 medical students at the International Medical University in Malaysia. Perceived stress levels were assessed by the Perceived Stress Scale questionnaire while the primary coping styles were determined by the Coping Orientation to Problems Experienced Inventory. *Results:* The emotion-focused coping style exhibited 17.99% increased utilization from low to high perceived stress levels. The avoidant focused coping style exhibited 38.80% increased utilization from low to high perceived stress levels. *Conclusion:* Emotion and avoidant focused coping styles are associated with higher perceived stress levels.

Keywords: Stress, Perception, Coping, Medical Students.

1. INTRODUCTION

Mental health disorders affect about three out of ten persons between the ages of 15 to 44 years old (Wahed and Hassan, 2017). Severe mental health illnesses cause the patient to die 20 years earlier than expected for the normal population, because of preventable and debilitating physical health conditions (Volkov, 2022). An individual's general well-being and adaptive capacity are greatly dependent on his or her psychosocial health (Ahmed et al., 2009). There has been rising acknowledgment of the importance of mental health in reaching international development goals, as highlighted by the presence of mental health wellness in the Supportable Development Goals (Volkov, 2022). The incidence of psychological distress, broadly referring to stress, anxiety, depression and other mental health disorders in medical students ranges from 21% to 56% (Yusoff et al., 2013). Studying medicine is well-established to be difficult, as medical students are subjected to greater academic and

professional stress for a longer duration compared to the general population (Ahmed et al., 2009; Villacura et al., 2017). The medicine program has even been identified as causing the greatest stress levels in its students compared to other undergraduate programs, especially in adapting first-year medical students (Villacura et al., 2017). In addition, medical students are also subjected to the psychosocial stress experienced in the transitory period from adolescence to adulthood, which can be the main stressful period in one's lifetime (Wahed and Hassan, 2017; Basheer et al., 2022).

Excessive and chronic psychosocial stress can eventually cause one to feel incompetent, fearful, guilty or angry at oneself (Erschens et al., 2016). These negative stress and emotions can significantly decrease one's self-worth, attention, concentration and cognitive processing, with studies proposing anxiety to include memory difficulties in its symptoms (Yusoff et al., 2013; Erschens et al., 2016; Nunes et al., 2018). Excessive stress also predisposes students to many other disorders as a way of coping with stress. Students may conduct academic dishonesty to get through university assessments, develop sleeping disorders or worse alcohol and drug abuse as forms of escapism (Yusoff et al., 2013). Our research aims to evaluate the levels of perceived stress and its association with the primary coping styles among medical students in Malaysia.

2. METHODOLOGY

Study Design

This is a self-administered online questionnaire applying a cross-sectional study.

Setting

The study will be conducted at the International Medical University (IMU) in Malaysia, a multi-racial country in Southeast Asia. There are an estimated 5000 students from year 1 to year 5 medical students in IMU as of 2021. Our study was done from October 2021 to January 2022.

Sampling Method

The snowballing sampling method will be utilized to disseminate the questionnaire to as many medical students as possible in IMU for 3 months. The online referral process allows the questionnaire to reach target populations that may be difficult to sample via physical survey dissemination methods.

Study Size

The study size is calculated to be 330 participants by using Andrew Fisher's formula with a confidence limit of 95%, z-score of 1.96 and standard deviation of 0.5.

Socio-demographic Variables

Including age, gender, ethnicity and year in medical school

Perceived Stress Scale (PSS)

PSS is a ten particulars questionnaire that assesses the extent to which participants consider life situations as stressful. Each item assesses how much the situation is not predictable, not under control and overloaded participants find their lives. It inquires the participants about how frequently they felt or thought in certain ways in the last month. The rate of each item is 5 points answer scale from 0 for "never" to 4 for "very often". The total score of the 4 positively stated particulars which are particulars 4, 5, 7 and 8 are calculated in a reverse way for example (0 equal 4, 1 equal 3, 2 equal 2 and 4 equal 0). These scores are then added to the scores of the six negatively stated items which are items 1, 2, 3, 6, 9 and 10. The total PSS score can range from a minimum of Zero to a maximum of 40, low stress is considered from the range of 0 – 13, moderate stress is from the range of 14 -26 and high stress is from the range of 27 – 40. The higher scores represent higher perceived stress levels.

Coping Orientation to Problems Experienced Inventory (COPE)

COPE is a 28-item questionnaire that assesses the coping styles and behaviors an individual utilizes to manage stressful situations in life. Each item represents a behavior associated with one of the three coping styles in this study:

Problem-concentrated managing: Particulars 2, 7, 10, 12, 14, 17, 23, 25

Emotion- concentrated managing: Particulars 5, 9, 13, 15, 18, 20-22, 24, 26- 28

Avoidant concentrated managing: Particulars 1, 3, 4, 6, 8, 11, 16, 19

Each item is answered with a score that indicates the degree to which the participant has been engaging with the coping behavior. One means never done, 2 means a little bit, 3 means a medium amount and 4 means have been doing this many times. The usage of each coping style is represented by an average score. The average score is calculated by adding up the scores of relevant items divided by the total number of relevant items. Additionally, item scores can be utilized to represent the 14 facets of coping behaviors below:

Problem-focused as active Coping: Particulars 2 & 7; use of Informational Support: Particulars 10 & 23; positive Reframing: Particulars 12 & 17 and planning: Items 14 & 25.

Emotion-focused as emotional Support: Particulars 5 & 15; venting: Particulars 9 & 21; humour: Particulars 18 & 28; acceptance: Particulars 20 & 24; religion: Particulars 22 & 27; self-blame: Particulars 13 & 26.

Avoidant as self-distraction: Particulars 1 & 19; denial: Particulars 3 & 8; substance use: Particulars 4 & 11 and behavioral Disengagement: Particulars 6 & 16.

Individual examination of the coping facets can indicate an individual's adaptive and maladaptive managing strategies.

Data Collection

Survey data will be collected online from October 2021 to January 2022. A study size of at least 385 unique survey responses is targeted for the survey data analysis. The questionnaire will be disseminated to year 1 to year 5 medical students in IMU. The respondent's participation in the survey will be voluntary. An information sheet will be included on the first page to ensure the participants thoroughly understand the study objectives and risks. The respondent's participation consent will be collected via a compulsory checkbox question before progressing through the remainder of the questionnaire.

Statistical Methods

Survey data collected via the questionnaire will first be extracted and organized in Microsoft Excel where invalid responses will be removed from the study. The survey data is then analyzed in the Statistical Software Package for the Social Sciences (SPSS) where the data will undergo descriptive and inferential statistics as described below.

Perceived Stress

The prevalence (%) of perceived stress among medical students will be calculated for each category of stress: Low, moderate and high stress. Descriptive statistics will be utilized to describe the total PSS score according to the different socio-demographic variables which are gender, age, ethnicity and year in medical school. T-tests will be utilized to assess the significance of different socio-demographic variables on the perceived stress levels among IMU students.

Coping Behaviors

The usage (%) of the three primary coping styles among medical students: Problem-focused, emotion-focused or avoidant coping will be calculated for each category of stress. The mean PSS score will be calculated for each primary coping style. T-tests will be utilized to assess the significance of primary coping styles on the perceived stress levels among IMU students. The usage (%) of 14 coping facets will be calculated for each category of stress. A 95% confidence interval (CI) will be utilized and a p-value of less than 0.05 will be considered statistically significant in the survey data analysis.

3. RESULTS

Demographic Characteristics

A total of 341 participants in the study which is composed of 38.4% people aged 21 years or less and 61.6% people aged 22 years or more. Females' participants were 61.3% with males 38.7%. 57.2% of participants were Chinese, 18.8% were Indian, 15.0% were Malay and 9.1% were categorized as "Others". The fourth-year medical students represent 30.8% of participants, the third-year medical students at 22%, fifth-year medical students at 16.7%, first-year medical students at 15.8% and second-year medical students at 14.7% (Figure 1).

Perceived Stress Scale (PSS)

Of 341 medical students, 266 (78%) were categorized as having moderate perceived stress levels. 44 (12.9%) were categorized as having high perceived stress levels while there were 31 (9.1%) categorized as having low perceived stress levels (Figure 2). The statistical analysis of each coping behavior is listed in Table 1.

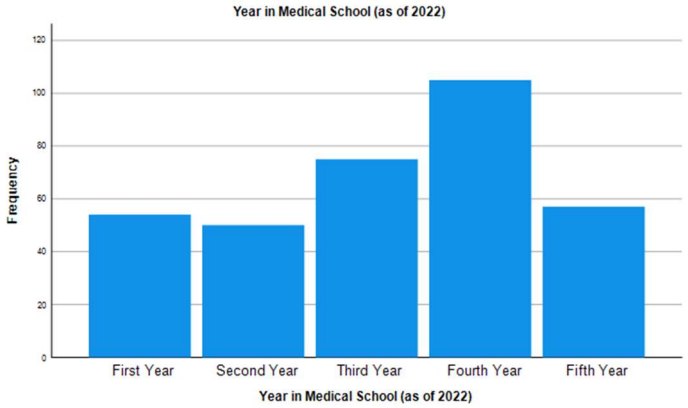

Figure 1 The frequency of medical students in each academic year in medical school

Table 1 Statistical analysis of each coping behavior

	Active coping	Positive reframing	Planning	Emotional Support	Venting
N Valid Missing	341	341	341	341	341
	-	-	-	-	-
Mean	5.79	5.68	5.88	5.16	4.53
Median	6.00	6.00	6.00	5.00	4.00
Mode	6	6	6	6	4
Std. Deviation	1.419	1.564	1.454	1.638	1.464
Variance	2.014	2.448	2.114	2.685	2.144
Range	6	6	6	6	6
Minimum	2	2	2	2	2
Maximum	8	8	8	8	8

	Humour	Acceptance	Religion	Self -blame	Self -distraction
N Valid	341	341	341	341	341
Missing	-	-	-	-	-
Mean	4.56	6.06	4.76	4.70	5.56
Median	4.00	6.00	4.00	5.00	6.00
Mode	2	6	2	4	6
Std. Deviation	1.913	1.525	2.112	1.755	1.400
Variance	3.659	2.326	4.460	3.080	1.959
Range	6	6	6	6	6
Minimum	2	2	2	2	2
Maximum	8	8	8	8	8

	Denial	Use of Substance	Behavioural disengagement	Use of informational support
N Valid	341	341	341	341
Missing	-	-	-	-
Mean	3.23	2.61	3.54	5.23
Median	3.00	2.00	3.00	5.00
Mode	2	2	2	4
Std. Deviation	1.527	1.301	1.615	1.733
Variance	2.333	1.692	2.608	3.002
Range	6	6	6	6

Minimum	2	2	2	2
Maximum	8	8	8	8

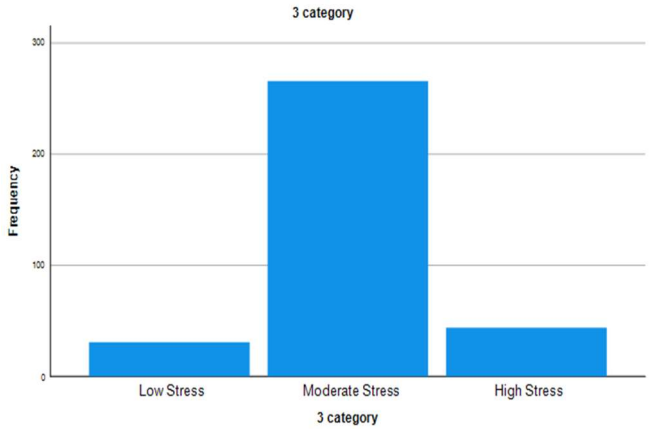

Figure 2 The frequency of medical students in each perceived stress level category

Coping Strategies

Items under "Acceptance" which is an emotion focused coping behavior were most utilized by medical students with a mean score of 6.06 (±1.525). The "Acceptance" coping behavior includes items "I've been accepting the reality of the fact that it has happened." and "I've been learning to live with it". Items under "Substance use" which is an avoidant focused coping behavior were least utilized by medical students with a mean score of 2.61 (±1.301). The "Substance use" coping behavior includes items like "I've been using alcohol or other drugs to make myself feel better" & "I've been using alcohol or other drugs to help me get through it".

The emotion-focused coping style was most utilized by medical students with a mean score of 29.77 (±6.013) while the avoidant focused coping style was least utilized with a mean score of 14.94 (±4.075), leaving problem focused coping style in the middle with a mean score of 22.58 (±4.770).

Table 2 The Games-Howell post hoc test for emotion focused coping style

Gomes Howell	Emotion Focused	Perceived stress Category	95% CI	
			Lower-Bound	Upper-Bond
	Low stress	Moderate stress	-5.64	-.29
		High stress	-8.00	-2.06
	Moderate stress	Low stress	.29	5.64
		High stress	-3.92	-.22
	High stress	Low stress	2.06	8.00
		Moderate stress	.22	3.92

CI: Confidence Interval

The emotion-focused coping style exhibited increasing utilization as the perceived stress level increased (Table 2). The mean score increased from 26.81 (±5.747) in the low perceived stress level to 29.77 (±6.138) in the moderate perceived stress level, demonstrating an 11.04% mean score increase (95% CI (-5.64 - -0.29), p = 0.027). The mean score continued to increase from 29.77 (±6.138) in the moderate perceived stress level to 31.84 (±4.467) in the high perceived stress level, demonstrating a 6.95% mean score increase (95% CI (-3.92 - -0.22), p = 0.024).

The avoidant focused coping style exhibited increasing utilization as the perceived stress level increased (Table 3). The mean score increased from 11.77 (±1.978) in the low perceived stress level to 15.02 (±4.084) in the moderate perceived stress level, demonstrating a 27.61% mean score increase (95% CI (-4.29 - -2.20), p = <0.001). The mean score continued to increase from 15.02 (±4.084) in the moderate perceived stress level to 16.70 (±3.921) in the high perceived stress level, demonstrating an 11.19% mean score increase (95% CI (-3.23 - -0.14), p = 0.029).

Table 3 The Games-Howell post hoc test for avoidant focused coping style

Gomes Howell	Avoidant Focused	Perceived stress Category	Mean Difference (I-J)	Std. Error	Sig
	Low stress	Moderate stress	-3.245*	.435	<.001
		High stress	-4.930*	.690	<.001
	Moderate stress	Low stress	3.245*	.435	<.001
		High stress	-1.686*	.642	.029
	High stress	Low stress	4.930*	.690	<.001
		Moderate stress	1.686*	.642	.029

On the other hand, the problem focused coping style exhibited decreasing utilization as the perceived stress level increased. The mean score decreased from 23.77 (±5.649) in the low perceived stress level to 22.73 (±4.615) in the moderate perceived stress level, demonstrating a 4.38% mean score decrease (95% CI (-1.53 - -3.63), p = 0.585). The mean score continued to decrease from 22.73 (±4.615) in the moderate perceived stress level to 20.84 (±4.705) in the high perceived stress level, demonstrating an 8.32% mean score decrease (95% CI (0.05 - 3.72), p = 0.43). However, the Games-Howell post hoc test demonstrated both 4.38% & 8.32% mean score decrease to be statistically insignificant.

4. DISCUSSION

Firstly, the study revealed that the majority of medical students experience moderate perceived stress levels. Previous studies have demonstrated this phenomenon to be the norm rather than the exception. Academic stress especially with examination preparations is reported to be a high-level stressor in 63.1% of medical students. Persistently high-stress levels were associated with 50% of medical students experiencing frequent psychic tension while 33% of them experienced sleeping difficulties (Backović et al., 2013). Therefore, this highlights the importance of identifying ideal coping behaviors and styles to decrease the prevalence of mental health disorders among students.

Furthermore, the study has identified increased utilization of emotion and avoidant-focused coping styles as the perceived stress level increases. The utilization of an emotion-focused coping style increased by a total of 17.99% while, the utilization of an avoidant-focused coping style increased by a total of 38.81% from low to high perceived stress levels. This association may suggest that these coping behaviors are more utilized as an effect of increased perceived stress levels or that these coping behaviors are maladaptive causes of increased perceived stress levels or both. Certain coping behaviors under these two coping styles have been proven to be ineffective or even harmful in dealing with perceived stress. For example, self-blame in an emotion-focused coping style and substance use in an avoidant-focused coping style are well-proven maladaptive behaviors.

The study identifies coping style utilization patterns according to perceived stress levels, allowing future research to identify the effectiveness of these highly utilized coping behaviors in each perceived stress level. The study paves the path to further research not only on primary coping styles but how secondary coping styles may work synergistically to influence one's perceived stress levels.

Study limitations include a study population sampled from one private institution, academic discipline and region. The choice to study the medical student population has resulted in a disproportionately high prevalence of moderate perceived stress levels among the study sample. Future further studies potentially benefit from a larger sample size extending beyond one institution and region.

5. CONCLUSION

In conclusion, emotion and avoidant focused coping styles are associated with higher incidences of perceived stress levels. Medical students would benefit from decreased perceived stress levels by avoiding maladaptive coping behaviors of these two coping styles.

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Author Contributions

Matthew Ooi, Syafiqah Nadirah, Tay Seng Key, Tong Wai Chin and Muhammad Hairi contributed to the design of the study, collection of data, analysis and writing of the manuscript. Mohamed Abd Elwahab and Sherreen Elhariri have critically reviewed and approved the final draft.

Ethical approval

The study was approved by IMU, Committee of the Medical Ethics (Ethical approval meeting 232nd on 14 October 2021).

Informed consent

Informed consent was obtained from all participants.

Funding

IMU was given incentive tokens for the questionnaire participation students.

Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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