

ORIGINAL ARTICLE

Relationship between Stress Severity and Motivation to Exercise among Undergraduate Physiotherapy Students in Malaysia

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ABSTRACT

Introduction: Physiotherapy students are vulnerable to stress due to the challenging scope of study and the dynamic learning environment. Studies found out that physiotherapy students have inadequate physical activity. Thus, sufficient motivation is vital in promoting active lifestyle. This study was conducted to evaluate stress severity and exercise motivation among physiotherapy students in Malaysia. This study also aimed to investigate the relationship between stress and exercise motivation. **Methods:** This cross-sectional study was conducted on 208 physiotherapy students in Malaysia. The Medical Student Stressor Questionnaire was used to evaluate stress severity while the Exercise Motivation Inventory-2 was used to evaluate exercise motivation. **Results:** Academic-related stressors (2.66 ± 0.66) have the highest score among all the stressors, followed by teaching and learning related stressors (2.47 ± 0.76) and group activities related stressors (2.08 ± 1.01). Top three exercise motivation with highest means were positive health (4.34 ± 0.87), ill-health avoidance (4.19 ± 0.95) and strength and endurance (4.08 ± 1.00). Academic related stressors were not significantly correlated with any of the 14 domains of exercise motivations. Teaching and learning related stressors were significantly positively correlated with affiliation ($r_s = 0.198$, $p < 0.05$) and competition ($r_s = 0.209$, $p < 0.05$). There was a significant positive correlation between group activities related stressors and competition ($r_s = 0.166$, $p < 0.05$). However, group activities related stressors were significantly negatively correlated with health pressures ($r_s = -0.290$, $p < 0.05$), ill health avoidance ($r_s = -0.206$, $p < 0.05$), positive health ($r_s = -0.171$, $p < 0.05$), weight management ($r_s = -0.198$, $p < 0.05$) and strength and endurance ($r_s = -0.138$, $p < 0.05$). **Conclusion:** This study showed that moderate to high severity of stress exists among physiotherapy students in Malaysia, with academic stress as the top stressor. Positive health is the strongest motivation to exercise, followed by ill health avoidance and strength and endurance. This study can be utilized in planning a comprehensive approach to cope with stress and to enhance the exercise motivation among physiotherapy students in Malaysia.

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INTRODUCTION

Stress is described as any effect of a change in the external environment that disrupt the homeostasis of a living being (1). Stress lead to various negative impacts on memory, cognition, learning, immune system, cardiovascular system, gastrointestinal system and endocrine system (2). Studies have reported a high level of stress among students in the healthcare field, including medical, dental, nursing, occupational therapy and physiotherapy (3). Stress may negatively impact one's mental well-being especially in the context

of self-esteem and cognitive functioning (4). This could impact on the students' learning, which would then be reflected on their poor academic performance (4). In Ireland, 27% of physical therapy students experienced psychological morbidity, which has a higher prevalence compared to the overall local population (5). Meanwhile, a recent study conducted in Malaysia reported that 65% of undergraduate health science students experienced normal-to-mild level severity of stress (6).

Despite the well-known benefits of exercise, about one-third (31.1%) of the global population is still physically inactive (7). Physical inactivity is linked to 6% of the global burden of coronary heart disease, 7% of type 2 diabetes, 10% of breast cancer, and 10% of colon cancer (7). According to the latest public health survey, 25.1% of Malaysians are physically inactive, which is

responsible for 16.4% of all deaths in the region (8).

Stress has impeded the population to be physically active (9,10). A previous systematic review has evaluated 168 studies on stress and exercises. 79.8% of the studies suggested that stress and exercises are highly related while 72.8% have shown that the higher stress level will lead to lesser exercises (9). People refrain from exercising due to lack of motivation (11). A majority of them are either unmotivated or insufficiently motivated to be physically active, while some are only temporarily motivated which could not contribute to sustained exercise (12). Motivation is the degree to which our action is chosen, directed, energized, and sustained to fulfil a specific motive (13).

Aside from providing physical therapy, physiotherapists also work with patients in promoting awareness about healthy behaviours (14). Physiotherapists should be the role model to inspire patients about the benefit of being physically active (14). However, a study across three universities in Western Cape has demonstrated inadequate level of physical activity among the local physiotherapy students (15).

Concerning results have been established from several studies conducted on local students. Moderate stress was found in 89% of physiotherapy students in a private college, while 10.25% of the students have severe stress (16). Another study revealed that college students in Malaysia have only adequate level of physical activity, and female students are considered being less physically active (17). The majority of past studies focused on stress and exercise motivation separately. The relationship between these two variables remains unknown among physiotherapy students in Malaysia. Hence, the current study plays a vital role in filling the gap in the literature to evaluate whether stress will affect exercise motivation among undergraduate physiotherapy students in Malaysia. Therefore, the objectives of the current study are to determine the stress severity and exercise motivation among physiotherapy students in Malaysia, and to establish the relationship between stress and motivation to exercise.

MATERIALS AND METHODS

Study Design, Settings and Participants

This cross-sectional correlational study was conducted from 31st August 2021 to 24th October 2021 among the undergraduate physiotherapy students in Malaysia. Participants were recruited from both government and private institutions that offer full-time undergraduate physiotherapy course. Questions were incorporated into google form and circulated through social media to be filled in by the participants voluntarily. The prevalence and severity of stress among the participants were not known before recruiting them into the study. Exclusion criteria include illiteracy in English language, presence

of bone fracture that restricts ability to exercise, and presence of psychological morbidities undergoing treatment with anxiolytics and antidepressants. Students pursuing diploma or postgraduate physiotherapy courses were also excluded from the study.

Sample Size Calculation

The sample size was calculated using a formula for proportions and prevalence. A study conducted in a private college in Malaysia reported that 10.25% of the undergraduate physiotherapy students experienced severe stress (16). The Z score for a confidence level of 95% was 1.96, and the significance level was set at 0.05. The calculated sample size from the formula was 142. However, the responses collected were more than the calculated sample size to prevent low response rate. The final sample size was 208.

The study was conducted using an online platform, Google Form. Brief information regarding the study, possible benefits and risks, confidentiality and researchers' contact were first provided. A form of informed consent was filled up by the participants before proceeding to the further sections. They were then directed to the 'Personal Data Sheet' to collect sociodemographic data which include e-mail, age, gender and year of study. Participants were also required to fill up the Medical Student Stressors Questionnaire (MSSQ) and Exercise Motivation Inventory-2 (EMI-2).

Measurements

The Medical Student Stressor Questionnaire (MSSQ) was utilized to recognize the stressors and quantify the severity of stress among the participants. MSSQ consisted of 40 events tailored according to the possible stressors faced by health science students (18). The 40 items in the questionnaire were categorized into six domains; Academic-related stressors (ARS), Intrapersonal and interpersonal related stressors (IRS), Teaching and learning-related stressors (TLRS), Social related stressors (SRS), Drive and desire related stressors (DRS) and Group activities related stressors (GARS). A score that ranges from 0 (causing no stress at all) to 4 (causing severe stress) was used to score the 40 items representing the six different stressor domains. A high score in a specific stressor category usually means that participants considered activities, circumstances, or scenarios in that group to be stressful (17). The total score from each domain was divided by the total number of items in the respective domain to get a mean score. The mean score was interpreted as follows: 0-1.00 (cause mild stress), 1.01-2.00 (cause moderate stress), 2.01-3.00 (cause high stress), 3.01-4.00 (cause severe stress). MSSQ has been a valid and reliable instrument with good psychometric properties in identifying stressors among medical students in Malaysia (17). Good internal consistency has been demonstrated as measured by Cronbach's alpha coefficient, 0.95, which is higher than the appropriate cut-off point of 0.6 (19).

The Exercise Motivation Inventory -2 (EMI-2) developed by Markland and Ingledew was used to measure the motivation in physical activity and exercises (20). EMI-2 is an enhanced version of the initial Exercise Motivation Inventory (EMI) due to a lack of effectiveness when testing fitness and health-related subscales. The EMI-2 scale has 51 items, each of which is scored on a 6-point Likert scale ranging from 0 (not at all true for me) to 5 (very true for me), with higher scores indicating greater exercise motivation. The items were formed by 14 subscales, including appearance, affiliation, competition, challenge, health pressure, enjoyment, ill-health avoidance, positive health, nimbleness, revitalization, strength and endurance, social recognition, and weight management and stress management. The total score of each subscale was summed up, and the mean and standard deviation were calculated for each subscale. Previous study has demonstrated good validity and consistency of EMI-2. The Cronbach's alpha range from 0.69 to 0.92 for all 14 subscales, thus making EMI-2 both applicable and reliable for the study (20).

Ethical Clearance

The protocol of this study has obtained ethical approval from the Research Ethics Board of INTI International University (INTI-IU/FHLS-RC/BPHTI/1NY12021/024).

Data Analysis

The data were tabulated in an excel worksheet to identify any missing information prior to analysis. Then, the data were analyzed using the Statistical Package for Social Sciences (IBM SPSS Statistics Version 21) for statistical computation. Frequency and percentage were used to analyze gender, age, year of study, and body mass index. Mean, standard deviation and rank were calculated for the severity of stress and exercise motivations. The data of the variables were not normally distributed when tested using Shapiro-Wilk test. Since Spearman Rank Correlation can investigate nonlinear monotonic relationships without normally distributed data (21), it has been utilized to analyze the relationship between the severity of stress and motivation to exercise. The alpha was set at 0.05 and a confidence level of 95% was applied.

RESULTS

The overview of the participants' socio-demographic characteristics is shown in Table I. 233 responses were collected and among these, 25 respondents were excluded from the study. Reason for exclusion including, not undergraduate physiotherapy students in Malaysia ($n=12$), part-time physiotherapy students ($n=3$), having underlying psychological morbidities on medical treatment ($n=10$). The total number of valid respondents were 208. The majority of respondents in the study were female ($n=135$; 64.9%) aged 18 to 22 years ($n=143$; 68.8%) and year 3 students ($n=73$; 35.1%). More than half of them ($n=106$; 51.0%) have normal body mass

Table I Frequency and Percentile of the Demographic Characteristics of Undergraduate Physiotherapy Student in Malaysia

Variables	Frequency (N=208)	%
Gender		
Male	73	35.1
Female	135	64.9
Age		
17 and below	3	1.4
18-22	143	68.8
23-27	60	28.8
28-32	2	1
Year of Study		
Year 1	32	15.4
Year 2	58	27.9
Year 3	73	35.1
Year 4	45	21.6
Body Mass Index (BMI, kg/m²)		
<18.5	58	27.9
18.5-24.9	106	51
25.0-29.9	42	20.2
30.0-34.9	1	0.5
35.0-39.9	0	0
>40	1	0.5

index, which range between 18.5 to 24.9kg/m².

Table II describes the mean, standard deviation and rank of the stressors and exercise motivators among undergraduate physiotherapy student in Malaysia. ARS have the highest score (2.66 ± 0.66) among all the stressors, indicating high level of stress. DRS have the lowest score (1.67 ± 0.99) among all the stressor, indicating moderate level of stress. The mean difference between the highest and the lowest stressors was 0.99. Among all the exercise motivators, the top three highest means were observed for these motivators: positive health (4.34 ± 0.87), ill-health avoidance (4.19 ± 0.95) and strength and endurance (4.08 ± 1.00). The exercise motivator with the lowest mean observed was competition (1.33 ± 1.22).

Table III exhibits the relationship between the severity of stress and exercise motivation among physiotherapy students in Malaysia. ARS has no significant correlation towards all exercise motivation domains, $p>0.05$. GARS showed negative correlation with health pressure ($r_s = -0.290$, $p<0.05$), ill-health avoidance ($r_s = -0.206$, $p<0.05$), positive health ($r_s = -0.171$, $p<0.05$), weight management ($r_s = -0.198$, $p<0.05$) plus strength and endurance ($r_s = -0.138$, $p<0.05$). IRS is negatively correlated with health pressure ($r_s = -0.316$, $p<0.05$), ill-health avoidance ($r_s = -0.276$, $p<0.05$), positive health ($r_s = -0.233$, $p<0.05$), weight management ($r_s = -0.259$, $p<0.05$), appearance ($r_s = -0.207$, $p<0.05$), strength and endurance ($r_s = -0.200$,

Table II: Stressors and Exercise Motivators among Undergraduate Physiotherapy Students in Malaysia

Variables	Mean ±SD	Rank
Stressors		
Academic related stressors (ARS)	2.66±0.66	1
Teaching and learning-related stressors (TLRS)	2.47±0.76	2
Group activities related stressors (GARS)	2.08±1.01	3
Social related stressors (SRS)	1.98±0.81	4
Intrapersonal and interpersonal related stressors (IRS)	1.73±0.95	5
Drive and desire related stressors (DRS)	1.67±0.99	6
Motivators		
Positive health	4.34±0.87	1
Ill health avoidance	4.19±0.95	2
Strength and endurance	4.08±1.00	3
Appearance	3.92±1.03	4
Weight Management	3.72±1.38	5
Nimbleness	3.69±1.22	6
Revitalization	3.51±1.18	7
Health pressure	3.30±1.55	8
Enjoyment	3.29±1.37	9
Challenge	3.29±1.37	9
Affiliation	2.85±1.48	10
Stress Management	2.78±0.96	11
Social Recognition	2.59±1.40	12
Competition	1.33±1.22	13

p<0.05), and nimbleness ($r_s=-0.195$, p<0.05). SRS was negatively correlated with health pressure ($r_s=-0.303$, p<0.05), ill-health avoidance ($r_s=-0.283$, p<0.05), positive health ($r_s=-0.211$, p<0.05), appearance ($r_s=0.143$, p<0.05), strength, and endurance ($r_s=-0.159$, p<0.05). TLRS were positively correlated with both affiliation ($r_s=0.198$, p<0.05) and competition ($r_s=0.209$, p<0.05), similarly SRS were also positively correlated with both affiliation ($r_s=0.179$, p<0.05) and competition ($r_s=0.271$, p<0.05). IRS and GARS were only positively correlated with competition [$(r_s=0.227$, p<0.05) and ($r_s=0.166$, p<0.05)] respectively.

DISCUSSION

The current study investigated the severity of stress and exercise motivations among physiotherapy students in Malaysia. Besides, the relationship between the severity of stress and exercise motivations among physiotherapy students has also been evaluated. From the current findings, most of the participants were female. Furthermore, most respondents in the current study aged between 18 to 22 years (n=143; 68.8%), followed by an age range of 23 to 27 years (n=60; 28.8%). The current finding is similar to a study that investigated the stress sources and coping behaviours among physiotherapy students in Palestine, in which 88% of the participants aged between 20 to 24 years (22).

The current study identified that ARS is the top stressor among physiotherapy students in Malaysia. A study conducted by Jacob et al. has also reported that academic factor was the most significant stress source among physiotherapy students in three different

Table III: Spearman Correlation Coefficient between Severity of Stress and Exercise Motivation among Undergraduate Physiotherapy Students in Malaysia

Variables	Stress Management	Revitalization	Enjoyment	Challenge	Social Recognition	Affiliation	Competition	Health Pressures	Ill Health Avoidance	Positive Health	Weight Management	Appearance	Strength And Endurance	Nimbleness
ARS	0.083	0.029	0.09	0.09	-0.006	0.091	0.074	-0.111	-0.014	0.025	-0.018	0.032	0.021	0.075
IRS	0.027	-0.018	0.073	0.073	0.005	0.09	.227*	-.316*	-.276*	-.233*	-.259*	-.207*	-.200*	-.195*
TLRS	0.111	0.015	0.118	0.118	0.06	.198*	.209*	-0.12	-0.089	-0.068	-0.013	-0.015	-0.015	0.103
SRS	0.024	0.005	0.082	0.082	0.075	.179*	.271*	-.303*	-.283*	-.211*	-0.135	-.143*	-.159*	-0.105
DRS	-0.098	-0.071	-0.034	-0.034	0.064	0.046	0.122	-0.098	-.147*	-.199*	-.140*	-.153*	-.238*	-0.136
GARS	0.012	0.008	0.067	0.067	-0.002	0.119	.166*	-.290*	-.206*	-.171*	-.198*	-0.055	-.138*	-0.103

*Correlation is significant at p<0.05 (2-tailed)

Abbreviation: ARS- Academic Related Stressors; IRS- Intrapersonal and Interpersonal Related Stressors; TLRS- Teaching and Learning Related Stressors; SRS- Social Related Stressors; DRS- Drive and Desire Related Stressors; GARS- Group Activities Related Stressors.

countries, Israel, Australia, and Sweden (3). The mean of academic factors based on the Undergraduate Sources of Stress questionnaire are the highest among Israel (1.69), Australia (2.43) and Sweden (1.91) compared to financial and personal factors (3). This could be explained by the highly demanding syllabus of the physiotherapy course. A combination of theoretical learning and clinical placement along the course could contribute to the high level of academic stress among the students. Besides, the current study revealed that physiotherapy students in Malaysia were least likely to experience stress from DRS (1.67 ± 0.99). This is consistent with a previous study which found DRS to be least stressful for Nigerian physiotherapy students (18). This shows that most participants chose the course based on their own will and were passionate towards physiotherapy.

In terms of exercise motivation, the majority of participants claimed that they would be motivated to exercise for positive health (4.34 ± 0.87). Similarities have been observed when comparing the results with previous studies. The result is in line with a study conducted by Ebben and Brudzynski, which reported that the top motive for college students to exercise was to maintain general health (23). The other top motives to exercise were ill-health avoidance, strength and endurance, appearance, and weight management. A study conducted by Kilpatrick et al. focusing on undergraduate health science students in the United States reported similar findings where the top five highest motives for exercise participation were positive health, strength and endurance, appearance, weight management and ill-health avoidance accordingly (24). This shows that health science students have adequate health awareness. As part of the healthcare team, they are able to act as role models in encouraging the public to be physically active. Enjoyment, challenge and social recognition were ranked ninth, tenth and twelfth respectively in the study conducted by Kilpatrick et al. (24), which was also consistent with the current study.

Meanwhile, differences of results have also been observed across the studies. In the current study, nimbleness and revitalization were ranked at the sixth and seventh places, but their ranking were swapped in the study conducted by Kilpatrick et al. (24). This minor disparity is less likely to be significant and could be due to the diversity of interest among the students. Health pressure was ranked at the eighth place in this current study. Surprisingly, this was contradicting with the result from Kilpatrick et al. which ranked health pressure last among all exercise motivations (24). This could be related to the high level of health awareness among physiotherapy students, which in some might indirectly increase the pressure to achieve and maintain good health. Finally, competition provided the least motivation for physiotherapy students in Malaysia to become physically active. Competition was ranked

slightly higher in the study conducted by Kilpatrick et al. at the eleventh place (24). This might be due to difference in the level of sports participation among the two groups of students.

The relationship between stress and exercise motivation has been evaluated in this current study. As mentioned earlier, ARS was found to be the top stressor among undergraduate physiotherapy students in Malaysia. However, no significant correlation has been found between ARS and exercise motivation in this current study. Meanwhile, the current study revealed a negative correlation between GARS and several motivations to exercise. This included health pressure, ill-health avoidance, positive health, weight management, plus strength and endurance. As for the systematic review conducted by Pascoe et al., negative correlation has been found between academic stress and engagement in physical activity (25). The disparity could be contributed by the categorizing method of stressors between the current study and the previous studies. Most authors in the previous studies discussed GARS and ARS as a whole. Pressures from group activities such as excessive coursework, peer competition, poor time management and social skills have all been academic-related as well (26). In general, stress from the course might impede the students from exercising.

The current study also showed that IRS was negatively correlated with health pressure, ill health avoidance, positive health, weight management, appearance, strength and endurance, and nimbleness. The findings were in line with a study conducted by Huang et al., which reported a negative association between intrinsic motivation and self-reported stress caused by interpersonal conflict (27). Students who are frequently involved in conflict-based interpersonal interactions may spend a lot of effort dealing with the issues, limiting the time and energy available to be spent on exercising (27). Besides, in the current study, SRS was negatively correlated with health pressure, ill-health avoidance, positive health, appearance, and strength and endurance. The presence of social-related stressors could be overwhelming to the students. Instead of spending time to exercise, they might prefer to deal with these issues or have a good rest to relax their mind. This result contradicted with a study conducted by Zervou et al., which stated that increased levels of exercise are influenced by social pressures (28). This might be due to the different perceptions towards exercise and social stress among these two groups of participants. In the previous study, the participants may take exercise as a way to relieve societal pressure.

The result of the current study showed that TLRS were positively correlated with affiliation and competition. The same result can be found where SRS were positively correlated with affiliation and competition in the current study. Moreover, the current study found a positive

correlation between GARS and competition. These stressors might provide eustress for undergraduate students to become motivated. Eustress improved performance until an optimum level was reached based on Yerkes-Dodson law (29). Eustress can help increase motivation, improve decision-making and achieve their goals more easily (30). A moderate amount of stress can produce cortisol which can boost physical and cognitive abilities through increasing blood sugar, metabolism, and memory function (31).

DRS was negatively correlated with ill-health avoidance, positive health, weight management, appearance, strength, and endurance. DRS is any internal or external forces that impact one's attitude, emotion, thinking, and conduct, resulting in stress (19). Previous research on the different forms of motivated behaviour following stress revealed that midbrain dopamine neurons have complex and perhaps contradictory roles in the behavioural consequences of various types of stressors (32). Chronic stress can affect behaviour by affecting the activity of the mesolimbic dopamine pathway, which reduces motivation in humans and animals (32).

There were some limitations in the current study. Firstly, this current study was a cross-sectional study based on self-reported questionnaire filled in by the respondents. There was probability of recall bias as the participants may not fully understand the questions or simply fill in the questionnaire due to time constraints or emotional issues. In future study, the respondent's frequency and exercise duration can be collected to determine whether the exercise motivation tally with the actual participation in exercise.

CONCLUSION

This study showed that moderate to high severity of stress exists among physiotherapy students in Malaysia, with academic stress as the top stressor. Positive health is the strongest motivation to exercise, followed by ill health avoidance and strength and endurance. Correlation has been established between stress and different domains of exercise motivation. Students with stress are less motivated to exercise for health, fitness and body image maintenance. Meanwhile, students exercising for affiliation and competition are more motivated to exercise under stress. This research provides some direction on the relationship between stress and exercise motivation among undergraduate physiotherapy students in Malaysia. The results could be a basis for the planning and application of stress management strategy among the targeted population, with the aim to promote physical activity and ultimately improve health among physiotherapy students in Malaysia.

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