ASSOCIATION BETWEEN PHYSICAL EXERCISE AND STRESS LEVEL AMONG FIRST YEAR STUDENTS OF KULLIYYAH OF ALLIED HEALTH SCIENCES IN INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA KUANTAN CAMPUS

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ABSTRACT

Stress may affect students physically and psychologically. As much as stress is affecting students' life in many ways, physical exercise can be used in managing stress. This research sought to identify the association between physical exercise and stress level among first year students of Kulliyyah of Allied Health Sciences (KAHS) in the International Islamic University Malaysia (IIUM) Kuantan Campus. A total of 111 subjects consisting of only first year students of Kulliyyah of Allied Health Science (KAHS) participated in this study. Physical exercise was assessed by basic exercise questionnaire, while the stress level was measured using the Perceived Stress Scale (PSS) questionnaire. The data acquired were then analyzed using SPSS version 20.0. The findings indicated that 55.9% participants perform exercise while 44.1% of the participants do not perform regular exercise. As for the association between the physical exercise and stress level, there is a significant association found (p < 0.001). While for type, frequency and duration of exercise with the stress level also shown a significant association p value less than 0.05. The study has provided evidence of an association between physical exercise and stress level among subjects. This finding is hoped to bring more awareness regarding the use of exercise as a mean to manage stress among university students.

1. Introduction

Life as university students can be emotionally challenging and quite tough. Students need to divide the time between their academic performance, extracurricular activities and their personal life. The university activities can also be quite demanding with examination, quizzes, tutorial class and assignments requirements. All these day-today activities as a student will definitely contribute to excessive stress need to be faced by almost all the students. The study stated that some college students struggle with stress while adjusting with the overwhelming challenges that arise from a new life experience such as an increase in academic, personal, social and moral pressures in their lives which may lead them to anxiety,

loneliness, depression, hopelessness, headaches, sleep disturbances, cold and sometimes suicidal ideations (Baghurst & Kelley, 2014).

Stress is defined as a harmful stimulus that interrupt the physiological or psychological homeostasis caused by harmful events that occurred from inside or outside environment (Lin, Lin, Lin, & Huang, 2011). "Research has shown that stress exposure was related to cognitive dysfunctions, altered attention strategies, reduced capacity to experience pleasure, and higher risk tendency in achieving gains" (Yoruk & Runco, 2014). Yoruk and Runco (2014) stated that, short-term alterations, such as physiological and emotional states, and the long-term changes in physiological and neuroanatomical levels are due to the complex process of stress. Explained by Dhabhar (2014) about the concept of stress, each started to prepare for this through encouraging scientific research and development in the fields of communication and technology. All of these serve as clear evidence on the important focus on internal and external obstacles, or stimulus like perception of an organism or on physiological response to stimulus. Dhabhar (2014) also mentioned that, stress is a cluster of events that include a stimulus (stressor), brain reaction (stress perception), and activated physiological fight or flight systems in the body (stress response).

This study aims at tackling the issue of stress management among university students. The findings stated by Kumar, Sharma, Gupta, Vaish, and Misra (2014) that, stress can give negative effect on medical students' performance by declining of their cognitive skills and higher cognitive functions such as reduced concentration, poor retention and poor memory, startle response and mental fatigue. Researchers stated that perceptions of stress have an essential link between physical activity and physical health. Firstly, physical activity can help in reduction of perceptions of stress (Rueggeberg, Wrosch, & Miller, 2012). Next, better physical health is generally related to physical activity and low stress levels (Rueggeberg et al., 2012).

It is believed that, different amount and types of exercises are effective in reducing the stress and anxiety score (Vancampfort et al., 2011). There is a study that proved both yoga and aerobic exercise are contributing to the reduction of stress and anxiety and promote good well-being subjectively (Vancampfort et al., 2011). Ülger and Yağlı (2010) also stated that, "With the therapeutic exercises of yoga, they relaxed, and their anxiety and stress level triggered by these symptoms decreased". Stated by Varvogli and Darviri (2011) that, there was a study founded by Edmund Jacobson in early 1920s which is called Progressive Muscle Relaxation (PMR), the technique that alternating tensing and relaxing of muscles for stress and anxiety reduction. It is believed that muscle tension is accompanied by anxiety, so the way to reduce anxiety is to learn how to relax the muscles. The researcher stated that, PMR consisted of physical and mental components. In addition, physical components involved tension and relaxation of muscle groups of legs, abdominal, chest, arm and face (Varvogli & Darviri, 2011). This study is conducted to determine the association of physical exercise and stress level among first year students of KAHS, IIUM Kuantan campus because they are more compatible. In addition, this study also aims to identify whether the type, frequency and duration of exercise have any association with stress level. It is also to promote physical exercise as one of the approaches towards healthy lifestyle.

2. Materials and methods

This research study was a non-experimental, cross-sectional quantitative study. This study was conducted to study the association between physical exercise and stress level among Kulliyyah of Allied Health Sciences (KAHS) first year students in International Islamic University Malaysia (IIUM) Kuantan campus. There were components considered in this study, which are physical exercise and stress level of

the participants. Questionnaires are used as the instruments in this study, for physical exercise questionnaire only consists of basic questions about exercise, while to evaluate the stress level the Perceived Stress Scale (PSS) questionnaires is used. The survey was conducted by the distribution of the questionnaires to the participants directly. The participants were only among first year students of KAHS. Then, the data collected was analysed using SPSS version 20.0 for windows.

2.1 Study Area

IIUM Kuantan Campus is the target study setting of this research. There are Medicine, Sciences, Pharmacy, Allied Health Sciences, Nursing and Dentistry Kulliyyah in this University.

2.2 Study Population

The subject selected are among first year students of Kulliyyah of Allied Health Sciences on IIUM Kuantan campus. There are six department in Kulliyyah of Allied Health Sciences, which consist of department of Audiology & Speech-Language Pathology, Optometry & Visual Sciences, Diagnostic Imaging & Radiotherapy, Physical Rehabilitation Sciences, Biomedical Science and Nutrition Sciences.

2.3 Study Design

Throughout this study, cross-sectional study design was employed to assess the association between physical exercise and stress levels among IIUM Kuantan KAHS first year students.

2.4 Sampling Method

Convenience sampling has been used in this study because it was easier for the researcher to select the participants based on their availability and willingness to respond. Inclusion criteria were IIUM Kuantan KAHS first year students who can write and read in English and the exclusion criteria were students who are not willing to participate.

2.5 Sample Size Calculation

n= ⟦1.96⟧ ^2/m^2 (p)(1-p)

n= ⟦1.96⟧ ^(2)/ ⟦0.09⟧ ^2 (0.63)(1-0.63)

n=111

p = prevalence of stress (Abdulghani, AlKanhal, Mahmoud, Ponnamperuma, & Alfaris, 2011)

m = margin of error

2.6 Pilot Study

A pilot study of this research project was held to determine suitability of the questions asked and to ensure that the participants can understand the questionnaires. The pilot study was conducted on 10 participants among IIUM KAHS first year students in Kuantan campus. The results from the pilot study shown that all the participants understand all the questions stated in the questionnaires and can fulfil the questionnaires correctly.

2.7 Instruments

In this study, questionnaire was used as an instrument. The participants were given two types of questionnaires. The first questionnaire consists of section A; socio-demographic information (name, age, gender, race and department), section B; questionnaire regarding the type of exercise (Flexibility, Aerobic, Strengthening and Balance), frequency and duration of exercise. The Perceived Stress Scale (PSS) was used as the second questionnaire in this study. PSS is a classic stress assessment instrument to measure stress level. The questionnaire consists of 10 closed ended questions ask students about feelings and thoughts during the last month.

2.8 Data Collection

In April 2018, the study was continued by distributing the survey questionnaires to about 130 first-year students of Kulliyyah of Allied Health Sciences on IIUM Kuantan campus before or after their class session according to their department. The data was distributed and collected by the researcher from the student representatives of each department. However, the data collected was only from 111 participants due to some participants did not return the survey. The data then had been analysed using SPSS statistics version 20.0 around April and May 2018.

2.9 Outcome Measure

In this study the outcome measure that was been used was Perceived stress scale (PSS). PSS is the classic stress assessment instrument being used to measure levels of stress. It consists of 10 closed ended questions. Individual scores on PSS can range from 0 to 40 which are: (1) scores ranging from 0-13 would be considered low stress, (2) scores ranging from 14-26 would be considered moderate stress, (3) scores ranging from 27-40 would be considered high perceived stress. The highest scores indicating higher perceived stress (Cohen, 2017).

2.10 Statistical Analysis

The data were analysed using SPSS Statistical Package Social Science (SPSS 20.0) for window. Descriptive statistic was used in this data analysis. Descriptive values of items were expressed in percentage in order to relate the association between physical exercise and stress level. The Chi-square test was used to test the association between physical exercise and stress level. While, to test association between type of exercise and stress level, Kruskal Wallis test has been used due to assumption do not met for this variable to used ANOVA. Furthermore, correlation test was used to test the association between frequency and duration of exercise with stress level. Confidence level 95% and 0.05 was set for alpha.

2.11 Ethical Consideration

This study had been approved by KAHS Postgraduate and Research Committee (KPGRC), and IIUM Ethics Committee (IREC). The identity of the participants is kept confidential as they signed the informed consent form. All the participants completed the survey with the knowledge that their participation was voluntary.

3. Results

First, sociodemographic data and physical exercise of the study population were analysed and evaluated by using descriptive statistics. The participants were grouped according to; gender, race and their departments, contribution in exercise, type of exercise, frequency of exercise and duration of exercise and conducted exercises in group or individual. While, to identify the association between physical exercise and stress level among first year KAHS, *p*-value from Chi-square was used.

3.1 Demographic Data

Table 3.1 shows the number of participants according to gender, race and departments. About 91 (81.1%) of the participants are female, while male participants are less than half which are 21 (18.9%). Next, only 2 (1.8%) participants from others race, with major participants are Malay which about 109 (98.2%). In addition, participants from departments of Audiology, Optometry and Diagnostic Imaging consists of 18 (16.2%) respectively, while from department of Physical Rehabilitation, Biomedical and Nutrition Sciences are 19 (17.1%) respectively.

Table 3.1 Participants according to gender, race and department. (n = 111)

Demographic data	no. (%)
Gender	
Male	21 (18.9)
Female	90 (81.1)
Race	
Malay	109 (98.2)
Non-Malay	2 (1.8)
Department	
Audiology &Speech-Language Pathology	18 (16.2)
Optometry & Visual Sciences	18 (16.2)

Diagnostic Imaging & Radiotherapy	18 (16.2)
Physical Rehabilitation Sciences	19 (17.1)
Biomedical Sciences	19 (17.1)
Nutrition Sciences	19 (17.1)

From Table 3.2 reported that 62 (55.9%) participants were doing physical exercise, while about 49 (44.1%) participants were not involved in physical exercise. The total numbers of participants were about 111 (100%).

Table 3.2 Participants according to contribution in physical exercise. (n = 111)

Variables	no. (%)
Doing physical exercise	62 (55.9)
Not doing physical exercise	49 (44.1)

3.2 Type of Exercise, Frequency of Exercise, Duration of Exercise

Based on Table 3.3, shows that aerobic exercise recorded the higher percentage of exercisers with 61.3%. While followed by second higher percentage, flexibility exercise which was 22.6%. In addition, strengthening exercise recorded 16.1% of exercisers and balance exercise recorded no exercisers.

Table 3.3 Exercisers according to type of exercise. (n = 62)

Type of exercise	no. (%)
Flexibility	14 (22.6)
Aerobic	38 (61.3)
Strengthening	10 (16.1)
Balance	0 (0)

Table 3.4 shows that 32 (51.6%) exercisers do exercise about 1-2 times per week, while 24 (38.7%) do exercise about 3-4 times per week. Next, the frequency of doing exercise about 5-6 times per week recorded the lowest value with 2 (3.2%).

Table 3.4 Exercisers according to frequency of exercise. (n = 62)

Frequency of exercise	no. (%)
1-2 times per week	32 (51.6)
3-4 times per week	24 (38.7)
5-6 times per week	2 (3.2)
Everyday	4 (6.5)

Table 3.5 below shows that about 35.5% exercisers do exercise 20-30 mins per session. Next, exercisers do exercise about 5-15 mins per session and 35-45 mins per session recorded about 20.9% respectively.

Table 3.5 Exercisers according to duration of exercise. (n = 62)

Duration of exercise	no. (%)
5-15 mins per session	13 (20.9)
20-30 mins per session	22 (35.5)
35-45 mins per session	13 (20.9)
1 hours / >	14 (22.6)

From Table 3.6, shows that exercise conducted in group was 24 (38.7%), while individual exercise recorded the higher value which was 38 (61.3%).

Table 3.6 Group exercise vs individual exercise. (n = 62)

Exercise conducted in:	no. (%)
Group	24 (38.7)
Individual	38 (61.3)

3.4 Association Between Physical Exercise and Stress Level

Table 3.7 Association between physical exercise and Perceived Stress Scale (PSS) using Chi-Square Test.
(n = 111)

Variable		PSS level			Chi-square statistic (df)	p-value
		Low (n=18) No. (%)	Mod. (n=80) No. (%)	High (n=13) No. (%)		
Physical Exercise	**Exercise**	18 (100)	4 (55.0)	0 (0)	30.699 (2)	<0.001
	Not exercise	0 (0)	36 (45.0)	13 (100)		

*df = degree of freedom

From Table 3.7, the *p*-value is < 0.001 which is less than 0.05. So, there is significance association between physical exercise and stress level among first year students of KAHS in IIUM Kuantan Campus.

3.5 Association Between Type, Frequency and Duration with Stress Level

Table 3.8 Association between type of exercise and Perceived Stress Scale (PSS) using Kruskal Wallis Test.
(n=111)

Type	n	Median (IQR)	*p*-value
None	49	22 (9)	
Flexibility	14	12 (3)	
Aerobic	38	19 (6)	< 0.001
Strengthening	10	18 (6)	

From Table 3.8, the p-value is < 0.001 which less than 0.05. There is significant difference in PSS between at least one pair of types of exercise, which needs to be determined through post-hoc test as presented below in Table 4.8. In addition, none recorded the highest median score of PSS.

Table 3.9 Post Hoc for types of exercise and Perceived Stress Scale (PSS). (n=111)

		p-value
None	Flexibility	<0.001
	Aerobic	<0.001
	Strengthening	0.020
Flexibility	Aerobic	<0.001
	Strengthening	0.001
Aerobic	Strengthening	1.000

Table 3.9 shows the *p*-value for each pair of types of exercise and PSS. The *p*-value for None - Flexibility, None - Aerobic and Flexibility - Aerobic are < 0.001 respectively. While None - Strengthening and Flexibility - Strengthening also recorded *p*-value 0.020 and 0.001 respectively which are less than 0.05. So, there is association between these variables with PSS. Next, the *p*-value for Aerobic - Strengthening is 1.000, which is more than 0.05. So, there is no significance association between Aerobic - Strengthening type of exercise with PSS. These results conclude that PSS for no exercise is significantly higher as compared to all other types of exercise, and PSS for flexibility is significantly lower than other types of exercise, including no exercise.
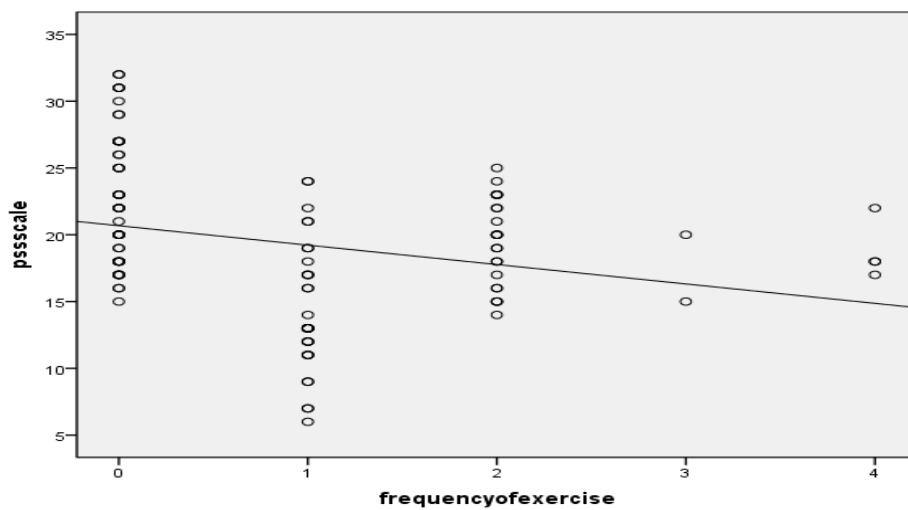

Figure 3.1: Correlation between frequency of exercise and Perceived Stress Scale (PSS) among exercisers.
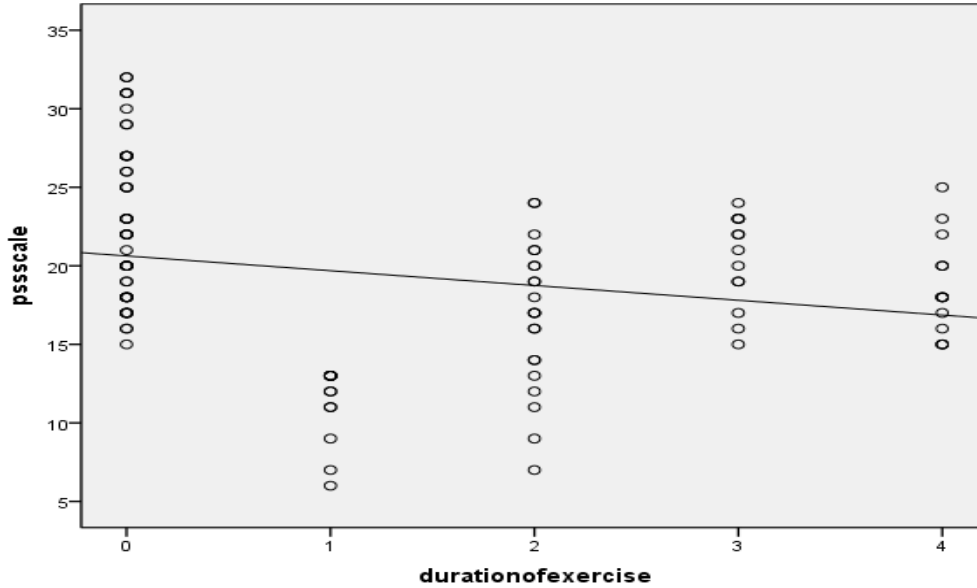
Figure 3.2: Correlation between duration of exercise and Perceived Stress Scale (PSS) among exercisers.

Figure 3.1 and Figure 3.2 shows the correlation between frequency and duration of exercise with PSS respectively. Based on these figures above, there were no curve in both the scatter plot. So, the linearity assumption was met. In addition, both scatter plot also had no U shape, so the normality assumptions were met. So, Pearson correlation was used for the statistical analysis between frequency and duration of exercise and PSS respectively.

Table 3.10 Correlation between frequency and duration of exercise with Perceived Stress Score(PSS). (n=62)

	r-value	p-value
PSS vs frequency	-0.268	0.005
PSS vs duration	-0.246	0.009

Table 3.10 shows that, *p*-value from correlation test for PSS vs frequency of exercise and PSS vs duration of exercise are 0.005 and 0.009 respectively, which are less than 0.05. So, there are significance correlation between frequency and duration of exercise with PSS. The r-values of -0.268 and -0.246 indicate negative fair correlation, meaning the PSS is lower when frequency and duration of exercise is higher, meaning more exercise is associated with lower stress.

4.0 Discussion

From the findings, it shows that most of the participants were female who were 81.1% from the total percent of participants. This is because the ratio of the female students is bigger than male students in KAHS, IIUM Kuantan campus. As for the percentage of participants who do exercise and do not exercise, the exerciser recorded the highest number compared to non-exerciser who were 55.9% and 44.1% respectively. The difference about 11.8%. It is shown that the majority of the first-year students did exercise. Next, this study reported a significant association between physical exercise and stress level among IIUM KAHS first year students ($p < 0.001$). It is shown that by doing exercise, the level of stress can be reduced. The result is consistent with previous study by Lippke, Kuhlmann, Fink, and Hambrecht (2015), whose study found that there is complementary between physical exercise and stress level, which proved that the higher levels of physical activity are associated with lower levels of perceived stress. In addition, current study finding is also similar to a study done by Park (2014) which main discovery of the study mentioned about the association between physical activity with reduction of perceived stress levels.

Moreover, as for the association between type of exercise, frequency of exercise and duration of exercise with stress level shown a significant association by p-value less than 0.05. In addition, flexibility type of exercise has proved more effective in lowering the stress level compare to others type of exercises. Meanwhile, 3-4 times of exercise per week are more efficient in managing stress. As for the duration of exercise, 5-15 mins exercise per session is enough for stress healing. Stults-Kolehmainen and Sinha, (2014) has stated that lesser exercise and/or physical activity are associated with higher stress. Peer, Hillman, and Van Hoet, (2015) mentioned that healthy mental and physical is crucial for the students as it can affect their decision making in the future and as for the students who with stress, have a knowledge about stress and how to manage it may guard them from the stress effects and help them emerge into adulthood successfully.

4.1 Conclusion

This present study indicated that there was a significant association between physical exercise and stress level among KAHS first year students in IIUM Kuantan Campus. The study proved that by doing physical exercise, it is good for stress management. It is also reported that flexibility exercise can be one of the most effective exercises apply to reduce stress. Through this study, it is hoped that students can be alerted about the importance of physical exercise especially as stress manager. As stress not only bad for mental but also gives effect to the body, so by promoting healthy lifestyle like doing exercise is crucial in maintaining good physical and psychological health.

4.2 Limitation

A few limitations were spotted in this study that may have contributed to inaccuracy in data information. This study is self-reported survey, which the relevant data where been gather from the university students. At that, there could have allowed information inaccuracy. The small sample size plays an important role in this study, as for survey study larger sample size is better. In addition, about the questionnaire, due to the physical exercise questionnaire is made by the researcher, even though is just a basic question in the questionnaire but it is better to have numerical and categorical variable to easy data analysis.

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