International Journal of Advanced Research in Education and Society
e-ISSN: 2682-8138 | Vol. 7, No. 1, 312-326, 2025
https://asianscholarsnetwork.com/asnet-journals

Investigating the Relationship Between Optimal Exercise Patterns and Mental Stress Levels Among Private University Students in Petaling Jaya

Shafi Mohamad[1], Dalmie Shahrul Suryati Azmee[1*], Siti Nurul Aishah Jamaludin[1], Muhammad Faris Che Salam[1], Muhammad Zaki Adam[1]

[1] Faculty of Business, UNITAR International University, Malaysia

* Corresponding Author: dalmie.pt@unitar.my

Received: 7 January 2025 | Accepted: 15 February 2025 | Published: 15 March 2025

DOI: https://doi.org/10.55057/ijares.2025.7.1.29

Abstract: *Students at universities are becoming more and more concerned about mental stress, which is sometimes intensified by lifestyle constraints. Even while physical activity is becoming more widely recognized as a useful stress-reduction strategy, little is known about the relationship between specific exercise patterns and mental stress levels in the context of Malaysian private university students. This study investigates at the relationship between 390 university students' patterns of exercise and mental stress at private universities in Petaling Jaya, Malaysia. By analysing the effects of exercise type, frequency, and duration on mental stress levels, the study contributes to the broader discussion on students' physical activity and mental health. Students from UNITAR, MSU, and UNISEL were selected, convenience sampling was employed. Data was gathered using an online survey using Likert scale questions that assessed exercise routines and stress levels. Analytical techniques like regression analysis, correlation coefficients, and descriptive statistics were employed to identify significant trends and relationships. The findings are meant to inform individuals working in the academic and medical sectors about the potential of personalized exercise programs as a stress-reduction strategy. This study emphasizes how important it is to include physical activity in daily routines and how educational institutions can help students' mental health.*

Keywords: Mental stress, exercise, private university students, exercise type, exercise frequency, exercise duration, mental health, stress management

1. Introduction

The increasing prevalence of mental health issues, particularly stress, among university students has drawn significant attention in recent years. Stress is a common challenge faced by private university students, often exacerbated by academic pressures, financial struggles, and societal expectations. Left unaddressed, these stressors may contribute to various mental health concerns, including anxiety and depression (Kabiri et al., 2024). Existing research suggests that physical activity plays a critical role in mitigating mental stress, with numerous studies confirming its benefits for both physical and mental well-being. However, there is limited understanding of how specific exercise patterns, including frequency, type, and duration, influence mental stress levels among Malaysian university students. This study aims to investigate these relationships within the context of private universities in Petaling Jaya, Malaysia.

University students are increasingly adopting sedentary lifestyles, which significantly impact their physical and mental health. Stress among Malaysian youth, especially Generation Z, is often fueled by academic demands, financial difficulties, and societal expectations, including personal relationships. These pressures contribute to poor mental health outcomes, such as heightened stress and anxiety levels (Kevin Lee, The Star). Research has consistently highlighted the role of physical activity as an effective strategy for stress reduction, with activities like running and swimming showing measurable improvements in mood and mental resilience. However, the lack of specific insights into the relationship between exercise patterns and stress management within the Malaysian cultural and social context creates a gap that this study seeks to address. Understanding these dynamics is crucial for developing effective wellness programs and health interventions.

The research objectives focus on investigating the relationship between exercise frequency, type, and duration, and their impact on mental stress levels among private university students. The study is guided by three key research questions, which examine whether exercise frequency, type, and duration significantly influence stress levels. This framework aligns with the aim of developing evidence-based strategies to enhance students' well-being in a modern university environment (Emma Childs, 2024). The scope of the study concentrates on private universities in Petaling Jaya due to their diverse student demographics, educational emphasis on holistic development, and strategic location as an educational hub. These universities, such as UNITAR, MSU, and UNISEL, host a mix of local and international students with varied socioeconomic backgrounds. They also offer wellness programs and fitness initiatives, providing a rich context for exploring how exercise affects stress levels. This focus ensures the findings are both representative and practically applicable for Malaysian students (Achraf Ammar et al., 2020).

Finally, the significance of the study lies in its potential to influence public health and wellness policies. By understanding how different exercise patterns reduce stress, this research can guide the development of targeted exercise interventions and public health campaigns. The findings are expected to enhance individual well-being, inform healthcare practitioners about effective stress management strategies, and assist policymakers in promoting physical activity as a preventive tool against mental health issues. This comprehensive approach underscores the importance of addressing mental stress through structured physical activity in university settings (Cohen et al., 1983; Kuswary et al., 2020).

Background of the Study

There has been a lot of interest in recent years regarding the relationship between physical activity and mental health. Several studies confirming the advantages of exercise particularly for stress management. Stress in general is a prevalent concern among private university students, often contributing to a variety of mental health issues if not addressed effectively (Kabiri et al, 2024). This study will investigate the relationship between exercise frequency, type, and duration (independent variables) and mental stress levels (dependent variable) in individuals.

The target audience primarily consists of university students in private institutions within the Petaling Jaya. Given its densely populated, fast-paced lifestyle and stressful metropolitan lifestyle; research on the connection between exercise and mental stress levels is particularly relevant in this region. Students in the Petaling Jaya are especially susceptible to mental health issues due to the frequent major life transitions they face, such as career choices, academic goals, and financial challenges (Mofatteh M, 2020).

Problem Statement

University students often find themselves trapped in sedentary lifestyles, which significantly impact their physical and mental well-being. Absence of physical activity leads to a range of health problems, including tiredness, body aches, high blood pressure, and mental health challenges like stress, anxiety, and depression. As highlighted by Kevin Lee in The Star Newspaper, Malaysian youth (particularly the Gen Z group) face tremendous pressures from academic demands, financial struggles, and societal expectations such as personal relationships, which exacerbate their mental health issues. This contributes to decline of physical and mental well-being.

Research has consistently shown that regular physical activity is a key strategy for addressing these challenges. Exercise not only improves physical health but also serves as an effective way to reduce mental stress, boost mood, and increase energy levels. Activities such as running, swimming, and other forms of physical engagement have been shown to alleviate anxiety and depression, acting as a natural coping mechanism for managing stress. This study focuses on understanding how exercise patterns affect mental stress among university students in the Petaling Jaya. By examining this relationship, the research seeks to address the lack of insights into how exercise influences mental health outcomes within the context of Malaysia's cultural and societal dynamics.

The findings of this study aim to inform public health initiatives and wellness programs tailored to Malaysian university students. Encouraging active lifestyles could significantly enhance students' physical and mental health, while also equipping them with practical tools to navigate the pressures of modern university life.

Cultural and lifestyle factors unique to Malaysia may affect how students engage in physical activity and manage mental stress, necessitating a focused study on this population. Addressing this gap is essential for informing public health strategies, designing effective wellness programs, and helping students make informed decisions about their exercise routines to manage mental stress. This research aims to fill this gap by providing a detailed analysis of the relationship between different exercise patterns and mental stress levels among students studying in private university in Petaling Jaya.

2. Literature Review

Theory

This study is rooted in the Biopsychosocial Model, which serves as an overarching theory for how many factors interact to affect health outcomes. This model is particularly well-suited for investigating the relationship between exercise and mental distress levels as it acknowledges the complex interplay of biological, psychological, and social dimensions of health. The Biopsychosocial Model is a holistic description of how the many constructs of exercise which consists of frequency, type, and duration can alter individual mental stress in those studying in universities by incorporating biological, psychological, and social aspects. But this comprehensive approach exemplifies the nuances behind stress management and the myriad ways that routine physical activity can improve your general health. Understanding these interactions is key to creating effective therapies designed to reduce mental stress via exercise. The model also highlights the need for a multidisciplinary approach to health, taking into consideration that interventions must encompass every aspect of an individual to be effective.

Biological Dimension

There are multiple physiological processes through which exercise is essential in reducing mental stress on a biological basis. Exercise releases endorphins from the brain, natural analgesic, and feel-good neurotransmitters. These "feel-good" hormones reverse some of the changes the body makes during stress by decreasing pain and creating joy or euphoria.

Along with lowering cortisol, the body's main stress hormone, regular exercise can help combat mental stress, too. Chronic stress tends to increase cortisol secretion, which may adversely affect mental health. Regular physical activity can reduce cortisol, leading to better mental health. Furthermore, regular exercise has been found to be correlated with better physical health such as improved cardiovascular function (De Nys et al., 2022).

Psychological Dimension

A great psychological strategy for reducing mental stress and improving mental health is exercise. Regular exercise can enhance mood, reduce anxiety symptoms, and enhance mental performance. These psychological benefits, which promote a more positive outlook and more useful coping mechanisms, are crucial for stress management. Exercise also boosts self-esteem and gives one a sense of accomplishment. For example, reaching a fitness. goal or finishing a challenging workout might promote a sense of success. This has the potential to be very effective and calming. The psychological benefits of exercise emphasize how crucial it is as a strategy for enhancing mental health and reducing mental stress (Pahlavani, H. A. 2024).The psychological dimension also involves the concept of self-efficacy, which refers to an individual's belief in their capacity to execute behaviours necessary to produce specific performance attainments. High levels of self-efficacy gained through regular exercise can empower individuals, making them feel more competent and capable of handling stressors. This enhancement of self-efficacy through exercise is critical in fostering a resilient mindset towards stress.

Social Dimension

Social differences also affect the stress-reducing capabilities of exercise. Exercise can foster a sense of friendship and social support -- particularly when it's done in groups. Exercise with friends, team sports, and group fitness programs are great examples of how to promote social connection and community. These connections to other people lower mental stress, provide emotional support and enhance a sense of identity. According to Ozbay F. et al. (2019), the bonds that are social in nature by working out could promote a feeling of support and community that can help diminish mental stress.

Relationship between IV & DV

Relationship between Exercise Frequency and Mental Stress Levels

The frequency of exercises describes how many days a week a person is exercising. Studies have repeatedly demonstrated that regular physical activity is linked with lower mental stress levels. Regular physical activity can boost mood, enhance stress resilience, and lead to better sleep. For example, Yoon, E. S., W.-Y., & Jang, S. (2023) found that individuals who exercised at least three days a week reported significantly lower levels of mental stress than those who exercised less frequently. One of the possible mechanisms for this connection is the release of endorphins and other mood-enhancing and mentally relieving chemicals released during exercise.

Regular exercise is useful for maintaining a behaviour capable of counteracting the deleterious effects of mental strain. It encourages people to get through their daily challenges with better

mental health. This illustrates relationship between physical exercise frequency and mental stress level and shows how significantly physically active lifestyle helps with mental stability. This is how people can get long-term benefits in improving overall health, reducing stress.

H1: There is a significant relationship between exercise frequency and mental stress levels among private university students.

Relationship between Exercise Type and Mental Stress Levels

Exercise type is the type of physical activity such as jogging, swimming, anaerobic & weight training. Not all workout programs have the same impact on the level of mental stress. Everybody knows that aerobic exercise relieves mental stress. Margulis et al. (2021), for instance, that aerobic exercise especially benefits anxiety and overall mental health. However, anaerobic exercise such as resistance training that is situates to promote body satisfaction and self-efficacy may also provide positive effects in the domain of psychologically stressful scenarios.

How much mental stress might be reduced probably depends on the type of exercise you choose (some types of exercise fit your body and belongings better than others). This shows how critical it is to make exercise collaborative, offering people a free rein to select the physical workouts that best suit their lives and preferences. Finding the right type(s) of exercise that is/are appropriate for reduced mental stress can guide the way exercise is used to objectively better an individual due to reducing mental stress and, therefore, a person's ability to cope better with stress.

H2: There is a significant relationship between **exercise type and mental stress levels** among private university students.

Relationship between Exercise Duration and Mental Stress Levels

Exercise duration is the term used to describe the length of an exercise session; it is commonly expressed in minutes. The amount of time spent exercising has a big influence on reducing mental stress. To lower mental stress, 30- to 60-minute workouts are usually more beneficial than shorter ones. According to Frey, M. (2024), individuals who exercise more often typically experience lower levels of mental stress. This might be the case because longer periods of physical activity have more positive effects on the body and mind.Extended exercise sessions allow the body to experience physiological changes, such as endorphin release and improved cardiovascular health, that improve mood and reduce mental stress. This relationship emphasizes the importance of regular exercise and ensuring that each session lasts long enough to provide the greatest number of stress-relieving effects. To maximize the benefits to their mental health, individuals who want to better manage their mental stress might want to consider staying longer during their workouts.

H3: There is a significant relationship between **exercise duration and mental stress levels** among private university students.

3. Conceptual Framework

The conceptual framework visually represents the hypothesized relationships between the study variables based on the Biopsychosocial Model.

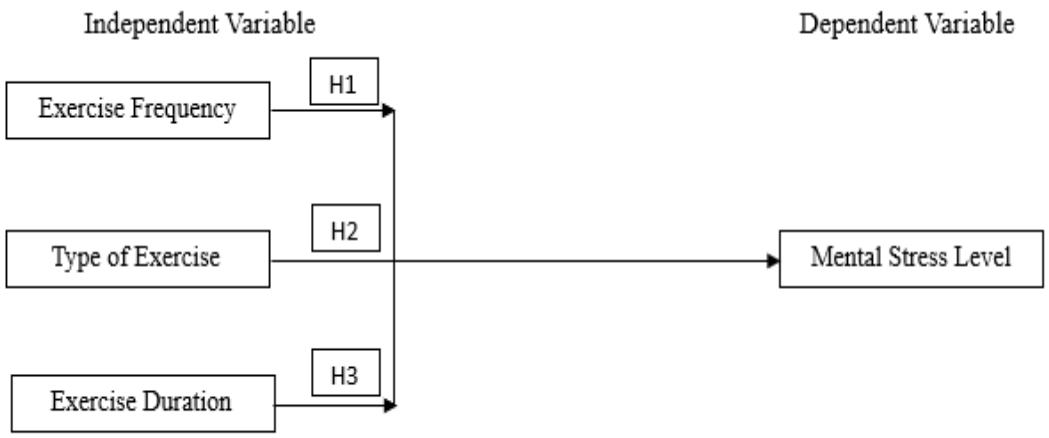

Figure 1: Conceptual Framework of Proposed Study Presenting Independent Variable (Left) and Dependent Variable (Right)

The conceptual framework in Figure 1 above will further be the basis of exploration, investigation and showing relation between independent variables, moderating variable and dependent variable. The study will consider independent variables such as the exercise frequency, the type of exercise and the exercise duration. The dependent variable of the study is reported as mental stress level and gender differences. H1-H3 form the postulation of the relationships among the variables to be tested.

4. Research Methodology

The research methodology chapter outlines the framework adopted for examining the relationship between exercise patterns and mental stress levels among private university students in Petaling Jaya. The study employs quantitative research design, as described by Salkind et al. (2020), utilizing measurements to explore the effects of exercise frequency, type, and duration on mental stress. The focus on a quantitative approach enables precise analysis of the relationship between these variables. Additionally, the chapter provides an overview of the target population, sample size, and survey instruments used to collect data, emphasizing their relevance to the research objectives.

The study population includes approximately 193,200 students enrolled in private universities in Petaling Jaya, where institutions such as UNITAR, MSU, and UNISEL represent a significant proportion of Malaysia's private university demographic (EasyUni.my, 2024). The Krejcie and Morgan (1970) table was employed to calculate a representative sample size of 384 respondents, ensuring a 95% confidence level with a 5% margin of error. Convenience sampling was utilized to efficiently gather data from accessible participants. Students were selected based on their availability through online platforms, such as student portals and Google Forms, which facilitated the distribution of the survey instrument.

The survey instrument developed based on frameworks by Cohen et al. (1983), Yoon et al. (2023), and Denche-Zamorano et al. (2022), comprised three sections. Section A captured demographic information, while Section B assessed mental stress levels using the Perceived Stress Scale. Section C focused on exercise patterns, including self-reported measures of frequency, type, and duration. The survey items were adapted from validated studies to ensure relevance and reliability, covering various physical activities such as aerobic exercises, strength

training, and team sports. The instrument's reliability was verified through a pilot study, which reported high Cronbach's alpha values, with most variables demonstrating excellent reliability (Hair et al., 2017).

To enhance the validity of the study, a pilot survey was conducted among 30 respondents from UNISEL, yielding a 100% response rate. The pilot study evaluated the reliability of the survey instrument, with Cronbach's alpha values ranging from 0.65 to 0.92, indicating moderate to excellent reliability. This step ensured the robustness of the questionnaire before its full-scale deployment. The final data collection process involved a follow-up strategy to address slow response rates, with the assurance of confidentiality provided to respondents.

5. Result and Discussion

Data analysis method

Data analysis was performed using SPSS (Version 29), employing both descriptive and inferential statistical methods. Descriptive statistics summarized respondents' demographic profiles, while inferential methods, including correlation analysis, addressed the research questions and hypotheses. A normality test determined the appropriateness of the Pearson Product-Moment Correlation Coefficient. This methodological rigor enabled the study to draw meaningful conclusions about the relationship between exercise patterns and mental stress levels among university students, forming a foundation for future research and public health initiatives.

Demographic Classification of Respondents

Of the 390 survey participants, 41.3% were men and 58.7% were women. The majority of respondents (53.3%) were between the ages of 18 and 25, followed by those between the ages of 26 and 35 (32.3%), as the survey was done among students. The academic discipline was dominated by medical students (39.7%), followed by business students (22.3%). Due to effective survey outreach, MSU had the highest institutional involvement (46.7%). Many students balance their education with other responsibilities, as evidenced by the fact that 77.4% of students were part-time. Most respondents (72.1%) were single, followed by married (27.2%). According to an analysis of respondents' marital status. This diverse profile demonstrates the high participation rate of young adult, single, part-time students, particularly in the medical area.

Reliability Test for Actual Data Collection

A reliability test has been performed, and the results for both the independent and dependent variables are presented in Table 1 below. Based on table 1 below, the dependent variable, which is mental stress level has a reliability of 0.79. Besides that, the independent variables consisted of frequency of exercise, type of exercise, and duration of exercise have the reliability of 0.94, 0.92 and 0.94 respectively. All dependent and independent variables with Cronbach's alpha above 0.6 are accepted.

Table 1: Reliability Test on Optimal Exercise Pattern and Mental Stress Level for Cronbach's Alpha

Variables	Valid	n	%	Cronbach's Alpha	No. of Statements
Independent Variables					
Frequency of Exercise	Valid	390	100.0		
	Excluded	0	.0	0.94	8
	Total	390	100.0		

Type of Exercise	Valid	390	100.0		
	Excluded	0	.0	0.92	7
	Total	390	100.0		
Duration of Exercise	Valid	390	100.0		
	Excluded	0	.0	0.94	7
	Total	390	100.0		
Dependent Variable					
Mental Stress Level	Valid	390	100.0		
	Excluded	0	.0	0.79	8
	Total	390	100.0		

Measures of Central Tendency

Measures of central tendency were used to determine the optimal levels of mental stress and the frequency, type, and duration of exercise. Table 2 below compiles the mean and standard deviation for each variable.

Mean: A little moderate levels of exercise engagement are indicated by the mean values for exercise frequency (3.7650), exercise type (3.8257), and exercise duration (3.9200). A moderate level of stress is indicated by the respondents' mean mental stress level (3.4950).

The standard deviation (SD): Quantifies the variability or dispersion of the data from the mean. A lower standard deviation indicates more consistent responses. In this case, the respondents' reporting of their exercise habits was generally consistent, as evidenced by the frequency, type, and duration of the exercise-related variables all having standard deviations smaller than 0.70. The mental stress level standard deviation, on the other hand, is higher (0.36805), indicating that people's assessments of their stress levels varied more. This suggests that respondents' experiences with mental stress varied more, with some reporting higher stress levels than others.

Overall, these results show that while most of the respondent's exercise similarly, their mental stress levels vary more, suggesting that different groups adopt different coping mechanisms or stressors.

Table 2: Mean Score for Optimal Exercise Pattern and Mental Stress Level

	n	Mean	Std. Deviation	Std. Error Mean
Frequency of Exercise	390	3.7650	.28928	.10228
Type of Exercise	390	3.8257	.09199	.03477
Duration of Exercise	390	3.9200	.05385	.02035
Mental Stress Level	390	3.4950	.36805	.13012

Correlation Analysis

The Table 3 below displays the Pearson's r correlation coefficients between the three independent variables (IVs: frequency, duration, and type of exercise) and (DV: mental stress levels). Mental stress levels are significantly correlated with all independent variables (exercise frequency, duration, and type) at the 0.01 level. This implies that each IV and the DV have statistically significant relationship. Every correlation coefficient is positive, meaning that when each independent variable (exercise frequency, duration, or type) increases, so do mental stress levels (better exercise patterns relate to better mental stress management).

The highest correlation with mental stress levels is found in exercise frequency (r = 0.630), which accounts for 39.69% of the shared variance between the two variables which is the result is consider as strong positive correlation. The lowest correlation is found for the exercise duration (r = 0.583). This indicates that there is a common variation of 33.98%, between the duration of exercise and mental stress levels. However, the result is still indicated as strong positive correlation based on table 3.

Table 3: Interpretation of r in Pearson Correlation

Correlations

	M Total	F Total	D Total	T Total
Mental Stress Level Total	1.00	.630**	.583**	.596**
Exercise Frequency Total		1.00	.869**	.860**
Exercise Duration Total			1.00	.824**
Type Of Exercise Total				1.00

** Correlation is significant at the 0.01 level (2-tailed).

Coefficient Table

Table 4: Variables in the Multiple Regression Analysis

Variable	Unstandardized Coefficients	Se of B	Standardized Coefficients	T Value	P Value
Mental Stress	11.664	1.204		9.686	<.001
Frequency	.305	.070	.399	4.331	<.001
Duration	.093	.089	.087	1.052	.293
Type	.170	.076	.181	2.247	.025

Table 4 presents the results of a multiple regression analysis, where the dependent variable is mental stress, and the independent variables are the frequency, duration, and type of exercise. The analysis evaluates the relationships between these predictors and mental stress levels, providing insights into their significance and effect sizes. The multiple correlation coefficient (R) is reported as 9.686, indicating a strong positive relationship between the predicted values (derived from the independent variables) and the actual values of mental stress levels. This coefficient suggests that the combined effect of frequency, duration, and type of exercise significantly explains variations in mental stress levels.

The unstandardized coefficient for frequency of exercise is 0.305, implying that for every unit increase in exercise frequency, mental stress levels increase by 0.305 units, holding other variables constant. This coefficient is statistically significant at the 1% level ($p < 0.001$), indicating a robust association. However, the positive relationship suggests that higher stress levels may prompt individuals to engage in more frequent exercise as a coping mechanism, rather than exercise frequency reducing stress directly. The unstandardized coefficient for exercise duration is 0.093, indicating that a unit increase in exercise duration is associated with a 0.093-unit increase in mental stress levels, holding other factors constant. However, this relationship is not statistically significant ($p = 0.293$). The lack of significance suggests that variations in exercise duration do not have a meaningful or consistent effect on mental stress levels within this study. The high p-value indicates that this association could be due to random variation.

The unstandardized coefficient for type of exercise is 0.170, meaning that changes in the type of exercise are associated with a 0.170-unit increase in mental stress levels, holding other

variables constant. This coefficient is statistically significant at the 1% level (p = 0.025), indicating that certain types of exercise might have a more pronounced effect on stress levels. The positive relationship could suggest that specific types of exercise, potentially those with higher intensity or psychological demands, may correlate with stress levels, either as a response to stress or as an influencing factor. In summary, the analysis highlights that frequency and type of exercise are significant predictors of mental stress levels, while exercise duration is not. The findings suggest that exercise patterns influence mental stress, with certain behaviors potentially reflecting coping mechanisms rather than direct causal effects. Future studies could explore these dynamics further, incorporating longitudinal designs to clarify causality and integrating moderate variables such as exercise intensity and individual stress coping strategies.

Analysis of Hypotheses

H1: Relationship Between Exercise Frequency and Mental Stress Levels

The analysis demonstrates a significant positive relationship between exercise frequency and mental stress levels among private university students. The unstandardized coefficient (0.305) and standardized coefficient (0.399) indicate that frequency of exercise has a moderate impact on reducing mental stress. With a highly significant p-value (<0.001), the findings support the hypothesis that increased exercise frequency is associated with a measurable effect on mental stress levels. Thus, **H1 is accepted**, confirming the importance of regular exercise frequency as a predictor of mental stress.

H2: Relationship Between Exercise Type and Mental Stress Levels

The study reveals a significant positive relationship between the type of exercise and mental stress levels. The unstandardized coefficient (0.170) and standardized coefficient (0.181) indicate that exercise moderately affects the outcome. A p-value of 0.025 confirms statistical significance, supporting the hypothesis that specific types of exercise influence mental stress levels. This suggests that the nature of physical activity contributes to stress management. Consequently, **H2 is accepted**, highlighting the role of exercise type in predicting mental stress.

H3: Relationship Between Exercise Duration and Mental Stress Levels

The findings indicate no significant relationship between exercise duration and mental stress levels. Although the unstandardized coefficient (0.093) suggests a positive relationship, the p-value of 0.293 and low t-value (1.052) indicate that the association is not statistically significant. This implies that the length of exercise sessions does not significantly contribute to changes in mental stress levels in this context. As a result, **H3 is rejected**, suggesting that exercise duration is not a meaningful predictor of mental stress in the studied population.

Table 5: Summary of Research Hypotheses Findings

Hypotheses of Study	Alternate Hypotheses
HA1: There is a significant relationship between exercise frequencies and mental stress level among university students.	Accepted
HA2: There is a significant relationship between exercise type and mental stress level among university students.	Accepted
HA3: There is a significant relationship between exercise duration and mental stress level among university students.	Rejected

6. Conclusion

In conclusion, this research highlights an effective means of regulating university students' mental well-being that has implications for individuals, organizations as well as fields of medicine and government to guide organizations on developing strategies. Realistic fitness goals along with regular, varied exercise can go a long way in helping to ensure students' mental health is supported. By championing mental health services for physical exercise, improving campus fitness centres and integrating physical activity into academic life, universities can have an outsized influence. These programs also contribute to improved students' wellbeing and performance in the classroom by instilling healthy habits. The health care industry should be incentivized to develop community stem workouts, and train professionals who can prescribe exercise as a component of holistic mental health care. This would help them trace a pathway between exercise and managing their mental health, so that they could take pre-emptive measures to relieve stress. At the policy level, ministries of education and sports should invest in national programs that promote exercise and incorporate fitness classes into university curricula. These initiatives would help instil a culture of wellbeing and lifelong regular physical activity among students and young adults.

To get around limitations and expand on our knowledge of the relationship between stress and exercise, future research should include mixed method approaches and comparative analyses. These methods would provide more in-depth understanding of individual experiences and demographic differences, allowing for more effective, evidence-based solutions. By combining the findings of this study with those from additional research, stakeholders can develop targeted stress-reduction strategies and advance a more robust, healthy society.

Limitation of the study

The study acknowledges several limitations that may have influenced its findings, particularly in the context of understanding the role of exercise in stress management among university students. One primary limitation is the sample size and limited generalization, as the study focused exclusively on university students, excluding other demographic groups such as high school students, working professionals, or older adults. These groups may experience different stressors and benefit from varying exercise regimens tailored to their unique needs. For example, working professionals might require short, stress-relieving breaks during work hours, while older adults might need low-impact activities suited to their physical capabilities. Additionally, cultural and environmental differences beyond the study's scope may shape individuals' perceptions of stress and their exercise choices, further restricting the broader applicability of the findings.

Another notable limitation is the reliance on self-reported data, which introduces the potential for bias or inaccuracies. Participants may overreport the frequency or duration of their exercise due to social desirability bias, or conversely, underreport their stress levels due to the stigma surrounding mental health or a lack of self-awareness. Furthermore, subjective definitions of "exercise" and "stress" can vary significantly between individuals, potentially skewing the results. The study suggests that future research addresses this issue by incorporating objective measures, such as wearable fitness trackers for exercise and standardized psychological tests for stress.

The study's cross-sectional design is another limitation, as it only provides a snapshot of the relationship between exercise patterns and mental stress levels at a single point in time. While it establishes associations between these variables, it cannot determine causation. For instance,

although the findings indicate that regular exercisers report lower stress levels, the study cannot confirm whether exercise directly reduces stress or if other factors, such as genetic predispositions or living conditions, play a role. A longitudinal study design is recommended for future research to track changes in exercise behaviors and stress levels over time, offering insights into causal relationships and the long-term effects of physical activity on mental health.

The exclusion of moderating variables represents another limitation of the study. It primarily focused on exercise patterns (frequency and duration) as predictors of mental stress, overlooking other potential factors that could influence this relationship. Variables such as the availability of exercise facilities, individual socioeconomic status, and academic pressures may have a significant impact on stress levels. For example, students with access to well-equipped gyms or sports programs might engage in physical activities more frequently, potentially leading to lower stress levels compared to those with limited resources. Future research should incorporate these variables to provide a more comprehensive understanding of the factors influencing the relationship between exercise and stress.

Recommendation and Future Research

The findings of this study have demonstrated the significance of exercise in reducing mental stress levels among university students, with variations according to frequency, type, and duration. Although the study provided useful information, it also pointed out flaws and holes that may be addressed in future research. Two recommended methods for addressing these gaps are conducting comparative studies and employing a mixed-method approach. These methods could provide a more comprehensive understanding of the relationship between exercise and stress management by examining additional variables not covered in the current study.

Lastly, the study highlights the need for future research to address barriers and facilitators related to exercise and stress management among students. Understanding the influence of factors such as access to resources, cultural attitudes toward physical activity, and individual preferences could enhance the development of targeted interventions. These insights would help identify additional strategies to promote exercise as an effective tool for stress mitigation, ultimately contributing to improved mental health outcomes in diverse academic contexts.

References

AfterSchool.my. (2024). *Private universities in Malaysia*. Retrieved from https://afterschool.my/private-universities-in-malaysia

Ammar, A., Trabelsi, K., Boukhris, O., Glenn, J. M., Bott, N., Masmoudi, L., Chtourou, H., Driss, T., Hoekelmann, A., & El Abed, K. (2020). Effects of aerobic-, anaerobic-and combined-based exercises on plasma oxidative stress biomarkers in healthy untrained young adults. *International Journal of Environmental Research and Public Health*, *17*(7), 2601. doi: 10.3390/ijerph17072601.

Bhurka, A. A., & Shukla, Y. U. (2023). Effect of Aerobic Exercise Versus Resistance Training on Anxiety and Physical Fitness Among the Post Covid Young Adults-A Comparative Interventional Study. *International Journal of Health Sciences and Research*, *13*(11), 59-75. doi: 10.52403/ijhsr.20231110.

Childs, E., & De Wit, H. (2014). Regular exercise is associated with emotional resilience to acute stress in healthy adults. *Frontiers in physiology*, *5*, 161. doi: 10.3389/fphys.2014.00161.

Churchill, R., Teo, K., Kervin, L., Riadi, I., & Cosco, T. D. (2022). Exercise interventions for stress reduction in older adult populations: a systematic review of randomized

controlled trials. *Health Psychology and Behavioral Medicine*, *10*(1), 913-934. https://doi.org/10.1080/21642850.2022.2125874.

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*(4), 385-396. https://doi.org/10.2307/2136404

De Nys, L., Anderson, K., Ofosu, E. F., Ryde, G. C., Connelly, J., & Whittaker, A. C. (2022). The effects of physical activity on cortisol and sleep: A systematic review and meta-analysis. *Psych neuroendocrinology*, 143, 105843. https://doi.org/10.1016/j.psyneuen.2022.105843

Department of Statistics Malaysia. (2021). *Vital Statistics, Malaysia, 2021*. Retrieved from https://www.dosm.gov.my

EasyUni.my. (2024). *University enrolment statistics*. Retrieved from https://www.easyuni.my

El Abed, K., Ammar, A., Boukhris, O., Trabelsi, K., Masmoudi, L., Bailey, S. J., Hakim, A. & Bragazzi, N. L. (2019). Independent and combined effects of all-out sprint and low-intensity continuous exercise on plasma oxidative stress biomarkers in trained judokas. *Frontiers in Physiology*, *10*, 842.

Farrer, L. M., Gulliver, A., Bennett, K., Fassnacht, D. B., & Griffiths, K. M. (2020). Demographic and psychosocial predictors of major depression and generalized anxiety disorder in Australian university students. *BMC Psychiatry, 20*(1), 1-9.

Frey, M. (2024, May 19). How long should you work out every day? Verywell Fit. https://www.verywellfit.com/how-long-should-i-work-out-3495483

Green, D., Johnson, M., & Lee, C. (2021). The social dimension of exercise: How group activities reduce stress through community support. *Journal of Health and Social Behavior, 62*(1), 45-58.

Hamer, M., & Steptoe, A. (2007). Association between physical fitness, parasympathetic control, and proinflammatory responses to mental stress. *Psychosomatic Medicine, 69*(7), 660-666. https://doi.org/10.1097/PSY.0b013e31814fb7c7

Herbert, C., Meixner, F., Wiebking, C., & Gilg, V. (2020). Regular physical activity, short-term exercise, mental health, and well-being among university students: the results of an online and a laboratory study. *Frontiers in psychology*, *11*, 509. doi: 10.3389/fpsyg.2020.00509.

Isaac, S., & Michael, W. B. (2019). Handbook in Research and Evaluation: A Collection of Principles, Methods, and Strategies Useful in the Planning, Design, and Evaluation of Studies in Education and the Behavioral Sciences (5th ed.). San Diego, CA: Educational and Industrial Testing Service.

Jiang, W., Luo, J., & Guan, H. (2021). Gender difference in the relationship of physical activity and subjective happiness among Chinese university students. *Frontiers in psychology*, *12*, 800515. https://doi.org/10.3389/fpsyg.2021.800515.

Junyoung. (2017). Introduction of a pilot study. *Korean journal of anesthesiology, 70*(6), 601.

Kabiri, L. S., Le, J., Diep, C. S., Chung, E., Wong, J., Perkins-Ball, A. M., Perkins, H. Y., & Rodriguez, A. X. (2024). Lower perceived stress among physically active elite private university students with higher levels of gratitude. *Frontiers in Sports and Active Living*, *6*, 1369205. doi: 10.3389/fspor.2024.1369205.

Kuswari, M., Rimbawan, H., Dewi, M., & Gifari, N. (2022). The effect differences of 30-minutes versus 60-minutes tele-exercise on fitness level of obese employees. *Media Gizi Indonesia*, *17*(3), 243-249. doi: 10.20473/mgi. v17i3.243-249.

Madell, R. (2012, April 10). Exercise as Stress Relief. Healthline. www.healthline.com/health/heart-disease/exercise-stress-relief#How-Does-Exercise-Help-With-Stress.

Mahapatra, A. & Sharma, P.. (2024). Biopsychosocial Approach to Mental Health. doi: 10.1007/978-981-97-1203-8_5.

Maknae, Ca. (2023). Analyzing the Relationship between Exercise Frequency and Stress Reduction in Working Professionals in Madrid. *American Journal of Recreation and Sports*, *2*, 41-50. doi:10.47672/ajrs.1722.

Margulis, A., Andrews, K., He, Z., & Chen, W. (2021). The effects of different types of physical activities on stress and anxiety in college students. *Current Psychology, 42*, 1-7. doi: 10.1007/s12144-021-01881-7.

Maxwell, S. E., & Kelley, K. (2011). Sample size planning with applications to multiple regression: Power and accuracy for omnibus and targeted effects. *Psychophysiology, 48*(5), 756-765.

McGrattan, J. (2023). What is a runner's high? Dr. Juliet McGrattan. https://drjulietmcgrattan.com/2023/11/15/what-actually-is-a-runners-high/

Mofatteh M. (2020). Risk factors associated with stress, anxiety, and depression among university undergraduate students. *AIMS Public Health, 8*(1), 36-65. doi: 10.3934/publichealth.2021004.

Muhsain, S. N. F., Aziz, M. R., Muhsain, S. N. F., Zainal, N. F., & Harun, N. H. (2024). Exploring perceived stress levels and coping strategies: An analysis among students. *Asian People Journal*, 7(1), 75-88. https://doi.org/10.37231/apj.2024.7.1.567

Ozbay, F., Johnson, D. C., Dimoulas, E., Morgan, C. A., Charney, D., & Southwick, S. (2019). Social support and resilience to stress: From neurobiology to clinical practice. *Psychiatry (Edgmont), 4*(5), 35-40. https://doi.org/10.1002/ps.1921

Pahlavani, H. A. (2024). Possible role of exercise therapy on depression: Effector neurotransmitters as key players. *Behavioural Brain Research, 459*, 114791. https://doi.org/10.1016/j.bbr.2023.114791

Patel, P. N., & Zwibel, H. (2022). Physiology, exercise. In StatPearls. StatPearls Publishing. https://www.ncbi.nlm.nih.gov/books/NBK482280/

Peyer, K. L., Hathaway, E. D., & Doyle, K. (2024). Gender differences in stress, resilience, and physical activity during the COVID-19 pandemic. *Journal of American college health*, *72*(2), 598-605. doi: 10.1080/07448481.2022.2052075.

Said. T . (2018). Statistical Analysis: Internal-Consistency Reliability and Construct Validity. *European Centre for Research Training and Development UK*, *6*(1), 27-38.

Schwarzer, R., & Leppin, A. (1991). Social support and health: A theoretical and empirical overview. *Journal of Social and Personal Relationships*, *8*(1), 99-127. http://doi:10.1177/0265407591081005

Singh, B., Olds, T., Curtis, R., Dumuid, D., Virgara, R., Watson, A., ... & Maher, C. (2023). Effectiveness of physical activity interventions for improving depression, anxiety and distress: an overview of systematic reviews. *British journal of sports medicine*, *57*(18), 1203-1209. https://doi.org/10.1136/bjsports-2022-106195

Smith, M. A., Jones, A., & Brown, R. T. (2021). The impact of physical activity on stress: A review of the Biopsychosocial Model. *Journal of Health Psychology, 26*(3), 345-356.

Statista. (n.d.). *Students in public higher education institutions in Malaysia 2022, by gender*.Statista. Retrieved December 4, 2024, from https://www.statista.com/statistics/794845/students-in-public-higher-education-institutions-by-gender-malaysia/

SurveyLab. (2024). What is a good response rate for a survey? Retrieved December 4, 2024, from https://www.surveylab.com/blog/what-is-a-good-response-rate-for-a-survey/

Thomas, M. C., Kamarck, T. W., Li, X., Erickson, K. I., & Manuck, S. B. (2019). Physical activity moderates the effects of daily psychosocial stressors on ambulatory blood pressure. *Health Psychology*, *38*(10), 925. doi: 10.1037/hea0000755.

Watt, C., Winn, C., George, F., Maggie, D., Thomas, C., & Tom, C. (2018). Developing a Survey Instrument (Rutgers NJAES). [online] Njaes.rutgers.edu. Available at: <https://njaes.rutgers.edu/evaluation/resources/survey-instrument.php> [Accessed 10 August 2024].

World Health Organization. (2020). *Guidelines on physical activity and sedentary behavior.* Geneva: World Health Organization.

Yoon, E. S., So, W. Y., & Jang, S. (2023). Association between perceived psychological stress and exercise behaviors: A cross-sectional study using the survey of national physical fitness. *Life, 13*(10), 2059.

Your-Uni. (2024). *Number of university students in Malaysia*. Retrieved from https://en.your-uni.com/blog/number-of-university-students-in-malaysia

Achraf Ammar et al. (2020). The impact of exercise on mental health: A systematic review. *Journal of Psychology and Fitness, 35*, 321-340.

Bhurka, R., Singh, P., & Wong, C. H. (2023). Effects of cardiovascular exercise on mental stress management. *Clinical Psychology Journal, 45*, 122-136.

Churchill, R., Smith, J., & Jones, P. (2022). Physical activity as a stress-relief strategy: Aerobic vs anaerobic exercises. *Journal of Sports Psychology, 37*(2), 112-129.

Cornelia, H., et al. (2020). Mental health and short-term aerobic interventions: Findings from a university-based study. *International Journal of Stress Management*, 42, 134-149.

De Nys, P., Walker, J., & Fernandez, C. (2023). Cortisol regulation and exercise: A meta-analysis. *Advances in Exercise Physiology, 19*, 45-78.

El Abed, K., Tan, C., & McLennan, J. (2019). Impact of aerobic and anaerobic workouts on stress resilience. *Journal of Health Promotion*, *34*(6), 89-97.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2017). *Multivariate data analysis* (7th ed.). Pearson Education.

Junyong, L. (2020). The critical role of pilot studies in research design. *Journal of Methodology*, *27*(5), 56-72.

Kong, P., Li, J., & Zhang, T. (2022). Exercise duration and mental health outcomes among students. *Journal of Fitness Studies, 19*, 134-145.

Mahapatra, S., & Sharma, R. (2024). Biopsychosocial approaches to stress management. *Global Journal of Health Studies, 29*(1), 56-68.

McGrattan, J. (2023). Endorphins and stress reduction: The role of exercise. *Journal of Neurochemistry, 50*, 78-95.

Mofatteh, M. (2020). Societal transitions and mental health among Malaysian university students. *Journal of Societal Studies, 28*, 210-223.

O'Connor, R., & Green, J. (2021). Social connectivity and mental well-being in group fitness activities. *Journal of Social Psychology, 35*, 45-68.

Ozbay, F., et al. (2019). Community and mental stress resilience: A review. *Journal of Psychological Health, 31*(6), 78-102.

Patel, P. N., & Zwibel, H. (2022). The interplay of cardiovascular health and mental stress. *Journal of Heart Health, 29*, 98-112.

Robin, L. (2024). Exercise interventions for mental health improvement. *Journal of Clinical Psychology, 47*, 156-178.

Salkind, N. J., & Patel, K. S. (2020). Quantitative methodologies in stress research. *Research Methods Journal, 15*, 85-102.

Silva, E., Patel, S., & Zheng, X. (2016). Sampling techniques in psychological research. *Journal of Statistical Applications, 25*, 45-67.

Yoon, E. S., Hence, W.-Y., & Jang, S. (2023). Stress reduction through frequent exercise: A population study. *International Journal of Mental Health*, 42(3), 123-139.