

**PHYSICAL ACTIVITY AND MENTAL HEALTH
AMONG UNDERGRADUATE STUDENTS AT
UNIVERSITI SAINS MALAYSIA HEALTH
CAMPUS**

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**PHYSICAL ACTIVITY AND MENTAL HEALTH
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CAMPUS**

by

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**Dissertation submitted in partial fulfilment of the requirements
for the degree of
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DECLARATION

I hereby declare that this dissertation is the result of my own investigations, except where otherwise stated and duly acknowledged. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at Universiti Sains Malaysia or other institutions. I grant Universiti Sains Malaysia the right to use the dissertation for teaching, research and promotional purposes.



.....

Nurul Huda Binti Mulyadi

Date: 3 August 2025

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TABLE OF CONTENTS

CERTIFICATE.....	iii
DECLARATION.....	iv
ACKNOWLEDGEMENT.....	v
TABLE OF CONTENTS.....	vi
LIST OF TABLES.....	ix
LIST OF FIGURES.....	x
LIST OF ABBREVIATIONS.....	xi
LIST OF APPENDICES.....	xii
ABSTRAK.....	xiii
ABSTRACT.....	xv
CHAPTER 1 INTRODUCTION.....	1
1.1 Introduction.....	1
1.2 Background of Study	1
1.3 Problem Statement	4
1.4 Research Questions	7
1.5 Research Objectives	8
1.5.1 General Objective	8
1.5.2 Specific Objectives.....	8
1.6 Research Hypothesis.....	9
1.7 Significance of study	9
1.8 Definitions of Operational Terms.....	11
CHAPTER 2 LITERATURE REVIEW.....	12
2.1 Introduction.....	12
2.2 Physical Activity	16
2.3 Mental Health.....	18

2.4	Relationship between physical activity and mental health among undergraduate students.....	20
2.5	Socio-demographic factors associated with physical activity	22
CHAPTER 3 METHODOLOGY.....		27
3.1	Introduction.....	27
3.2	Research Design.....	27
3.3	Study Setting and Population	27
3.3.1	Sample criteria	28
3.3.1(a)	Inclusion criteria.....	28
3.3.1(b)	Exclusion criteria.....	28
3.4	Sampling Plan.....	28
3.4.1	Sample Size Estimation	28
3.4.2	Sampling Methods	33
3.5	Instrumentation	33
3.5.1	Translation of instrument.....	37
3.5.2	Validation and reliability of instrument.....	37
3.6	Variables.....	38
3.6.1	Measurement of Variables and Variable Scoring	39
3.7	Data collection methods.....	42
3.7.1	Flow Chart of Data Collection	43
3.8	Ethical Consideration.....	44
3.9	Data Analysis.....	45
CHAPTER 4 RESULT.....		47
4.1	Introduction.....	47
4.2	Socio-demographic Characteristics.....	47
4.3	Physical Activity of Undergraduates at USM Health Campus.....	49
4.4	Mental Health of Undergraduates at USM Health Campus.....	50

4.5	Relationship between physical activity with mental health among undergraduate students in USM, Health Campus	51
4.6	Association between physical activity and socio-demographic (gender and years of study).....	51
CHAPTER 5 DISCUSSION.....		54
5.1	Level of Physical Activity.....	54
5.2	Level of Mental Health among Undergraduate students	57
5.3	Relationship between Physical Activity and Mental Health	59
5.4	Association between physical activity and sociodemographic (gender and years of study).....	60
5.5	Strength and Limitations.....	63
CHAPTER 6 CONCLUSION AND FUTURE RECOMMENDATIONS.....		65
6.1	Introduction.....	65
6.2	Summary of the study findings.....	65
6.3	Implication and Recommendations.....	66
6.3.2	Implication to Nursing Practice.....	66
6.3.3	Recommendation for Future Research.....	67
6.4	Conclusion	68
REFERENCES.....		69
APPENDICES		

LIST OF TABLES

	Page
Table 3.1 Independent and dependent variables.....	38
Table 3.2 Questions number of sub scales.....	42
Table 3.3 Scoring of questionnaire	42
Table 4.1 Socio-demographic Characteristics of undergraduate students at USM Health Campus	48
Table 4.2 Physical Activity shows the frequency and percentage of physical activity among undergraduate students at USM Health Campus.....	49
Table 4.3 Mental Health.....	50
Table 4.4 Relationship between physical activity with mental health among undergraduate students in USM, Health Campus.....	51
Table 4.5 Association between physical activity and socio-demographic (gender).....	52
Table 4.6 Association between physical activity and socio-demographic (Year of study).....	53

LIST OF FIGURES

	Page
Figure 1.1 Show the intensity of each physical exercise of college (Cai, 2022)	5
Figure 2.1: Show the intensity of each physical exercise of college (Cai, 2022)	13
Figure 2.2: Show the intensity of each physical exercise of college (Cai, 2022)	14
Figure 2.3: Social Cognitive Theory Framework (Bandura, 2002).....	26
Figure 2.4: Conceptual framework of the study for physical activity and mental health (Bandura, 2002.	26
Figure 3.1: Sample size Calculation for the relationship between physical activity and mental health.....	31
Figure 3.2: Sample size Calculation Sample size Calculation for the Sociodemographic Characteristic (Gender)	32
Figure 3.3: Illustrates the complete flow of the data collection process.	43

LIST OF ABBREVIATIONS

IPAQ	International Physical Activity Questionnaire
DASS-21	Depression, Anxiety and Stress Scale
USM	Universiti Sains Malaysia
WHO	World Health Organization
SCT	Social Cognitive Theory

LIST OF APPENDICES

- Appendix A: Questionnaire
- Appendix B: Research Information For Participants
- Appendix C: Consent form
- Appendix D: Ethical Approval
- Appendix E: Letter of Institutional Approval
- Appendix F: Recruitment poster
- Appendix G: Poster about relation Physical Activity and Mental Health

AKTIVITI FIZIKAL DAN KESIHATAN MENTAL DALAM KALANGAN PELAJAR SARJANA MUDA DI UNIVERSITI SAINS MALAYSIA, KAMPUS KESIHATAN

ABSTRAK

Isu kesihatan mental seperti kemurungan, kebimbangan, dan tekanan semakin kerap berlaku dalam kalangan pelajar prasiswazah. Aktiviti fizikal sering dianggap sebagai salah satu cara yang berkesan untuk menyokong kesejahteraan mental. Kajian ini bertujuan untuk menilai tahap aktiviti fizikal dan kesihatan mental (kemurungan, kebimbangan dan tekanan) dalam kalangan pelajar prasiswazah di Universiti Sains Malaysia, Kampus Kesihatan serta menentukan hubungan antara pembolehubah tersebut. Kajian ini dijalankan dari bulan Mac hingga April 2025 melibatkan 209 pelajar menggunakan borang soal selidik yang dijawab sendiri oleh responden. Soal selidik *International Physical Activity Questionnaire* (IPAQ) dan *Depression, Anxiety and Stress Scale* (DASS-21) digunakan bagi pengumpulan data. Analisis deskriptif dan ujian korelasi *Pearson* telah digunakan untuk mengkaji hubungan antara aktiviti fizikal dan kesihatan mental. Dapatan kajian menunjukkan bahawa 46.4% pelajar mempunyai tahap aktiviti fizikal yang rendah, manakala hanya 33% yang mempunyai tahap aktiviti yang tinggi. Disamping itu, keputusan terhadap tahap kesihatan mental bagi kemurungan adalah sebanyak 61.2% dalam kalangan pelajar yang berada dalam tahap normal, manakala sebanyak 15.2% pada tahap sederhana, 12.0% pada tahap ringan, 8.1% pada tahap teruk, dan sebanyak 3.3% pada tahap yang sangat teruk. Bagi kebimbangan atau “*anxiety*” hanya 4.7% pelajar berada pada tahap normal, manakala 23.9% berada pada tahap sederhana, 15.3% pada tahap teruk, dan 11.0% pada tahap ringan. Bagi tekanan atau “*stress*” pula, 80.4% pelajar berada dalam kategori normal,

dengan 7.7% tahap sederhana, 4.8% pada tahap ringan, 5.3% pada tahap teruk, dan 1.9% pada tahap sangat teruk. Walaubagaimanapun, tiada hubungan yang signifikan ditemui antara aktiviti fizikal dengan kemurungan ($p = 0.886$), kebimbangan ($p = 0.955$), atau tekanan ($p = 0.806$). Hubungan yang signifikan hanya dilihat antara jantina dan tahap aktiviti fizikal ($p = 0.029$), tetapi tiada hubungan antara tahun pengajian dan aktiviti fizikal. Kesimpulannya, walaupun tiada hubungan signifikan antara aktiviti fizikal dan kesihatan mental, kajian akan datang disarankan untuk meneroka faktor lain seperti tidur, pemakanan dan sokongan sosial dalam kaitannya dengan kesihatan mental pelajar.

PHYSICAL ACTIVITY AND MENTAL HEALTH AMONG UNDERGRADUATE STUDENTS AT UNIVERSITI SAINS MALAYSIA, HEALTH CAMPUS

ABSTRACT

Mental health problems such as depression, anxiety, and stress are becoming more common among undergraduate students. Physical activity is widely believed to support mental well-being. This study aimed to assess the levels of physical activity and mental health, specifically depression, anxiety, and stress among undergraduate students at Universiti Sains Malaysia, Health Campus and to examine the relationship between these factors. A cross-sectional study was conducted between March and April 2024 involving 209 undergraduate students. Data were collected using self-administered questionnaires, including the International Physical Activity Questionnaire (IPAQ) and the Depression, Anxiety and Stress Scale (DASS-21). Descriptive statistics and Pearson correlation analysis were used to analyze the data. The results showed that 46.4% of students had low levels of physical activity, while only 33% reported high levels. In addition, the results for mental health levels for depression, 61.2% of students had normal levels, followed by 15.3% moderate, 12.0% mild, 8.1% severe, and 3.3% extremely severe. For anxiety, only 4.7% had normal levels, while 23.9% were moderate, 15.3% extremely severe, 9.1% severe, and 11.0% mild. As for stress, 80.4% were in the normal category, with 7.7% moderate, and 4.80% mild, 5.3% severe, and 1.9% extremely severe. However, no significant correlation was found between physical activity and depression $p = 0.886$, anxiety $p = 0.955$, or stress $p = 0.806$. A significant association was observed between gender and physical activity level $p = 0.029$, while no significant link was found between year of

study and physical activity. In conclusion, although the study did not find a significant relationship between physical activity and mental health, future research is recommended to include additional factors such as sleep patterns, dietary habits, and social support to gain a better understanding of what influences mental health among university students.

CHAPTER 1

INTRODUCTION

1.1 Introduction

1.2 Background of Study

Physical activity is any movement of the body that is produced by skeletal muscle and requires the use of energy. According to the World Health Organization (WHO), this includes moving in any form, whether for work, play, domestic chores, or as part of a commute. Both moderate and intense physical activity are beneficial to one's health. People of all skill levels can enjoy common physical fitness-promoting activities like walking, cycling, wheeling, playing sports, and indulging in active recreation (World Health Organization, 2024). Engaging in physical activity improves physical health and positively impacts mental well-being. Studies show that increased aerobic exercise levels are related to better mental health.

College students need to maintain their mental health by doing sufficient physical activity (Sullivan, 2018). They often face various health issues, including anxiety, depression, eating disorders, attention-deficit hyperactivity disorder (ADHD), and more (Pedrelli et al., 2015). According to a study, about 35% of college students currently fulfil the diagnostic criteria for a mental disorder (Sullivan, 2018). In addition, recent findings by Ma et al. (2024) indicate that male students report higher scores compared to female students. These include somatization, obsessive-compulsive symptoms, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, and paranoia. This suggests that

mental health challenges are not only widespread among university students in general but may affect male students at higher level than previously recognized. Furthermore, according to others study, approximately one in five students worldwide report experiencing symptoms of anxiety and depression, with a similar number seeking support to manage academic stress and mental health challenges (Herbert,2022). The number of undergraduate students experiencing mental health issues has increased dramatically. For instance, a long-term study carried out in the US between 2013 and 2021 found that the number of mental health diagnoses had increased by 50% (Huang et al., 2024).

According to past study findings, the university students' mental health (MH) status and physical activity (PA) level are positively correlated. This correlation can be observed when evaluating total PA and the different domains such as occupational, leisure-time, and commuting physical activity. Indeed, the higher the level of total PA performed by university students, the better their MH scores and status (Gabriel, et al., 2022). Research shows that regular physical activity can greatly enhance mental health and reduce symptoms of depression, anxiety, and stress. Some studies even suggest that physical activity can be as effective as psychotherapy in improving mental well-being. For instance, just 20 to 40 minutes of aerobic exercise has been found to improve mood and reduce anxiety for several hours. Individuals who experience acute anxiety often respond more positively to exercise than those with chronic stress (Mikkelsen et al., 2017). This is supported by findings from Fossati et al. (2021), that emphasized that although few studies explore how mental health impacts physical performance, there is much stronger

evidence confirming that exercise and sport participation significantly improve mental health outcomes.

There has been an evident decrease in activity levels in recent years, despite the increased awareness of the negative effects of inactivity on health. Research on this issue has grown significantly in importance, especially when it comes to undergraduate students. The transition to university often introduces new social connections and increases academic responsibilities, which can lead to changes in behaviour that may compromise their health. To influence the development of initiatives and health promotion policies that encourage the adoption and maintenance of healthy habits, these aspects and their relationship with this demographic must be investigated (Legey et al., 2017). At the same time, the demand for mental health services has continued to rise often outpacing the availability of resources such as psychologist, psychiatrist, and other mental health professionals. As a result, many students face long wait times and limited access to necessary care. Given these growing challenges, there is an urgent need to explore and implement preventive approaches to mental health concerns (Huang et Al.,2024).

1.3 Problem Statement

University students are young adults who in their first year of school, attend state or private university to continue their education and pursue further academic studies such as in a bachelor's or master's level of education. On average, students spend three to five years in university, during this time they must work very hard. For example, the typical weekly workload for a bachelor's degree for instance is 45.00 to 56.25 hours, most of which is devoted to sedentary activities such as studying at home or attending lectures and seminars (Herbert, 2022). Besides, many things contribute to college student's mental health, such as high academic pressure, navigating social lives, living away from family, and balancing many activities and responsibilities (Almquist & Almquist, 2023).

The students in university face a wide range of mental health issues, including anxiety, depression, eating disorders, attention-deficit hyperactivity disorder (ADHD), and other challenges. Approximately, 35% of college students meet diagnostic criteria or mental health disorder such as anxiety or depression (Almquist & Almquist, 2023). Furthermore, a significantly higher proportion of undergraduate students are diagnosed with some form of mental health illness relative to individuals and this population also tends to report higher levels of psychological distress when compared with non-students in three national surveys (Huang et al., 2024). Research has demonstrated that physical activity positively influences not only physical health but also mental health. Higher levels of aerobic exercise have been found to correlate with improved mental health outcomes (Almquist & Almquist, 2023). This finding is further supported by a study conducted by Li et al, (2024), which observed that the

level of depressive symptoms decreased by 0.062 points among university students who participated in moderate-to-vigorous physical activity (MVPA), compared to those who did not engage in such activity. This suggests that regular participation in MVPA contributes to a reduction in depressive symptoms, thus reinforcing the evidence that physical activity can serve as an effective strategy to improve mental health among undergraduate students. Physical activity and mental health have a strong relation to each other, suggesting that regular physical activity and exercise can reduce symptoms of stress, anxiety, and depression (Huang et al., 2024). Besides that, there a survey shows in Figure 1 examining university student's pattern of physical activity found that 36% of students engaged in exercise for 30 to 60 minutes per session, while 55% reported exercising for longer than 30 minutes, highlighting a promising level of engagement that may contribute to mental health benefits.

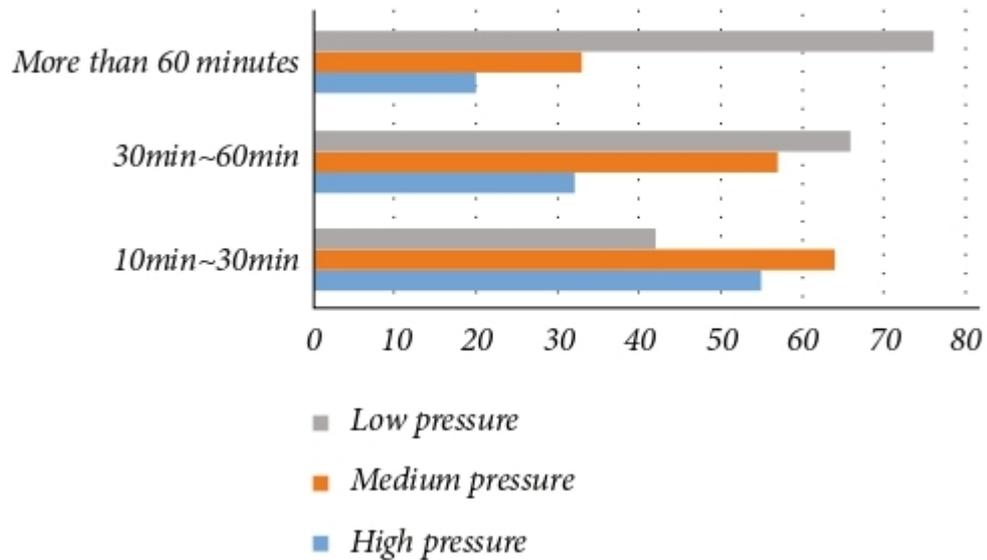


Figure 1.1 Show the intensity of each physical exercise of college (Cai, 2022)

The common barrier to physical activity engagement can be limited time and unpleasant surroundings. Given that undergraduate students have to accumulate a certain credit unit during their study term (Grasdalsmoen et al., 2020). Meanwhile, a study from (Anuar et al., 2021), the external barriers including insufficient resources, lack of support, and time constraints, emerged as significant obstacles preventing students from actively participating in their daily physical activities. This can affect their mental health. Indirectly, physical activity influences mental health through both direct mechanisms, such as endorphin release that enhances mood, and indirect mechanisms, including the improvement of sleep quality, which can contribute to better mental health outcomes (Huang et al., 2024).

Additionally, a study found that students were 1.64 times more likely to show signs of mental health issues compared to other young individuals. Also, a study revealed that 60% of undergraduate students had higher levels of anxiety and depression (Tyson et al., 2010). Nowak et al (2019) have mentioned that physical activity is widely acknowledged as a vital component of health promotion, as it improves health both biologically and psychosocially. The World Health Organization (WHO) has provided guidelines on physical activity, detailing the necessary amount and frequency to sustain and enhance overall health. Furthermore, various factors influence physical activity, including certain barriers, knowledge, and effect.

Despite evidence linking physical activity to mental health, few studies have explored this relationship among Malaysian undergraduate students, particularly at Universiti Sains Malaysia, Health Campus. This study aims to fill this gap by assessing

physical activity levels and examining their association with mental health outcomes in this population.

1.4 Research Questions

- 1) What is the level of physical activity among undergraduate students at Universiti Sains Malaysia, Health Campus?
- 2) What is the level of mental health among undergraduate students at Universiti Sains Malaysia, Health Campus?
- 3) Is there any relationship between physical activity and mental health among undergraduate students at Universiti Sains Malaysia, Health Campus?
- 4) Is there any association between physical activity and sociodemographic (gender, and years of study) among undergraduate students at Universiti Sains Malaysia, Health Campus?

1.5 Research Objectives

1.5.1 General Objective

To determine the relationship between physical activity and mental health among undergraduate students at Universiti Sains Malaysia, Health Campus.

1.5.2 Specific Objectives

- 1) To assess the level of physical activity among undergraduate students at Universiti Sains Malaysia, Health Campus.
- 2) To assess the level of mental health among undergraduate students at Universiti Sains Malaysia, Health Campus.
- 3) To evaluate the relationship between physical activity and mental health among undergraduate students at Universiti Sains Malaysia, Health Campus.
- 4) To determine the association between physical activity and sociodemographic (gender and years of study) health among undergraduate students at Universiti Sains Malaysia, Health Campus.

1.6 Research Hypothesis

Hypothesis 1

H1: There is a significant relationship between physical activity and mental health among undergraduate students at Universiti Sains Malaysia, Health Campus.

H0: There is no significant relationship between physical activity and mental health among undergraduate students at Universiti Sains Malaysia, Health Campus.

Hypothesis 2

H1: There is a significant association between physical activity and sociodemographic (gender, and years of study) health among undergraduate students at Universiti Sains Malaysia, Health Campus.

H0: There is no significant association between physical activity and sociodemographic (gender, and years of study) health among undergraduate students at Universiti Sains Malaysia, Health Campus.

1.7 Significance of study

The significance of this study is its potential to provide a comprehensive understanding of the relationship between physical activity and mental health among undergraduate students especially at University Sains Malaysia, Health Campus, such insight is essential for evaluating the development of academic literature and informing future research directions, as understanding overarching trends in this field is crucial for the progression of science (Sabe et al., 2022).

Despite the well-documented benefits of physical activity, evidence shows that up to one-third of adults and four-fifths of youth fail to meet the recommended levels of physical activity, which raises concerns about the negative impact of sedentary behavior, such as increased screen time, on health-related quality of life. Physical inactivity has also been identified as the fourth leading cause of death worldwide according to the article research (Nowak et al., 2019). A study by Legey et al.,(2017) supports that regular, moderate physical exercise can significantly reduce symptoms of depression and anxiety while improving mood, thereby having a positive effect on mental health. However, it also warns that intense and inappropriate exercise, especially over extended periods, can exacerbate issues like disrupted sleep patterns and overtraining. This concerning trend is further supported by Kljajević et al. (2021) who found that 46.7% of university students did not engage in any physical activity, while 16.7% were considered physically inactive, the study also highlighted that a weak physically active lifestyle is becoming increasingly common among university students. These findings align with the broader evidence on global inactivity and suggest an urgent need to address physical inactivity among young adults to improve their overall mental and physical well-being.

1.8 Definitions of Operational Terms

Term	Conceptual	Operational definition
Physical activity	According to the World Health Organization (WHO), physical activity is defined as any movement of the body that uses energy and involves the muscles. This includes all kinds of movement, whether it is during free time, commuting, or as a part of work or household chores. Both moderate and intense physical activities benefit health. Examples are walking, cycling, sports, and play. (World Health Organization, 2024)	In this study, the researcher will assess the level of physical activity among undergraduate's students at USM, Health Campus by using self-administered IPAQ questionnaire.
Mental health	According to the World Health Organization (WHO), mental health means having a good state of mind that helps people handle life's challenges, use their skills, learn and work effectively, and contribute to their community. Mental health issues can include mental disorders, psychological disabilities, and other conditions that cause significant stress and difficulties in daily life (World, 2022).	In this study, the researcher will assess the level of mental health such as depression, anxiety, and stress among undergraduate students at USM, Health Campus by using DASS-21-short form questionnaires.
Undergraduates students	An undergraduate student is someone enrolled in a college or university who has not yet earned a bachelor's degree, which is typically the first level of academic qualification. (UNDERGRADUATE Meaning in the Cambridge English Dictionary, 2024).	In this study, the researcher defines undergraduate students as those studying from first to five year at USM Health Campus who have not yet obtained their bachelor's degree.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This literature review provides a structured overview of current research related to this study. It explores topics such as physical activity, mental health, and the relationship between physical activity and mental health. Additionally, it outlines the conceptual framework for this study.

Physical activity refers to any bodily movement produced by skeletal muscles that requires energy expenditure. In contrast, exercise is defined as a planned, structured, repetitive, and purposeful physical activity aimed at improving or maintaining one or more components of physical fitness (Mikkelsen et al., 2017). According to Cai (2022), physical exercise stimulates various organ systems through scientific structure activities, promoting adaptive changes that enhance the human body's physiological functions and morphological structure. This results in improved physical health and fitness.

The beneficial effects of regular physical activity on mental health have been repeatedly demonstrated by research. Research indicates that physical activity may help in lowering anxiety and depressive symptoms, particularly in teenagers and young adults. According to Guo and Zhang (2022), regular activity has a good impact on mental health by reducing extra energy, reducing stress, improving interpersonal connections, raising self-esteem, and boosting self-confidence. Evidence also suggests that university students, who are more prone to stress and mental health issues, benefit greatly from physical activity in terms of their psychological health.

According to Figure 2.1 and Figure 2.2, a survey examining university student's patterns of physical activity, 36% of students engaged in exercise for 30 to 60 minutes each session, while 55% of students reported exercising for longer than 30 minutes (Cai, 2022). Additionally, the survey found that men were generally more active than women. A key finding was that exercise intensity significantly affected mental health, with moderate-intensity exercise being the most beneficial. As a result, intensity becomes essential in determining the psychological advantages that exercise provides for students.

Exercise time	Man	Woman	Total
High strength	21%	15%	36%
Medium strength	23%	20%	43%
Small strength	6%	9%	15%
Other	1%	5%	6%
Total	51%	49%	100%

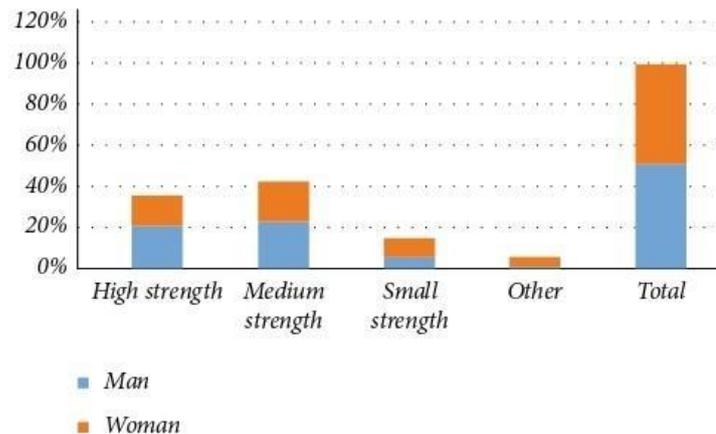


Figure 2.1: Show the intensity of each physical exercise of college (Cai, 2022)

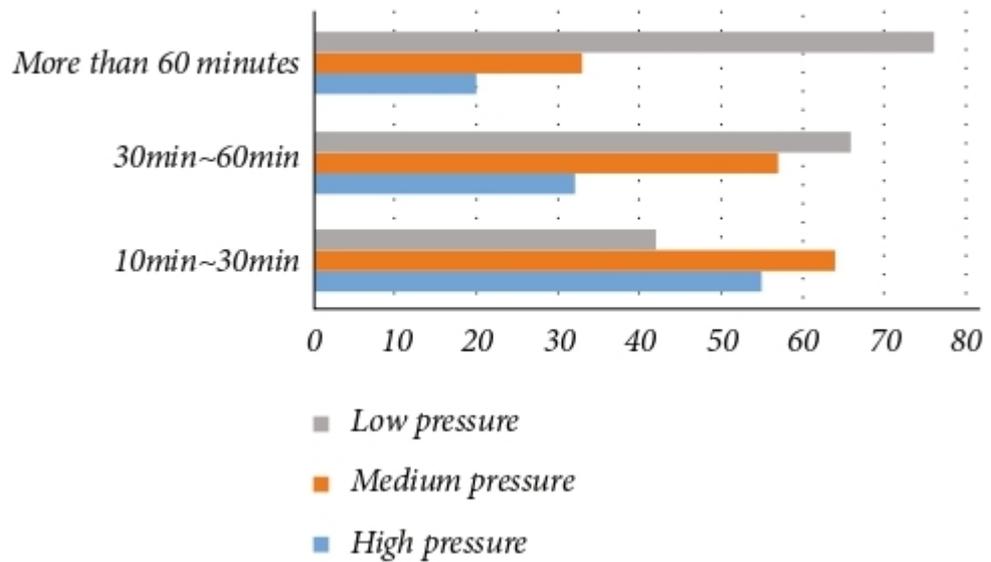


Figure 2.2: Show the intensity of each physical exercise of college (Cai, 2022)

Additional research supports the notion that moderate-intensity physical exercise is optimal for enhancing mental health, especially among college students. Nearly 80% of students surveyed in another study reported reaching at least moderate intensity during exercise, with 36% experiencing exhaustion (Cai, 2022). However, it was noted that excessive exercise could negatively affect mental health, potentially leading to mood and behavioural disorders (Mikkelsen et al., 2017). This suggests that balance is crucial, while regular physical activity can improve mental health, over-exercising may have detrimental effects. However, it is important to closely control the time and intensity of exercise to prevent negative effects like physical activity addiction, which can worsen general health.

The importance of physical activity treatments in improving mental health among university students has received more attention in recent years. According to Huang et al. (2024), physical activity treatments enhanced students' mental health outcomes in addition to increasing moderate-intensity physical activity. There is a

research deficit, nevertheless, since only five of the 59 papers that were reviewed included behavioural change theories in their intervention designs. Frameworks for behavioural change, as proposed by Hagger (2019), are crucial to ensuring that treatments are successful in encouraging long-lasting changes in the habits of physical activity.

A study from Anuar et al., (2021), the external barriers including insufficient resources, lack of support, and time constraints, emerged as significant obstacles preventing students from actively participating in their daily physical activities. The beneficial correlation between regular physical activity and several quality-of-life domains, including psychological well-being. Exercise that ranges from low to moderate intensity can be a valuable tool for students to manage stress and enhance their mental health given that they are able as a buffer against the psychological demands of a sedentary academic lifestyle.

In conclusion, the existing body of research underscores the importance of physical activity, particularly at moderate intensities, in improving the mental health of undergraduate students. Regular exercise can significantly reduce stress, anxiety, and depression while boosting self-esteem and overall psychological well-being. However, caution must be taken to avoid excessive, which can negatively impact mental health. Future research should aim to incorporate a behavioural change framework to ensure the efficacy of physical activity interventions in promoting long-term mental health benefits among students

2.2 Physical Activity

Mental health is defined as the capacity of individuals to adapt to their environment, manage their emotions, and maintain a positive state of behavioural. According to Guo and Zhang (2022), mental health encompasses self-control, the ability to perceive external influence with a balanced attitude and maintaining psychological stability. These characteristics enable individuals to cope effectively with challenges, both internal and external, ensuring their mental well-being remains intact.

Recent studies reveal that the mental health of university students is concerning. Cai (2022) found that only 5% of studies reported feeling no pressure while 25% experienced minimal stress/ the majority of students, 46% reported moderate self-pressure, and 18% felt significant self-imposed pressure. This suggests that stress is very common among students, an issue that may have a significant impact on both their mental health and academic achievement

Further research by Herbet (2022) provides additional insights into the mental health of university students. The study utilized the Beck Depression Inventory-II (BDI-II) to assess depressive symptoms and found that only 63.40% of participants scored within a range indicating no depression. In specific studies focusing on all-female samples, 16.7% of participants reported minimal depressive symptoms. Furthermore, between 29.4) and 30% of participants scored above the clinical cutoff for trait anxiety, and 23.3% to 41.83% reported state anxiety. These findings are consistent across different samples, emphasizing that university students are prone to anxiety and stress.

Additionally, university students felt stress was more frequently related to high demands and uncertainty than it was to particular negative life events (Herbert, 2022). This indicates that students are more likely to feel overwhelmed by the pressure of academic life and uncertainty of their future, contributing to their overall mental health

challenges. The COVID-19 pandemic's effects are a major factor in increasing the mental health problem. Before the epidemic, research revealed significant levels of stress, anxiety, and despair. However, studies carried out during the pandemic such as Herbert (2022) survey showed a marked rise in these mental health problems. The lockdown and restrictions imposed during the pandemic. The lockdowns and restrictions imposed during the pandemic intensified feelings of isolation, uncertainty, and stress, leading to a notable rise in depressive symptoms, anxiety, and threat.

The pandemic's impact on mental health was particularly evident in Malaysia, where multiple studies found that university students had variable degrees of stress, anxiety, and depression while under the Movement Control Order (MCO) According to Faez et al, 59.29% of students reported stress, 67.2% had symptoms of anxiety, and 65% of students showed signs of depression. These prevalence rates decreased slightly towards the end of the MCO, according to Woon et al (36.4%) for depression, 36.7% for anxiety, and 42.4% for stress (Mansor & Ahmad., 2022). These fluctuations highlight the ongoing vulnerability of university students to mental health issues, exacerbated by external factors such as the pandemic.

The results of multiple studies point to complicated interactions between university students' mental health, stress, and outside pressures. The global pandemic has intensified existing mental health challenges, with a noticeable increase in depression and anxiety levels. The variations in stress levels across different studies underscore the importance of contextualizing mental health data and considering factors such as location, external events, and individual circumstances when assessing the mental health status of university students

2.3 Mental Health

Mental health is defined as the capacity of individuals to adapt to their environment, manage their emotions, and maintain a positive state of behavioural. According to Guo and Zhang (2022), mental health encompasses self-control, the ability to perceive external influence with a balanced attitude and maintaining psychological stability. These characteristics enable individuals to cope effectively with challenges, both internal and external, ensuring their mental well-being remains intact.

Recent studies reveal that the mental health of university students is concerning. Cai (2022) found that only 5% of studies reported feeling no pressure while 25% experienced minimal stress/ the majority of students, 46% reported moderate self-pressure, and 18% felt significant self-imposed pressure. This suggests that stress is very common among students, an issue that may have a significant impact on both their mental health and academic achievement.

Further research by Herbet (2022) provides additional insights into the mental health of university students. The study utilized the Beck Depression Inventory-II (BDI-II) to assess depressive symptoms and found that only 63.40% of participants scored within a range indicating no depression. In specific studies focusing on all-female samples, 16.7% of participants reported minimal depressive symptoms. Furthermore, between 29.4% and 30% of participants scored above the clinical cut off for trait anxiety, and 23.3% to 41.83% reported state anxiety. These findings are consistent across different samples, emphasizing that university students are prone to anxiety and stress.

Additionally, university students felt stress was more frequently related to high demands and uncertainty than it was to particular negative life events (Herbert, 2022). This indicates that students are more likely to feel overwhelmed by the pressure of

academic life and uncertainty of their future, contributing to their overall mental health challenges. The COVID-19 pandemic's effects are a major factor in increasing the mental health problem. Before the epidemic, research revealed significant levels of stress, anxiety, and despair. However, studies carried out during the pandemic such as Herbert (2022) survey showed a marked rise in these mental health problems. The lockdown and restrictions imposed during the pandemic. The lockdowns and restrictions imposed during the pandemic intensified feelings of isolation, uncertainty, and stress, leading to a notable rise in depressive symptoms, anxiety, and threat.

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2.4 Relationship between physical activity and mental health among undergraduate students

In contemporary society, the understanding of health extends beyond just physical well-being to include mental health as well. For university students, engaging in regular physical activity not only enhances physical fitness but also plays a crucial role in maintaining and improving mental health. Guo and Zhang (2022) highlight the importance of physical exercise in shaping well-rounded individuals, emphasizing that promoting exercise and mental health among students is essential not only for personal development but also for societal progress.

Research shows that consistent physical activity can have profound effects on mental health. In a retrospective analysis of the Taiwanese Longitudinal Study on Aging, data spanning over a decade 1996-2007 revealed that regular exercise, even as little as 15 minutes three times a week, significantly reduced the risk of developing depressive symptoms. This suggests that even minimal, consistent exercise can positively impact mental health (Mikkelsen et al., 2017). The study also found that both aerobic and non-aerobic forms of exercise were equally effective in alleviating symptoms of mental disorders. Specifically, individuals who engage in regular physical activity experience reduced anxiety levels compared to those who are physically inactive. A meta-analysis involving 42,264 participants found that exercise was particularly beneficial in improving anxiety among individuals with clinical anxiety compared to those without such conditions (Mikkelsen et al., 2017). A study of Congsheng et al., 2022 shows that physical activity has strong positive effect on mental health. A recent study on university students found that both physical activity and participation in sport significantly predicted better mental health outcomes. Specifically, physical activity ($b = 0.402$, $p < 0.001$) and sports involvement ($b = 0.330$,

$p < 0.001$) together explained of the variation in mental health levels. These findings highlight the importance of promoting physical activity and sports among university students as a way to address rising mental health challenges in this age group .

Furthermore, regular exercise has been associated with a decreased likelihood of developing depression. Physical activity can also be used as a treatment for mild depression. A cross-sectional study involving 269 adults found that regular exercise significantly reduced the frequency of both depression and anxiety (Mikkelsen et al., 2017). These findings underline the critical role of physical activity in preventing and managing mental health conditions such as depression and anxiety.

In a more detailed analysis, a one-way ANOVA revealed a significant effect of physical activity on both depression and anxiety. For depression, the high- and low-activity groups, as well as the high- and medium-activity groups, showed significant differences, while there was no significant difference between the medium and low-activity groups. For anxiety, significant differences were observed across all physical activity levels (Tyson et al., 2010). These findings suggest that higher levels of physical activity tend to correlate with better mental health outcomes, particularly in reducing symptoms of depression and anxiety. Despite that, the broader study findings support generally positive relationship between physical activity and mental health outcomes in college populations. Regular participation in physical activity, especially at moderate to high intensities. This has been shown to act as a protective factors against common psychological issues such as depression, anxiety, and stress (Daly, 2025).

Contradictory, a more recent study conducted at IIUM Kuantan Campus found no significant association between physical activity levels and mental health status among undergraduate students. The study suggests that the non-significant findings

could be due to the small sample size, which may have limited the statistical power of the study. Despite these findings, previous research supports the idea that high levels of physical activity are generally associated with fewer depressive symptoms (Mansor & Ahmad, 2022). The research study by Cai (2022) emphasizes the significant value of physical exercise in promoting mental health, advocating for continued exploration in this field. Theoretical and practical advancements in this area could lead to more effective strategies for improving the mental well-being of university students

2.5 Socio-demographic factors associated with physical activity

Exploring the relationship between sociodemographic factors and physical activity is crucial for identifying patterns and understanding disparities in activity levels. Research suggests that demographic characteristics, such as gender and academic year, play a significant role in shaping physical activity behaviors. By examining these factors, we can pinpoint groups that may be more or less active and develop targeted strategies to promote healthier lifestyles. This section focuses on how gender and years of study influence physical activity among university students

2.5.1 Gender

Physical activity (PA) was assessed in university students using self-administered long-form International Physical Activity Questionnaire (IPAQ). This widely used tool measure PA level in different domain, such as leisure time, domestic activities, work-related tasks, and transportation. A total of 223 students aged 18 to 15 years participated I this study, with females comprising the majority 59.2% of the sample. The median total PA, measured in metabolic equivalent (MET) minutes per week, was 1320 across all participants. When stratified by gender, males demonstrated

significantly higher PA levels, with a median of 20337 Met minutes/week compared to 771 Met minutes/week among females (Anandabaskar Nishanthi et al., 2024).

Additionally, the prevalence of low PA levels was disproportionately higher in females 70.5% than in males 52.7%, a statistically significant difference. Conversely, a greater proportion of male students (18.7%) engaged in high levels of PA compared to their female counterparts 2.3%, ($p < 0.001$) (Anandabaskar Nishanthi et al., 2024). These findings are consistent with previous research, which has shown that females tend to report lower levels of PA than males across various populations (Rodríguez-Romo et al., 2022).

In terms of insufficient PA, defined as activity levels below recommended guidelines, 22.4% of the overall sample was categorized as insufficiently active. When analyzed by gender, 17.6% of males, 24.2% of females, and 32.3% of students identifying as diverse reported insufficient PA levels. Interestingly, male students reported the highest average PA levels, while students identifying as diverse reported the lowest. These patterns reflect broader trends observed in studies of global, European, and German populations, which consistently show men being more physically active than women (Edelmann et al., 2022).

The study also examined the relationship between PA levels and years of study. First-year students exhibited significantly lower PA levels compared to students in higher years. Although the effect size was negligible, this finding highlights the potential impact of academic adjustments and lifestyle changes on PA during the transition to university life. This trend aligns with previous research showing that PA tends to increase as students advance through their academic years (Edelmann et al., 2022).

2.5.2 Years of study

The relationship between physical activity (PA) and socio-demographic factors, such as academic year, has been widely studied, with several studies highlighting the impact of university progression on students' activity levels. One significant finding from recent research is the variation in PA across different academic years. According to a study by Anandabaskar Nishanthi et al. (2024), second-year students were found to expend more energy on transportation and domestic activities compared to other academic years. Interestingly, walking was the most common form of physical activity across all years, while vigorous-intensity activity was virtually absent among all groups. The second-year students were more physically active than first and third-year students, with fourth-year students reporting the highest overall energy expenditure, followed by second-year students, third-year students, and first-year students $p = 0.007$. This pattern emphasizes the growing PA levels as students' progress through their studies.

Furthermore, when examining PA levels within the student population, 63.2% of the total sample were classified as having low PA levels, while only 9% achieved high PA levels. These results indicate that most students are not engaging in sufficient physical activity, with first-year students being significantly less active than their peers in higher years. Previous studies support this finding, suggesting that the transition from secondary school to university is often accompanied by lifestyle changes that can lead to decreased PA and the adoption of unhealthy behaviors (Edelmann et al., 2022).

The drop in physical activity levels from high school to university is particularly notable. Petruzzello and Box (2020) found that 66% of first-year students engaged in adequate physical activity during their last two months in high school, but this dropped to only 44% during the first two months of university. Conversely, 56% of students reported insufficient physical activity during college, compared to only 34% during