

**CHAN ZHI XIN**

**FATIGUE AND PSYCHOLOGICAL FACTORS**

**2023**

**ASSOCIATION BETWEEN FATIGUE AND  
PSYCHOLOGICAL FACTORS AMONG  
UNDERGRADUATE UNIVERSITY STUDENTS: A  
CROSS-SECTIONAL STUDY**

**CHAN ZHI XIN**

**BACHELOR OF PHYSIOTHERAPY (HONOURS)**

**UNIVERSITI TUNKU ABDUL RAHMAN**

**DECEMBER 2023**

*(This page is intentionally left blank.)*

**ASSOCIATION BETWEEN FATIGUE AND PSYCHOLOGICAL FACTORS AMONG  
UNDERGRADUATE UNIVERSITY STUDENTS: A CROSS-SECTIONAL STUDY**

By

**CHAN ZHI XIN**

A Research project submitted to the Department of Physiotherapy,  
Faculty of Medicine and Health Sciences,  
Universiti Tunku Abdul Rahman,  
in partial fulfillment of the requirements for the degree of Bachelor of Physiotherapy  
(HONOURS)

December 2023

# ASSOCIATION BETWEEN FATIGUE AND PSYCHOLOGICAL FACTORS AMONG UNDERGRADUATE UNIVERSITY STUDENTS: A CROSS-SECTIONAL STUDY

Ms. Siti Hazirah Binti Samsuri<sup>1</sup>

Chan Zhi Xin<sup>2</sup>

Author affiliation

1. Senior lecturer, M. Kandiah Faculty of Medicine and Health Sciences, Department of Physiotherapy, Universiti Tunku Abdul Rahman, Malaysia.
2. Year 3 Bachelor of Physiotherapy (HONOURS) student, M. Kandiah Faculty of Medicine and Health Sciences, Department of Physiotherapy, Universiti Tunku Abdul Rahman, Malaysia

## ABSTRACT

**Background and Objective:** Fatigue is common among university students and can affect their academic performance and well-being. Besides, female students often reported higher fatigue levels than male students. High academic demands often lead to stress, anxiety and depression, contributing to physical and mental exhaustion. However, there are limited studies comparing gender on different types of fatigue and investigating the association between fatigue and psychological factors among Malaysian university students. The objectives of this study were to identify the prevalence of different types of fatigue and psychological factors and to compare the different types of fatigue among undergraduate students between genders. Lastly, this study also investigated the association between fatigue and psychological factors among undergraduate students.

**Methods:** Convenience sampling was the sampling method used in the study. The cross-sectional study enrolled a sample of 363 students aged 18-26 from the University Tunku Abdul Rahman, Sungai Long. The Multidimensional Fatigue Symptom Inventory-short form (MFSI-sf) and Depression, Anxiety and Stress Scale-21 (DASS-21) were employed to measure fatigue and negative psychological symptoms, respectively. The statistical data were analyzed using IBM SPSS software statistics version 29.0 and Microsoft Excel. The demography data were analyzed by descriptive analysis. Spearman's correlation analyzed the association between different types of fatigue and psychological factors. A comparison of different types of fatigue between genders was analyzed using an independent t-test.

**Results:** In the study, 398 participants were recruited in total but only 364 participants including 64.3% of female and 35.7% of male meet the inclusion criteria and proceed to the study. The prevalence of total fatigue (-1.6% to 35.8%), general fatigue (2.4% to 13.1%), physical fatigue (0.5% to 10.3%), mental fatigue (2.2% to 11.7%), emotional fatigue (3.1% to 13.7%), vigor (6.6% to 16.2%), depression (50.0%), anxiety (59.1%) and stress (33.8%) among university students were found in this study. There was no significant difference between gender on total fatigue (MD=15.75 for male, MD=17.85 for female,  $p=0.30$ ), general fatigue (MD=7.35 for

male, MD=7.99 for female,  $p=0.27$ ), physical fatigue ( MD=5.02 for male, MD=5.59 for female,  $p=0.28$ ), mental fatigue ( MD=6.68 for male, MD=7.09 for female,  $p=0.45$ ), emotional fatigue ( MD=8.21 for male, MD=8.51 for female,  $p=0.60$ ) and vigor ( MD=11.51 for male, MD=11.33 for female,  $p=0.74$ ). Lastly, there was a significant association between depression, anxiety and stress with different types of fatigue among university students, which are total fatigue ( $r=0.687$ ,  $p<0.001$ ;  $r=0.624$ ,  $p<0.001$ ;  $r=0.690$ ,  $p<0.001$ ), general fatigue ( $r=0.591$ ,  $p<0.001$ ;  $r=0.510$ ,  $p<0.001$ ;  $r=0.599$ ,  $p<0.001$ ), physical fatigue ( $r=0.510$ ,  $p<0.001$ ;  $r=0.528$ ,  $p<0.001$ ;  $r=0.575$ ,  $p<0.001$ ), mental fatigue ( $r=0.599$ ,  $p<0.001$ ;  $r=0.586$ ,  $p<0.001$ ;  $r=0.635$ ,  $p<0.001$ ), emotional fatigue ( $r=0.547$ ,  $p<0.001$ ;  $r=0.525$ ,  $p<0.001$ ;  $r=0.579$ ,  $p<0.001$ ) and vigor ( $r=-0.262$ ,  $p<0.001$ ;  $r=-0.114$ ,  $p=0.029$ ;  $r=-0.148$ ,  $p=0.05$ ).

**Conclusion:** In conclusion, the prevalence of total fatigue was slightly higher among university students. Emotional fatigue is the most prevalent among different types of fatigue and the anxiety prevalence is the highest compared to depression and stress prevalence. There are no gender differences in different types of fatigue. Lastly, the different types of fatigue significantly correlate with psychological factors among university students. Future studies can further discuss the development of fatigue management programs or health care services to reduce the adverse psychological problems of students.

**Keywords:** Fatigue, Psychological factors, Undergraduate university students

## **ACKNOWLEDGEMENTS**

With the completion of this research project, I would like to express my deepest gratitude firstly to all the participants who generously spent their valuable time and unswervingly cooperated with my research. This undertaking would not have been possible without their wholehearted participation. I sincerely thank each participant for their time and effort.

Furthermore, I would like to acknowledge my supervisor, Ms. Siti Hazirah Binti Samsuri, for all of her assistance and advice over the course of the proposal preparation up to this point.

Lastly, I would like to thank my family and friends for all their support and understanding towards me throughout this process of producing the research project.

## APPROVAL SHEET

This Research project entitled **“ASSOCIATION BETWEEN FATIGUE AND PSYCHOLOGICAL FACTORS AMONG UNDERGRADUATE UNIVERSITY STUDENTS: A CROSS-SECTIONAL STUDY”** was prepared by CHAN ZHI XIN and submitted as partial fulfilment of the requirements for the degree of Bachelor of Physiotherapy (HONOURS) at Universiti Tunku Abdul Rahman.

Approved by:

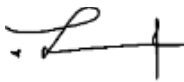


---

(Ms. Siti Hazirah Binti Samsuri)  
Supervisor  
Department of Physiotherapy  
M. Kandiah Faculty of Medicine and Health Sciences  
Universiti Tunku Abdul Rahman

Date: 05/02/2024

Approved by:



---

(Mr. Muhammad Noh Zulfikri bin Mohd Jamali)  
Head of Department  
Department of Physiotherapy  
M. Kandiah Faculty of Medicine and Health Sciences  
Universiti Tunku Abdul Rahman

Date: 05/02/2024

**FACULTY OF MEDICINE AND HEALTH SCIENCES**

**UNIVERSITI TUNKU ABDUL RAHMAN**

Date: 26/12/2023

**PERMISSION SHEET**

It is hereby certified that **CHAN ZHI XIN** (ID No: **20UMB05164**) has completed this Research project entitled “ASSOCIATION BETWEEN FATIGUE AND PSYCHOLOGICAL FACTORS AMONG UNDERGRADUATE UNIVERSITY STUDENTS: A CROSS-SECTIONAL STUDY” under the supervision of MS. SITI HAZIRAH BINTI SAMSURI (Supervisor) from the Department of Physiotherapy, M. Kandiah Faculty of Medicine and Health sciences.

Yours truly,

A handwritten signature in black ink, appearing to read 'Chan Zhi Xin', with a stylized flourish at the end.

(CHAN ZHI XIN)



## DECLARATION

I hereby declare that the Research project is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UTAR or other institutions.

Name: CHAN ZHI XIN

Date: 26/12/2023

## TABLE OF CONTENT

<b>ABSTRACT</b>	<b>II</b>
<b>ACKNOWLEDGEMENTS</b>	<b>III</b>
<b>APPROVAL SHEET</b>	<b>IV</b>
<b>PERMISSION SHEET</b>	<b>V</b>
<b>DECLARATION</b>	<b>VI</b>
<b>TABLE OF CONTENT</b>	<b>VIII</b>
<b>LIST OF TABLES</b>	<b>X</b>
<b>LIST OF ABBREVIATIONS</b>	<b>XI</b>

### CHAPTERS

#### 1. INTRODUCTION

1.1 Chapter overview	1
1.2 Background of study	1-5
1.3 Research question	5
1.4 Problem statement	5-6
1.5 Research objectives	6
1.6 Hypotheses	6-7
1.7 Operational definition	7
1.8 Structure of research project	7-8
1.9 Rationale of study	8-9

#### 2. LITERATURE REVIEW

2.1 Chapter overview	10
2.2 Different types of fatigue	
2.2.1 General fatigue	10-12
2.2.2 Physical fatigue	13-14
2.2.3 Mental fatigue	15-16
2.2.4 Emotional fatigue	16-17
2.2.5 Vigor	17-18

2.3 Comparison between gender on different types of fatigue	<b>18-20</b>
2.4 Psychological factors (Depression, Anxiety and Stress)	
2.4.1 Depression	<b>21-22</b>
2.4.2 Anxiety	<b>22</b>
2.4.3 Stress	<b>23</b>
2.5 Association between fatigue and depression, anxiety and stress	<b>24-25</b>
<b>3. METHOD</b>	
3.1 Chapter overview	<b>26</b>
3.2 Research design	<b>26</b>
3.3 Ethnical approval	<b>26-27</b>
3.4 Sampling design	<b>27-28</b>
3.5 Research instrument	<b>28-29</b>
3.5.1 Multidimensional Fatigue Symptom Inventory-short form (MFSI-sf)	<b>29-31</b>
3.5.2 Depression, Anxiety and Stress Scale-21 (DASS-21)	<b>32-34</b>
3.6 Procedure	<b>35</b>
3.7 Data analysis	<b>36</b>
<b>4. RESULTS</b>	
4.1 Chapter overview	<b>37</b>
4.2 Demographic of population	<b>38</b>
4.2.1 Age	<b>39</b>
4.2.2 Gender	<b>39</b>
4.2.3 Types of study	<b>39</b>
4.2.4 Year of study	<b>40</b>
4.3 Total scores for MFSI-sf and DASS-21	
4.3.1 Total scores for MFSI-sf	<b>41-42</b>
4.3.2 Total scores for DASS-21	<b>43-45</b>
4.4 Test of normality	<b>46</b>
4.5 Inferential analysis	
4.5.1 Independent t-test	<b>46-48</b>

4.5.2 Spearman’s correlation test	<b>49-51</b>
4.6 Hypothesis testing	<b>52-53</b>
<b>5. DISCUSSION</b>	
5.1 Chapter overview	<b>54</b>
5.2 Discussion	
5.2.1 Prevalence of different types of fatigue and psychological factors among university students	<b>54-59</b>
5.2.2 Comparison between gender on different types of fatigue	<b>60-62</b>
5.2.3 Association between different types of fatigue and psychological factors	<b>63-69</b>
5.3 Limitation of study	<b>70-71</b>
5.4 Recommendation for future research	<b>72</b>
5.5 Conclusion	<b>73-74</b>
<b>LIST OF REFERENCES</b>	<b>75-86</b>
<b>APPENDIX A – ETHICAL APPROVAL FORM</b>	<b>87</b>
<b>APPENDIX B – PERSONAL DATA PROTECTION NOTICE</b>	<b>88-89</b>
<b>APPENDIX C – INFORMED CONSENT FORM</b>	<b>90</b>
<b>APPENDIX D – DEMOGRAPHIC DATA</b>	<b>91-93</b>
<b>APPENDIX E – MULTIDEMENSIONAL FATIGUE SYMPTOM INVENTORY – SHORT FORM (MFSI-sf)</b>	<b>94-95</b>
<b>APPENDIX F – DEPRESSION, ANXIETY AND STRESS SCALE-21 (DASS- 21)</b>	<b>96-97</b>
<b>APPENDIX G – TUNITIN REPORT</b>	<b>98-112</b>

## LIST OF TABLES

<b>Table</b>	<b>Page</b>
3.1 Calculation table for MFSI-sf	<b>30</b>
3.2 Calculation table for DASS-21	<b>33</b>
3.2.1 Scoring table for DASS-21	<b>33</b>
3.3 The grading table of Spearman's Correlation coefficient ( $\rho$ )	<b>36</b>
4.1 Demographic data of participants	<b>38</b>
4.2 Total score of participants with general fatigue, physical fatigue, mental fatigue, emotional fatigue, vigor and total fatigue score	<b>42</b>
4.3 Total scores of different types of psychological factors	<b>43</b>
4.4 The result of independent t-test	<b>48</b>
4.5 The result of Spearman's correlation test between different types of fatigue and psychological fatigue	<b>51</b>

## LIST OF ABBREVIATIONS

UTAR	Universiti Tunku Abdul Rahman
MFSI-sf	Multidimensional Fatigue Symptom Inventory- short form
DASS-21	Depression, Anxiety and Stress Scale-21
M	Mean
SD	Standard Deviation
SE	Standard Error
df	Degree of Freedom
P	p- value (Significance)
CI	Confidence Interval

# CHAPTER 1

## INTRODUCTION

### 1.1 Chapter overview

This chapter will delve into the background of this study by offering crucial context about the topic of interest including the research objectives, hypotheses, and operational definitions of key terms.

### 1.2 Background of study

Fatigue is a multifaceted and pervasive phenomenon that significantly impacts all aspects of human life. Individuals who experience fatigue always feel extremely tired, exhausted, or lack the energy to perform every task in their daily lives. These symptoms will become physical exertion and mental or emotional stress over time if they do not eliminate this problem (Tang et al., 2016). Therefore, issues related to fatigue in the general population are currently very concerning to public health authorities and people from all walks of life in the community. As society becomes modernised and pursues a high level of development, people's desire for a higher quality of life is getting stronger. As a result, they can unknowingly overlook their need for rest and self-care in order to pursue a more fulfilling and higher quality of life. Besides, constantly pursuing excellence and a fast-paced lifestyle over a long time of period can lead to fatigue due to lack of enough sleep, irregular eating habits, and poor management of physical and psychological well-being, which has become a common problem in modern society (Hirshkowitz, 2013). Although fatigue is often associated with medical or psychiatric illness, it is essential to understand

lifestyle and situational aspects may be also potential factors that influence fatigue. For example, a person who experiences fatigue may be due to a poor lifestyle with insufficient sleep or being in a constant state of excessive stress. A systematic review and meta-analysis of the demographic features of fatigue in the general population worldwide by Yoon et al. (2023) showed prevalence rates of 24.2% for general fatigue and 7.7% for chronic fatigue among the general population. General fatigue defined as feeling fatigue that lasts less than six months or occurs within an unspecified timeframe, while chronic fatigue lasts for more than six months (Yoon et al., 2023). Several studies revealed that short-term fatigue is a common symptom for most people and can be easily overlooked by the community.

Fatigue can be classified into two main categories: physiological and pathological fatigue. Physiological fatigue usually occurs in healthy people and can be considered normal physical or mental exertion due to various lifestyle factors. This type of fatigue is also known as non-pathological, as its symptoms of physiological factors typically last less than three months but improve with rest and proper self-care (Kutlubaev & Mead, 2013). For example, physical fatigue is a common fatigue that decreases muscle contraction and muscle weakness, reducing the physical performance of an individual when performing physical tasks or exercising (Bachleda & Darhiri, 2018). In addition, mental fatigue refers to fatigue and overstimulation of the brain because of cognitive activities or intense intellectual tasks over prolonged periods, leading to impaired cognitive ability and concentration (Water, 2021). Physical and mental fatigue are closely related to impacting the physiological function of humans. Besides, pathological fatigue is less common fatigue than physiological fatigue, as it is experienced by individuals suffering from medical or psychiatric diseases, such as cancer and multiple sclerosis (MS) (Kutlubaev & Mead, 2013).



Compared to psychological fatigue, pathological fatigue is a persistent condition that may last for an elongated period and cannot be relieved with rest, resulting in significantly impacting the quality of life and functional performance of the individual (Kutlubaev & Mead, 2013). In addition, physiological fatigue can convert into pathological fatigue if the symptom persists as prolonged and becomes a severe unexplained fatigue that is unable to be relieved with resting, leading to the onset of fatigue-related illnesses, such as chronic fatigue syndrome (CFS) (Doncker et al., 2018).

According to a study by Yoon et al. (2023), females experience fatigue 1.4 times more than males. Similarly, a study by Lasselin et al. (2018) stated that one possible explanation for female-predominant fatigue is due to the inflammatory model of females differing from males. Females tend to be more sensitive to changes in the body's defence systems, resulting in more adverse effects of immune-related behavioural changes, including fatigue, pain sensitivity and worsened moods (Lasselin et al., 2018; Seney & Sibille, 2014). Furthermore, several studies mentioned that fatigue is closely associated with female gender, advancing age and poor socioeconomic status (Fieo et al., 2014; Basu et al., 2016; Engberg et al., 2017). For example, a study by Jing et al. (2015) found that the prevalence rate of women over 45 years old under the middle-aged and elderly group from the general population was 33.9%. In addition, most women in the general population have lower socioeconomic status because they may manage higher household workloads and fulfil family demands, leading to greater fatigue than males (Engberg et al., 2017; Uzoigwe et al., 2016).

Previous studies revealed an increasing recognition of the profound connection between fatigue and mental health problems, which can significantly affect an individual's quality of life

(Bazazan et al., 2019). The relationship between fatigue and mental health is bidirectional. Mental health conditions can significantly affect an individual's energy levels, leading to feelings of tiredness and exhaustion. Similarly, when an individual experiences chronic fatigue, it can also affect mental health, mood, cognitive function, and overall mental health (Bazazan et al., 2019). Raaj et al. (2021) stated that the prevalence of mental disorders was highest in rural East Malaysia, affecting approximately 43% of the population. It was followed by the capital Kuala Lumpur, where about 40 percent of the people met the criteria for a mental disorder. The high prevalence of mental disorders in these regions raises concerns about the potential impact of mental disorders on an individual's well-being, including possible fatigue-related problems. For example, fatigue can impede sleep quality and cognitive function, with long-term effects on memory, concentration, and decision-making, making individuals more prone to mental health problems such as stress, depression, anxiety, and mood or emotional disturbances (Vaes et al., 2022).

According to a statement from the Ministry of Health (MOH), Health Minister Dr Zaliha Mustafa revealed that in Malaysia, the majority of young people, including teenagers and younger adults, suffer from financial problems, higher expectations of themselves, academic pressure and other reasons, encountered mental health challenges, to combat low self-confidence, all of which combine to lead to elevated levels of depression, anxiety and stress (CodeBlue, 2023). This problem is obviously seen in the student population, especially university students pursuing greater academic demands. A study by Kumaraswamy (2013) showed that the prevalence of psychological problems in university students, especially stress, anxiety and depression, increased dramatically from 2% to 50%. Higher intensities of these psychological factors may lead to poorer sleep quality, decreased academic motivation and interest, and emotional exhaustion, leading to fatigue

symptoms in university students (Abdali et al., 2020). Feeling tired and fatigued frequently may worsen their mental health, thereby increasing the prevalence of mental health problems among the general population in Malaysia.

### 1.3 Research question

1. What is the prevalence of different types of fatigue and psychological factors among undergraduate students?
2. Is there a difference between gender on the different types of fatigue among undergraduate students?
3. Is there an association between different types of fatigue and psychological factors among undergraduate students?

### 1.4 Problem statement

Fatigue is a common complaint among university students, especially female students. Due to the high demands of pursuing higher education, university students experience chronic stress, anxiety and depression to cope with the demanding academic challenges, resulting in physical and mental exhaustion. Long-term fatigue will aggravate psychological problems and seriously affect the physical and mental health of university students. Besides, several studies have examined the prevalence of fatigue and mental health problems among university students. However, studies explicitly exploring the relationship between these two factors are limited. In addition, there is also a lack of research on the psychological factors associated with non-pathological fatigue in Malaysian healthy individuals, especially university students. Therefore, this study will investigate the association between fatigue and psychological factors among university students in Selangor,

Malaysia. This study also aimed to determine the prevalence of different types of fatigue and psychological factors and to compare gender differences in various kinds of fatigue among undergraduate students. Due to university students are not aware that the relationship between fatigue and psychological factors among university students, the prevalence of fatigue and mental health problems is increasing and even has a negative impact on their quality of life. Therefore, based on the results from the study, physiotherapists could assist in providing appropriate coping fatigue management and promoting fatigue-preventive healthcare programs to maintain university students' physical and mental health.

### 1.5 Research objective

1. To identify the prevalence of different types of fatigue and psychological factors among undergraduate students.
2. To compare between genders on the different types of fatigue among undergraduate students.
3. To identify the association between different types of fatigue and psychological factors among undergraduate students.

### 1.6 Hypothesis

H01: There are no significant differences between genders on the different types of fatigue among undergraduate students.

HA1: There are significant differences between genders on the different types of fatigue among undergraduate students.

H02: There is no significant association between the different types of fatigue and psychological factors among undergraduate students.

HA2: There is a significant association between the different types of fatigue and psychological factors among undergraduate students.

### 1.7 Operational definition

1. Association refers to various coefficients and factors used to quantify a relationship between two or more variables (Haug, 2017).
2. Fatigue described as a state of weariness and decreased vigilance linked to drowsiness, leading to a decline in both the ability and motivation to carry out tasks effectively (Vega et al, 2022).
3. Psychological factors mean that processes and interpretations at the individual's level that impact mental states, the development of personality and maintain well-being and health (Upton, 2013).
4. Undergraduate university students are the students who are pursuing a degree at an institute, college, university or other authorized institution (Russo et al., 2014).

### 1.8 Structure of research project

In this research paper, Chapter 1 will serve as the introduction, encompassing the study's background, research question, problem statement, research objectives, hypotheses, and the significance and relevance of the study. Chapter 2 will undertake a comprehensive literature review which explores various titles and themes from previous studies. Moving on to Chapter 3, the methodology of this study will be expounded, detailing the research design, sampling approach,

research instruments, and data collection procedures. Chapter 4 will incorporate the results derived from data analysis, employing both descriptive and inferential analyses, including hypothesis testing. Finally, Chapter 5 will conclude with a discussion of the study's findings, outlining any limitations and offering recommendations for future research.

### 1.9 Rationale of study

There are many studies investigating the effects of psychological factors on academic or working performance among workers or students. There are also many researches that study the association between pathological fatigue and mental health issues among patients with various medical conditions. However, despite the recognition of fatigue's impact on cognitive aspects, there has been relatively limited research exploring the association between fatigue and psychological factors among healthy populations. Thus, this study aims to determine the association between fatigue and psychological factors among undergraduate university students. Throughout this study, the prevalence of fatigue that is affected by psychological factors among university students may also be evaluated.

The result of this study is crucial for physiotherapy practice because physiotherapists can identify how much effect the contributing psychological factors, such as depression, anxiety, and stress play a role in fatigue among university students. Hence, physiotherapists can prescribe various interventions to address and manage fatigue effectively. As we know, physiotherapy is a holistic profession; physiotherapists should not only tailor the treatment plans based on an individual's condition but also incorporate psychological support and provide relaxation exercises

to manage mental health and fatigue issues. In addition, physiotherapists can play a role in identifying early signs of burnout and implementing preventive measures to promote public well-being. Besides, physiotherapists can further prepare the education or relevant healthcare programs to the public, including exercises, stress management techniques, maintaining sleep quality and coping strategies to help the public better manage fatigue and maintain their well-being.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Chapter overview

This chapter provides an overview of the various literature found in previous articles and journals, laying the foundation for the research project.

#### 2.2 Different types of fatigue

##### 2.2.1 General fatigue

General fatigue is a general feeling of lethargy and decreased concentration that affects a person's ability and willingness to do things and is a complaint of both healthy people and those with health conditions or diseases such as cancer, multiple sclerosis, stroke, and fibromyalgia (Bilones et al., 2021). A study previously authored by Williamson et al. (2005) pointed out that fatigue is not just physical exhaustion but also includes emotional and spiritual dimensions that contribute to an individual's overall health. In addition, a study previously authored by Stewart et al. (1992) investigated measures of health cognition, energy/fatigue, and health distress and found a higher correlation between fatigue and physical and mental health through SEM analysis. Therefore, examining various types of fatigue is gaining significance because of its possible influence on both physical and psychological well-being. Fatigue is a prevalent symptom in the general population, with reported prevalence ranging from 4% to 45% (Galland-decker et al., 2019). Based on a study on "Fatigue in the general population" written by Rimaud et al. (2023), it was stated that the prevalence of fatigue has been documented to vary from 3% to over 75%. These varying findings observed in numerous studies stems from variations in countries and cultures,



disparities in the methodologies employed to evaluate fatigue, and distinctions among study participants, including patients' populations, diverse occupational groups and age categories.

A study by Pagnin and Queiroz (2015) explained that an individual's perception of general fatigue may be related to various factors, including lifestyle, sleep quality and duration, health status, and mental health. Due to insufficient study time and high academic demands, fatigue and poor sleep quality are interrelated problems, with a prevalence of as high as 71% among university students, especially medical students (Mazurkiewicz et al., 2012). Consequently, sleep deprivation caused these medical students to be more exhausted, creating a cyclical pattern in which increased burnout and sleep difficulties fueled each other, leading to generalized fatigue. In addition, in a 2019 study conducted by Gallan-Decker et al. in Switzerland, an investigation was carried out to assess the prevalence of fatigue and identify its associated factors in the general population. Their study also supported a positive relationship between insomnia, depression, low health status and obesity with fatigue among the middle-aged 45-86 years population, but older age and fatigue are negatively associated. Compared to younger people, the elderly are less frequently complaint fatigue and poor sleep quality, possibly due to the better quality of life experienced by the elderly in contemporary times and their decreased likelihood of experiencing depression (Engberg et al., 2017).

Several studies have focused on general fatigue's prevalence, impact, and correlation in diverse patient populations with various diseases or medical conditions. As fatigue is an essential complication of radiotherapy, chemotherapy, and biological therapy, the occurrence of fatigue in

cancer patients exceeds that in non-cancer populations, with reported rates ranging from 11% to 99% (Maqbali et al., 2021). A research studied by Williams et al. (2021) who investigated on the impact of fatigue and its association factors in breast cancer patients compared with non-cancer populations. They found that general fatigue scales worsened in breast cancer patients both before and after chemotherapy when compared to non-cancer populations. Throughout the study, the results showed that breast cancer patients frequently encounter intense fatigue and elevate levels of anxiety, persisting for as long as six months after completion of chemotherapy. This enormous burden of fatigue and stress has been identified as significantly impacting their overall quality of life, including magnifying adverse effects on various aspects of well-being and daily functioning (Ancoli et al., 2014).

According to a study reported in the *Western Journal of Nursing Research*, Tung et al. (2016), revealed a higher prevalence of fatigue and depression in colorectal cancer (CRC) patients, and their findings highlighted the interplay between fatigue and depression on quality of life in CRC patients. They also realized that fatigue affects individuals uniquely at each stage of treatment, and given the substantial physical and psychological side effects of cancer treatment, significantly higher levels of fatigue were observed in treated patients (Tung et al., 2016). Therefore, it shows that the prevalence of general fatigue varies among different types of populations, and several studies have investigated fatigue in patients with varying conditions of health because symptoms are so typical for them. This also affects their quality of life, but limited studies have determined the incidence of general fatigue among healthy populations.

### 2.2.2 Physical fatigue

Physical fatigue is generally defined as tiredness and reduced energy levels, leading to a decreased ability to perform physical tasks due to physically demanding activities (Xing et al., 2020). Most physical fatigue arises from work-related activities that demand physical effort, such as manual labour, and can be influenced by factors like posture, repetitive motions and equipment use, known as occupational fatigue, which is a common type of physical fatigue among various workers (Ahmadi et al, 2022). A study by Skinner & Dorrian (2015) stated that occupational fatigue emerges from an imbalance between effort, work duration and rest intervals, which can provide adverse effects to the workers, such as increased human errors in their working performance, memory impairment, reduced decision-making capabilities due to extreme lethargy, escalated vulnerability to feelings of depression and anxiety, lower efficiency and even disability. Hence, this shows that occupational fatigue adversely affects job performance, impacting both physical tasks and mental engagement.

Some studies have investigated the effects of physical fatigue and its associated factors in different groups of workers. According to the study by Zhang et al. (2015), data from 606 construction workers who participated in the National Health Interview Survey found a significant correlation between workers' physical fatigue and physical and mental abilities. Expressly, more than 296 workers indicated that physical fatigue significantly affected their physical and cognitive performance compared to workers who did not experience physical fatigue. Furthermore, Xing et al. (2020) investigated how physical fatigue influences the onset of mental fatigue in construction workers and they identified a connection between physical fatigue and cognitive function in their body. The results suggest that increased physical fatigue accelerates the onset of mental fatigue

due to the increased energy demands required to maintain consistent cognitive performance during high-load tasks. Increased cognitive demands have the potential to worsen mental fatigue and may be intensified by psychological elements like heightened stress, diminish motivation, or cognitive inefficiency (Soylu et al., 2022). Thus, these studies highlight the complex link between the physiological and psychological aspects of construction workers' experience of physical fatigue.

Based on a study by Jang et al. (2021), they reported a high prevalence of work-related physical fatigue among healthcare professionals, especially among 85% of female nurses facing this problem. Their work-related physical fatigue commonly emerges from demanding physical activities like extended standing, lifting and transferring, or manoeuvring patients, which leads to experiencing an overall sense of bodily discomfort and challenges in tasks requiring physical strength (Barker Steege & Nussbaum, 2013). Besides, engaging in professional responsibilities can lead to additional tasks that extend the daily work duration to 12 hours, potentially leading to medical errors due to prolonged physical fatigue (Santana et al., 2013). Nurses also exhibit higher levels of depressive symptoms, especially due to shift work and irregular hours, which may disrupt their sleep quality, further exacerbating physical fatigue (Jang et al., 2021). Furthermore, a research from Sajadi et al. (2014) discovered that the degree of depression and anxiety significantly impacts physical fatigue among nursing students and also revealed that nursing students who experienced moderate to severe physical fatigue exhibited and elevated levels of depression or anxiety obtained higher scores on measurement of suicide risk compared to those with mild or no physical fatigue. Many studies find physical fatigue in various occupations or medical students, but studies on Malaysian university students are lacking.

### 2.2.3 Mental fatigue

Mental fatigue is a psychophysiological condition characterized by cognitive weariness and reduces cognitive function due to prolonged and intensive cognitive tasks, resulting in feelings of tiredness and reduced energy (Ishii et al., 2014). It is a prevalent phenomenon affecting individuals across different populations, including high-stress occupations, such as healthcare professionals, emergency responders, and shift workers. Most students are also mentally fatigued due to intensive cognitive demands, especially during exams (Li et al., 2022). According to a study by Hanifah & Ismail (2020), there was a distinct and significantly association between mental fatigue, the duration of shifts and the occurrence of overtime work. This suggests that longer changes and extended working hours are associated with increased mental fatigue in individuals. A study by James et al. (2018) stated that night-shift workers have higher mental fatigue than day shifts because they might be attributed to reduced energy levels and heightened physical efforts required during night hours. In addition, James et al. (2018) also mentioned that night-shift workers are particularly susceptible to fatigue due to the mismatch between their biological circadian rhythms, which promote sleep at night and alertness during the day and their work schedules. This interruption could result in disturbances in sleep. And a low quality of sleep is strongly associated with a heightened risk of psychological issues, including depression, anxiety and stress (James et al., 2013). Therefore, it can be argued that mental fatigue can also worsen psychological problems and that depression can lead to cognitive difficulties, including problems with memory, attention, and concentration, which can lead to mental fatigue.

Similarly, MAPC et al. (2022) investigated the "Effects of Academic Workload to the Mental Fatigue of Students during Online Class" and showed that recognizing the importance of

sleep is crucial when assessing students' perceived mental fatigue. Sleep deprivation triggers mental fatigue and hampers the cognitive potential required for effective academic performance. A study by Lam et al. (2014) showed that students generally have negative perceptions of their workload. This means that increasing academic demands on students reduces their motivation to learn and can potentially exacerbate mental fatigue and stress, leading to heightened frustration. A survey on medical students conducted by Ribeiro et al. (2018) revealing elevated stress levels attributed to the academic rigor and clinical posting demands of their program, along with the nature of their field of work. It's well-established that stress associated with academics is closely linked to a negative impact on the mental well-being of students. There are several studies that determined and analyzed the mental fatigue and association factors such as sleep quality and academic workload on workers and medical students. However, there are still limited studies exploring the association between mental fatigue and psychological factors such as depression, anxiety and stress among university students.

#### 2.2.4 Emotional fatigue

Emotional fatigue is a state of exhaustion resulting from processing intense emotions, often related to empathy or emotional engagement. This is common among caregivers, healthcare professionals, and individuals who provide emotional support to others (Ilies et al., 2015). Compassion fatigue, known as secondary traumatic stress which is a classic form of emotional fatigue that occurs when an individual becomes emotionally overwhelmed by regularly witnessing the pain of others. There are several studies investigating the prevalence, impact, or factors associated with emotional fatigue or compassion fatigue in nursing populations. According to a recent study by Tian et al. (2018); Mongolia et al. (2015) revealed that the incidence of compassion

fatigue among nurses can be pretty high, ranging from 7.3% to 44.8%. This is especially noteworthy for intensive care, oncology, emergency departments, paediatrics and psychiatry staff. According to the Journal of Nursing Management, Hagney et al. (2014) noted that burnout and compassion fatigue were strongly associated with increased levels of anxiety and depression. Nurses at risk for these disorders had significantly higher stress and depression scores than nurses who experienced greater satisfaction from their compassion for patients. Based on Sinclair et al. (2017), healthcare professionals have a higher prevalence of emotional fatigue than other populations because they are constantly experiencing the emotional pain of their patients, which triggers empathy in therapists, causing them to feel the emotions of their patients. Compassionate stress can negatively impact the therapist's physical and mental well-being. This stress can escalate and lead to emotional fatigue, especially compassion fatigue (Van Bogaert et al., 2013). There is currently no research on emotional fatigue in college students. Therefore, this study will use the MFSI-sf questionnaire to determine the association between different types of fatigue, including emotional fatigue and psychological factors in university students.

#### 2.2.5 Vigor

Vigor is described as a positive emotional reaction to meaningful aspects of one's job and work environment and is characterized by high levels of energy, enthusiasm, feeling of physical vitality and mental alertness (Swords et al., 2018). In their study, they revealed an inverse relationship between fatigue and vigor. They also discovered that a substantial proportion of the graduated medical students have high levels of work-related stress during their clinical training. Consequently, these students often report heightened levels of both physical and mental fatigue, coupled with a diminished sense of vigor. Based on a study by Ridner et al. (2016), most college

students experienced higher depression and lower vigor levels because of academic pressures, lack of recreational time and sedentary behaviours, and hence, they rarely perform physical activity or exercise regularly. Insufficient physical activity contributes to feeling more tired and less energetic, which may potentially affect both physical and mental aspects of health. Besides, higher vigor and effective coping skills can positively impact psychological health, such as decreasing depression, anxiety, stress, and thoughts of suicidal, leading to improved academic performance among university students (Vizoso et al., 2018). Students who possess these qualities can better cope with stress, stay healthy and excel in their studies. However, current research on the prevalence of vitality in college students and its influence on both physical and mental health is still limited, resulting in a lack of understanding of the relationship between psychological factors and vitality in college students.

### 2.3 Comparison between gender on different types of fatigue

For gender on general fatigue, there are 12 studies in a systematic review and meta-analysis by Al Maqbali et al. (2020), who stated that the female gender has a higher prevalence of fatigue than the male gender in various populations. They also mentioned that the female gender was a critical moderating factor for the higher incidence of fatigue, possibly due to women's lack of social support. A study also showed that there is a significantly higher likelihood of experiencing mild fatigue (67.3%) and moderate or severe fatigue (74.4%) among female students compared to male students (Nyer et al., 2015). According to Kizhakkeveettil et al. (2017), their study revealed that female students perceived higher levels of stress and fatigue than male students during chiropractic training programs due to lower ability to cope with fatigue and stress and facing more stress-inducing situations. There are many researches mentioning a higher prevalence of fatigue



among women. Still, a study by Wylie et al. (2022) utilised the Modified Fatigue Impact Scale (MFIS) revealed no distinction in trait fatigue ratings between males and females, which was unexpected.

A study by Engberg et al. (2017) showed a significant relationship between physical fatigue and socioeconomic status. They found that females tend to have a lower socioeconomic status than males, which results in gender inequalities. For instance, women often take on more household chores and caregiving responsibilities, contributing to higher physical fatigue levels (Engberg et al., 2017). A study by Martinez et al. (2019) also revealed that female assistant nurses have a higher prevalence of absenteeism than males because of higher levels of occupational fatigue, including physical and mental fatigue. Their report mentioned a higher level of general, physical and mental fatigue among female assistant nurses who lead their households, especially those with three or more children or people under their care (Martinez et al., 2019). However, a study by Roelen et al. (2014) revealed a significant association between prolonged physical and mental fatigue and absenteeism among white-collar men compared to white-collar women. They mentioned that it is more commonly observed in men than in women and is often associated with engaging in mentally demanding occupations, leading to difficulty in maintaining their work performance (Roelen et al., 2014).

According to a study by Seney & Sibille (2014), it was noted that mental fatigue exhibits a robust connection with shifts in mood states. They also mentioned that females tend to experience more significant negative mood state changes due to changes in the hormone level, resulting in

elevated mental fatigue compared to males (Seney & Sibille, 2014). Besides, a study by Zeidner et al. (2013) revealed that female healthcare workers demonstrated significantly higher levels of avoidance coping and emotional fatigue, especially compassion fatigue, than male healthcare workers. Based on a study by Al Barmawi et al. (2019), female nurses have a higher level of compassion fatigue than male nurses because they tend to involve more patient interaction and empathy than male nurses, reducing working performance. A study by Thompson et al. (2014) also showed that female mental health counsellors have higher emotional fatigue than males. However, a study by Kabunga et al. (2016) showed no significant difference between gender and emotional fatigue. A study revealed that female students are always having a higher level of fatigue and lower level of vigor compared to male students (Ridner et al., 2016), but some studies noticed that there is no significant difference between gender and vigor levels as both genders have only slightly difference or similar level of vigor (Demirbatir et al., 2020; Demirbatir & Engur, 2018). Although there are several studies investigating the level of fatigue among males and females, there is a lack of studies examining the different types of fatigue among male and female university students, such as general, physical, mental, emotional and vigor.

## 2.4 Psychological factors (Depression, Anxiety and Stress)

### 2.4.1 Depression

Depression is a multifaceted mental health condition characterized by enduring feelings of low mood and loss of enjoyment of activities. Depression is not only a significant cause of suicide risk but also an essential factor in disability rates worldwide (Majeed & Lee, 2017). People with depression may experience persistent sadness, difficulty concentrating and making decisions, and significant changes in appetite and sleep patterns that can negatively impact their quality of life. A study also demonstrated a significant association between stress scores and academic progress among college students (Fauzi et al., 2021). Additionally, they also highlighted that an increased likelihood of depression is linked to both inadequate sleep quality and fatigue. Based on Yusof et al. (2013) showed a significant association between depressive symptoms and college academic performance, as higher expectations and performance pressure also lead to stress and anxiety in students striving for academic excellence. Among the students surveyed, approximately 87% of university students reported experiencing at least a mild degree of fatigue and those students with moderate to severe fatigue due to a higher level of depression, higher suicide risk and anxiety level as well as functional and cognitive impairment (Nyer et al., 2015).

Several studies proved that healthcare workers often experience higher levels of depression. This is because they have long working hours compared to other workers, are continuously exposed to distressing situations and maintain their responsibility for the well-being of patients, which can increase depression levels and emotional exhaustion, especially compassion fatigue over time (Fond et al., 2022). Bosman et al. (2013) mentioned that construction workers constantly working at a fast pace and dealing with many tasks can lead to feelings of stress and pressure. In

contrast, ongoing stress can negatively impact their mental well-being and increase the likelihood of experiencing symptoms of depression. Therefore, it is also proved that high working speed and heavy workload contribute to physical and mental fatigue in construction workers, thus increasing the risk of depressive symptoms (Zhang et al., 2015).

#### 2.4.2 Anxiety

Anxiety is a common mental health condition characterized by uncomfortable feelings of fear and anticipation associated with potentially threatening or unfamiliar situations, loss of concentration, and heightened physiological responses such as breathing and heart rates. According to Lopes et al. (2020) and Courtney et al. (2020), anxiety is seen as a problem when it becomes excessive and disrupts a person's well-being, emotional comfort and daily functioning, which is also highly associated with the risk of suicidal behavior, especially among teenagers. A study found a 29% prevalence risk of anxiety among 1851 Malaysian students related to their academic difficulty, financial support, presence of supportive friendships, interpersonal conflicts and apprehensions about the future (Mohamad et al., 2021). Based on research by Lun et al. (2018), their results also showed that the degree of academic challenge was associated with varying degrees of anxiety symptoms. More demanding academic tasks can increase student stress and anxiety, leading to suboptimal academic performance. According to La Brague et al. (2021) found that students with higher levels of anxiety experienced more significant levels of mental and emotional arousal, leading to increased mental stress and fatigue. The same study also revealed that anxiety makes it difficult for students to relax fully and affects sleep quality, which can also lead to feelings of fatigue and exhaustion over time.

### 2.4.3 Stress

Stress is a common human experience that can significantly impact an individual's well-being, affecting their physical and mental health. According to Salari et al. (2020), a study mentioned that the prevalence of stress in the general population was 29.6%, while the current research by Hamzah et al. (2023) revealed that stress is an essential factor affecting suicidal thoughts. Their findings showed that the proportion of people expressing suicidal thoughts due to stress increased to 41.2% in 2020. A study by Jacob (2013) showed that medical and nursing students in physical therapy, nursing, pharmacy and physician staff often experience high stress levels due to high academic demands, teacher interaction and health issues. This is undoubtedly because medical students often place academic demands above sleep and tend to sacrifice sleep time to allocate more time to study and manage their workload. A study in Saudi Arabia by Almojili et al. (2017) also noted a high prevalence and strong association among medical students between perceived stress and poor sleep quality, which affects their physical and mental health. Kizhakkeveetil et al. (2016) mentioned in their study that the stress levels experienced by medical students indicated the fatigue they reported due to lack of rest time and poor sleep quality. The same study demonstrated that elevated stress and fatigue levels are strongly correlated with anxiety and depression. It also caused a decline in academic performance such as a low GPA, decreased both physical and mental well-being and contributing to an overall diminished quality of life.

## 2.5 Association between fatigue and depression, anxiety and stress

According to Bazazan et al. (2018), nurses are the most common healthcare professional population who constantly face a stressful environment with high risk for impacting physical and mental health. This study also proved a significant relationship between different dimensions of fatigue, such as physical and mental fatigue and physiological distress among nurses. Based on Williams et al. (2021), cancer patients often complain of fatigue and anxiety pre or post-chemotherapy. Their study revealed a significant association between cancer-related fatigue (CRF) and anxiety in individuals diagnosed with breast cancer. These patients consistently experience both fatigue and anxiety for a duration of up to six months following the completion of chemotherapy. In Australia, research by Creedy et al. (2017) showed a high prevalence of work-related fatigue among Australian midwives. They also noticed that Australian midwives with higher levels of work-related fatigue, including physical and mental fatigue, were associated with depression, anxiety and stress symptoms. Ahmadi et al. (2015) stated that patients with sickle cell disease have a higher prevalence of impairment in their psychological health, such as depression, anxiety, and stress compared to healthy populations which may lead to disease-related fatigue and decrease their quality of life. Hence, it can show that psychological problems can be associated with disease-related fatigue. Nyer et al. (2015) who investigated the association between fatigue and functional impairment among students with depressive symptoms and found that depressed students have functional impairment and fatigue symptoms as this study also mentioned that depression and fatigue have similar pathophysiological mechanisms which can be linked with functional impairment.

From the above literature review, it was found that there are some gaps. First, there is no study investigating the comparison of genders on different types of fatigue among university students. Besides, most fatigue research has focused on specific groups, such as healthcare workers, construction workers, and patients with cancer or other diseases. Therefore, there still needs to be more research on the fatigue and psychological factors of university students. Although several studies have explored the relationship between depression/anxiety/stress and fatigue in general, there appears to be limited research specifically investigating the relationship between anxiety and various types of fatigue among university students. Furthermore, despite the significant association between fatigue and psychological factors, studies investigating this relationship among Malaysian college students still need to be completed. This study aims to fill this gap by examining the association between fatigue and psychological factors among Malaysian undergraduates.

## **CHAPTER 3**

### **METHODS**

#### 3.1 Chapter overview

This chapter illustrates the methodology of the study, including research design, ethical approval, sampling design, research instruments, procedure and data analysis.

#### 3.2 Research design

Cross-sectional study was the research design of this study to determine the association between fatigue and psychological factors among undergraduate university students. The questionnaire was conducted online via Google Form and the participants for this study were recruited through a convenience sampling method, utilizing social media platforms such as WhatsApp, Instagram and Facebook. Additionally, face-to-face recruitment efforts were also conducted at UTAR Sungai Long campus in Selangor. The participants were also encouraged by the investigator to share the questionnaire link with their friends who fulfilled the inclusion criteria, motivating them to participate in the research.

#### 3.3 Ethical approval

This study was subjected to ethical approval by the Scientific and Ethical Review Committee (SERC) of Universiti Tunku Abdul Rahman (UTAR). (Appendix A) before initiating the research. After carefully reading the information sheet and Personal Data Protection Notice,



each participant was obligated to sign a consent form before continuing to fill out the questionnaire to ensure that they are willing participation in this study.

### 3.4 Sampling design

The target population in this study was undergraduate university students of all faculties enrolled at UTAR Sungai Long campus in Selangor. The estimated total number of university students in UTAR Sungai Long campus was 6300. This study utilised the OpenEpi software version 3, the calculated minimum sample size for the population was 161 participants with a confidence level of 80%. The hypothesized frequency of the outcome factor in the population ( $p$ ) was set to 50%  $\pm$  5. An additional 15% for a 95% confidence level was included in the calculations to account for potential incomplete or missing data, dropouts or participants not meeting inclusion criteria. Therefore, the study aimed to recruit a total of 363 participants. The sampling method used in the study was convenience sampling which is convenient for the researcher saves time, is simple and cost-effective. It is a non-probability sampling technique in which the samples are drawn from a target population that is easily accessible or approach (Nikolopoulou, 2022).

The inclusion criteria of target population in this study comprised undergraduate university students aged 18-26 years. Both male and female students were eligible to participate in this study. Participants were required to be able to understand and write English to answer the questionnaire and follow the researcher's instructions during the study. Voluntary participation should be considered to ensure that there are no ethical issues in the study. Whereas the exclusion criteria of

target population in this study encompassed participants with specific health conditions within the past six months known to impact fatigue such as fibromyalgia, chronic fatigue syndrome, severe thyroid disorders, diabetes and heart disease (Kizhakkeveetil et al., 2017). Participants with any neurological impairment or deficit including myasthenia gravis, multiple sclerosis, and traumatic brain injury were excluded due to their potential impact on the brain or nervous system and association with chronic fatigue (Kluger et al., 2013). As non-pathological fatigue was the main focus of this study, participants diagnosed with any form of cancer, such as breast cancer, colorectal cancer and other cancer-related fatigue were excluded (Fredberg and Jason, 2001). Furthermore, participants diagnosed with physical disabilities or mental disorders by healthcare practitioners, such as loss of limb or vision, sleeping sickness, eating disorder, and post-traumatic stress disorder (PTSD) were excluded (Sharpe & Wilks, 2013). These exclusions were implemented to mitigate potential confounding factor which will affect the accuracy of the result.

### 3.5 Research instrument

The research instrument of the study divided into five sections which were Personal Data Protection Notice (Appendix B), informed consent (Appendix C), demographic data (Appendix D), Multidimensional Fatigue Symptom Inventory – Short form (MFSI-sf) (Appendix E) and Depression, Anxiety and Stress Scale-21 (DASS-21) (Appendix F).

A brief introduction of the study including the purpose of the study, procedures, length of participation, risks and benefits, confidentiality information and voluntary nature of the study were provided to ensure participants have additional information before proceeding to the questionnaire.

The contact number and email address of researcher were provided in the first sections for solving participant's question or clarification. Personal Data Protection Notice (Appendix B) and informed consent (Appendix C) were mentioned in the following section and participants were required to signify their agreement and understanding as a means to express their acknowledgment of the notice. In the subsequent section, the demographic data form (Appendix D) was provided to collect essential information from participants, including their name, age, gender, contact number, type of faculty and year of study. The screening of exclusion criteria was also involved to exclude the participants who did not meet the inclusion criteria such as a history of neurological impairment, the presence of cancer, any health condition in the past six months and the presence of physical disability or mental disease.

### 3.5.1 Multidimensional Fatigue Symptom Inventory – Short form (MFSI-sf)

Multidimensional Fatigue Symptom Inventory-short form (MFSI-sf), a 30-item self-report questionnaire was used to evaluate fatigue and its effects on various aspects of an participant's life (Chan et al, 2018). This questionnaire can aid medical and psychological researchers to assess the severity and nature of fatigue experienced by participants. The area of assessment in MFSI-sf included activities of daily living (ADL), life participation, cognition, strength and sleep (Asvat et al., 2014). The MFSI-sf was a shortened version of the original MFSI and derived into 5 subscales that targeting specific aspects of fatigue which were general fatigue, physical fatigue, mental fatigue, emotional fatigue and vigor. General fatigue subscales measured the overall feelings of tiredness, lack of energy and weakness; physical fatigue subscales assessed exhaustion related to physical activities and tasks; mental fatigue subscales assessed cognitive exhaustion, challenges in concentration, memory and mental alertness; emotional fatigue subscales focused on the

emotional exhaustion and draining effects of dealing with emotions; vigor subscales captured the level of vitality, enthusiasm, and energy.

Every subscale comprised 6 items and each item were assessed on a 5-point Likert scale ranging from 0 to 4 as a mean to indicate from not at all to extremely, respectively. The scale reflected the extent to which participants found each statement to be true over the past one-week period (Lim et al., 2005). The duration for completing MFSI-sf should be take around 5 minutes. Once MFSI-sf questionnaire was completed, fatigue total score was calculated by sum of the subscales (general, physical, emotional, mental fatigue) and followed by deducted with the final subscale (vigor) because higher scores of vigor indicated greater vitality. This yielded a comprehensive score ranging from -24 to 96. MFSI-SF does not have a set cut-off score which means that a higher value denotes an increased level of fatigue experienced by participants (Klysiak et al., 2023). The MFSI-sf scoring was shown in Table 3.1.

Table 3.1: Calculation table for MFSI-sf.

<b>MFSI-sf subscale</b>	<b>MFSI-sf calculation</b>
General fatigue scale	sum of items 10, 12, 14, 17, 18, and 28
Physical fatigue scale	sum of items 2, 4, 6, 16, 19, and 26
Emotional fatigue scale	sum of items 3, 8, 13, 21, 23, and 30
Mental fatigue scale	sum of items 1, 11, 15, 20, 25, and 27
Vigor fatigue scale	sum of items 5, 7, 9, 22, 24, and 29
Total fatigue score	(General + Physical + Emotional + Mental) – Vigor

Based on the study “Further Validation of the Multidimensional Fatigue Symptom Inventory-Short Form”, examined by Stein et al. (2004), Cronbach’s alpha was employed to assess the internal consistency of MFSI-sf, evaluating its validity and reliability of MFSI-sf for each of the 5 empirically derived subscales. The alpha coefficients for these 5 subscales were reported in their result as follows: general fatigue (0.96), physical fatigue (0.87), emotional fatigue (0.92), mental fatigue (0.91) and vigor (0.90). Besides, Pearson correlation coefficients were used to investigate the validity of the MFSI-sf by comparing the association between fatigue total score and the scores of the 5 empirically derived subscales in MFSI-sf with FSI and SF-36 which are other two outcome measurements for fatigue (Stein et al, 2004). Throughout the study, it was demonstrated that there were moderate to high correlations between the 5 empirically derived subscales and other two measures of fatigue.

A research was investigated by Cordero et al. (2012) revealed that the MFSI-sf questionnaire supported by empirical evidence, demonstrated reliability and validity. This instrument was found to enable the measurement of various aspects of fatigue across different populations, offering significant value to both the research and medical fields. Hence, the MFSI-sf questionnaire was not only validated on cancer patients but was also deemed applicable for other population including healthy adults, non-specific patient population and organ transplant recipients (Asvat et al., 2014). Since MFSI-sf is not disease-specific nature and does not presumptively detect fatigue, it enhances its clinical utility and appeal in research.

### 3.5.2 Depression, Anxiety and Stress Scale-21 (DASS-21)

The Depression, Anxiety and Stress Scale-21 (DASS-21) was a self-administered questionnaire developed by Lovibond and Lovibond with the purpose of assessing levels of negative emotional symptoms, including depression, anxiety and stress in individuals (Salehpoor et al, 2014). This questionnaire represented a shorter version of the original DASS questionnaire, consisting of 21 items derived into three subscales: Depression, Anxiety and Stress. According to Coker et al. (2018), the Depression subscale measured the presence and intensity of general depressive symptoms, encompassing feelings of dissatisfaction, worthlessness, hopelessness, lack of interest, low mood and an inability to regulate emotional states. The Anxiety subscale assessed the severity of symptoms related to anxiety including situational anxiety, autonomic arousal, subjective beliefs about anxious emotions. The Stress subscales assessed the perception of stressors and their impact on an individual, incorporating elements such as impatience, irritability, difficulties in relaxing, nervousness and over reactivity.

Each subscale comprised 7 items and each item rated on 4-point Likert scale, typically ranging from 0 (indicated did not apply to me at all) to 3 (indicates applied to me very much or most of the time). This scale measured the extent to which each statement applied to participants over the past week (Moya et al, 2022). The duration required to complete DASS-21 was approximately 5 minutes. The scores for each subscale were totaled and then multiplied by two to simplify the interpretation of scores on a similar scale as the original DASS questionnaire which is DASS-42 (Thiyagarajan et al, 2022). The higher scores indicated a greater severity of negative emotional symptoms whereas the severity of depression, anxiety and stress in DASS-21 was

categorized into normal, mild, moderate, severe, extremely severe (Salehpoor, 2014). The DASS-21 calculation and scoring were shown in Table 3.2 and Table 3.2.1, respectively.

Table 3.2: Calculation table for DASS-21.

<b>DASS-21 subscales</b>	<b>DASS-21 calculation</b>
Depression scale	sum of items 3, 5, 10, 13, 16, 17, and 21, then multiply by 2.
Anxiety scale	sum of items 2, 4, 7, 9, 15, 19, and 20, then multiply by 2.
Stress scale	sum of items 1, 6, 8, 11, 12, 14, and 18, then multiply by 2.

Table 3.2.1: Scoring table for DASS-21.

<b>DASS-21 subscales</b>	<b>Scoring</b>	<b>Severity</b>
Depression	0-9	Normal
	10-13	Mild
	14-20	Moderate
	21-27	Severe
	28+	Extremely severe
Anxiety	0-7	Normal
	8-9	Mild
	10-14	Moderate
	15-19	Severe
	20+	Extremely severe
Stress	0-14	Normal
	15-18	Mild
	19-25	Moderate
	26-33	Severe
	34+	Extremely severe

According to a research on “The short-form version of the Depression Anxiety Stress Scales-21 (DASS-21): Construct validity and normative data in a large non-clinical sample” studied by Henry and Crawford (2005), they demonstrated that the DASS-21 exhibits good reliability and validity across various populations and settings including general adult population, non-specific patient population, mixed populations and individual with back pain. Reliability refers to the consistency of the measurements produced by the scale, was assessed using Cronbach’s alpha for the internal consistency of DASS-21. The results indicated satisfactory value for each of the subscales, with alpha coefficients reported as follows: depression scale (0.88), anxiety scale (0.82) and stress scale (0.90) as well as 0.93 for the total scale (Henry & Crawford, 2005). These finding suggested that the items within each subscale consistently measure the same underlying psychological construct. Validity refers to how well the scale measures its intended to measure. Based on the study by Henry and Crawford (2005), Pearson correlation coefficients was assessed to measure the convergent and discriminant validity of the DASS-21 by comparing the association between DASS-21 subscales score with the Hospital Anxiety and Depression Scale and the Personal Disturbance Scale which are another two separate measures of anxiety and depression. Throughout the study, it proved that the DASS-21 scale exhibited high convergent and discriminative validity, meaning that its scores correlate well with scores from other established measures of depression, anxiety and stress (Henry and Crawford, 2005; Coker et al., 2018). DASS-21 is a useful tool which is applicable to various population because its foundation is dimensional rather than based on distinct categories such as under the measurement of psychological disorder (Moya et al, 2022).



### 3.6 Procedure

After obtaining the ethical approval from the Scientific and Ethical Review Committee (SERC) (Appendix A) of University Tunku Abdul Rahman (UTAR), participants for this study were recruited through convenience sampling, utilizing social media platforms such as WhatsApp, Instagram and Facebook. A cross-sectional design was used in this study with the goal of involving 363 participants. Eligible participants fell within the age range of 18 to 26 years, had the ability to comprehend and write in English and were administered with an online questionnaire through Google Form. Those meeting the eligibility criteria and opting to participate provided demographic and relevant information. However, participants who did not meet the eligibility criteria were excluded from this study. When the participants met all of inclusion criteria, they were briefly informed about the purpose of study and the informed consent form was provided and completed to ensure they voluntarily participated in the study. Included participants went through MFSl-sf questionnaire to assess the fatigue level in different perspective such as general fatigue, physical fatigue, mental fatigue, emotional fatigue and vigor among them. Participants also filled up the DASS-21 questionnaire to measure the psychological status of university students in terms of depression, anxiety and stress. After the data were collected, statistical analysis was conducted and the report was written.

### 3.7 Data analysis

After data editing was carried out to clean and removed the wrong or empty data, data collected were analysed by using IBM Statistical Package for Social Science (SPSS) software version 29.0 and Microsoft Excel to produce study outcomes. Demographic data including name, age, gender, type of faculty, year of study and history medical condition were analysed by descriptive statistics, and were reported as frequency and percentage, and Mean (M) and Standard Deviation (SD). Normality of the data were determined using Kolmogorov-Smirnov and Shapiro-Wilk method. Comparison of different types of fatigue between gender were analysed using independent t-test, and the data were reported as Mean (M), Standard Deviation (SD), Standard Error (SE), t-value, degree of freedom, significant values, effect size, upper and lower limit of 95% confidence interval. The association between different types of fatigue (general, physical, mental, emotional fatigue and vigor) and psychological factors (depression, anxiety and stress) were analysed using Spearman's correlation. The data were reported as correlation coefficient ( $r$ ), the significant values and the strength of correlation (Table 3.4) will be reported. The significant value for both independent t-test and Spearman's correlation were set to  $p < 0.05$ .

Table 3.3: The grading table of Spearman's correlation coefficient ( $\rho$ ).

<b>Grading Standards</b>	<b>Correlation Degree</b>
$r = 0$	No correlation
$0 <  r  \leq 0.19$	Very weak
$0.20 \leq  r  \leq 0.39$	Weak
$0.40 \leq  r  \leq 0.59$	Moderate
$0.60 \leq  r  \leq 0.79$	Strong
$0.80 \leq  r  \leq 1.00$	Very strong
1.00	Monotonic correlation

## **CHAPTER 4**

### **RESULTS**

#### 4.1 Chapter overview

This chapter will present the outcomes derived from the data collection process undertaken for this research project. Firstly, comprehensive demographic information of the participants will be provided. Subsequently, a detailed exploration of the results obtained from the inference tests will be demonstrated, closely followed by the hypothesis testing outcomes will be discussed. The presentation of the findings will be systematically organized, starting with any relevant graphical representation such as bar chart and pie chart, followed by a concise discussion with providing a relevant tabulation summary in conclusion of each respective component if required.

A total of 398 responses were received in this research project. Based on the application of inclusion and exclusion criteria, it was found that 364 participants (91.5%) met the inclusion criteria, while 34 participants (8.5%) were excluded from the study. Among the exclusions, 7 participants (1.8%) disagreed with the consent form to protect their privacy, 2 participants (0.5%) exceeded the age limit of 26 years, 6 participants (1.5%) were not undergraduate UTAR students in Sungai Long campus and 19 participants (4.7%) either had a neurological impairment or experienced a health condition in the past 6 months or were diagnosed with physical/mental disability by a doctor.

## 4.2 Demographic of population

This section focuses on presenting the demographic information of the participants through detailed descriptions, graphical representations, and providing a comprehensive summary of the entire subsection by tabulation (Table 4.1). Age, gender, type of faculty and year of study among participants in UTAR Sungai Long campus were demonstrated in Table 4.1 and were reported as frequency and percentage, and Mean (M) and Standard Deviation (SD), respectively.

Table 4.1: Demographic data of participants

<b>Demographic Data</b>	<b>Frequency, n (%)</b>	<b>Mean <math>\pm</math> SD</b>
<b>Age</b>		21.03 $\pm$ 1.40
18	1 (0.3)	
19	52(14.3)	
20	82(22.5)	
21	99(27.2)	
22	85(23.4)	
23	30(8.2)	
24	9(2.5)	
25	3(0.8)	
26	3(0.8)	
<b>Gender</b>		1.64 $\pm$ 0.48
Male	130(35.7)	
Female	234(64.3)	
<b>Faculty</b>		
MK FMHS	128(35.2)	
LKC FES	108(29.7)	
FAM	80(22.0)	
FCI	48(13.2)	
<b>Year of study</b>		
1	88(24.2)	
2	105(28.8)	
3	107(29.4)	
4	57(15.7)	
5	7(1.9)	

Data of age and gender are presented as total number, n (percentage), and means  $\pm$  standard deviations. Data of faculty and year of study are presented as total number, n (percentage).

#### 4.2.1 Age

Among the participants, there was only one participant (0.3%) aged 18, 52 participants (14.3%) aged 19 and 82 participants (22.5%) aged 20. The age group with the highest representation was 21-year-olds constituting 99 participants (27.2%) of the total recruited. Besides, there were 85 participants (23.4%) with the age of 22 years, 30 participants (8.2%) with the age of 23 years and 9 participants (2.5) aged 24. Three participants each were recorded at the ages of 25 years (0.8%) and 26 year (0.8%), respectively. On average, the distribution of participant ages in this study was  $21.03 \pm 1.40$  (Table 4.1).

#### 4.2.2 Gender

The recruitment comprised 130 male students, accounting for 35.7% of the population, while 234 female students constituted the remaining 64.3% of the population which is the majority gender in the study. On average, the distribution of gender in this study was  $1.64 \pm 0.48$  (Table 4.1).

#### 4.2.3 Types of faculty

The majority number of participants comprising 128 people (35.7%), belonged to MK FMHS faculty. Besides, there were 108 participants (29.7%) came from LKC FES faculty, while 80 participants (22.0%) from FAM faculty, followed by 48 participants (13.2%) belonged to FCI faculty (Table 4.1).

#### 4.2.4 Year of Study

Among the participants, 88 participants are first-year undergraduates (24.2%) and 105 participants are second-year undergraduates (28.8%). The majority of participants were third-year undergraduate students, with a maximum of 107 participants (29.4%), while fourth-year undergraduate students had 57 participants (15.7%) and the fewest were fifth-year undergraduate students, with only 7 participants (1.9%) (Table 4.1).

### 4.3 Total scores for MFSI-sf and DASS-21

This section is dedicated to present the total score of participants in each outcome measure which are MFSI-sf and DASS-21. The total scores for each subscale of MFSI-sf will be outlined and reported in terms of Mean (M) and Standard Deviation (SD). Subsequently, the total scores for each of category DASS-21, including its severity levels will be illustrated and reported using frequency and percentage, along with Mean (M) and Standard Deviation (SD). Each subsection will offer detailed description, graphical representations and tabulations (Table 4.2 and Table 4.3) to comprehensively present the findings.

#### 4.3.1 Total scores for MFSI-sf

Refer to the data presented in Table 4.2, which provides overview of the total scores for each subscale of MFSI-sf, including general fatigue, physical fatigue, mental fatigue, emotional fatigue, vigor and total fatigue score. All of the scores are reported as Mean (M) and Standard Deviation (SD). Each subscale is scored from 0 to 24, while the total fatigue score is ranging from -24 to 96.

Within the range of different types of fatigue, the analysis showed that the emotional fatigue score received the highest mean score of  $8.40 \pm 5.28$ . General fatigue score follows closely behind with a mean and standard deviation of 7.76 and 5.34, respectively. Subsequently, the mental fatigue score demonstrates an average of  $6.94 \pm 4.79$ . The result also presents that the physical fatigue scores were recorded the lowest among the different types of fatigue with an average score of  $5.39 \pm 4.88$ . Conversely, among ranging from 0 to 24, the vigor score exceeded the various

types of fatigue scores, with a mean and standard deviation of  $11.40 \pm 4.84$ . The score for total fatigue as mention in the literature is from -24 to 96 which is calculation by a formula, involving the sum of the general fatigue, physical fatigue, mental fatigue, emotional fatigue scores then subtract the vigor scores. In the current study, the average of the total fatigue score was calculated to be  $17.10 \pm 18.68$ . This finding shows that the participants experienced some level of fatigue on average, but it was not severe.

Table 4.2 Total score of participants with general fatigue, physical fatigue, mental fatigue, emotional fatigue, vigor and total fatigue score.

<b>Type of fatigue</b>	<b>Mean <math>\pm</math> SD</b>
<b>General Fatigue</b>	$7.76 \pm 5.34$
<b>Physical Fatigue</b>	$5.39 \pm 4.88$
<b>Mental Fatigue</b>	$6.94 \pm 4.79$
<b>Emotional Fatigue</b>	$8.40 \pm 5.28$
<b>Vigor</b>	$11.40 \pm 4.84$
<b>Total fatigue score</b>	$17.10 \pm 18.68$

Data are presented as means  $\pm$  standard deviations.



#### 4.3.2 Total scores for DASS-21

Table 4.3 lists three different mean total scores for each category on the DASS-21 for the 364 participants in this study. According to the DASS-21 scoring table as mention in the literature (Table 3.2.1), the average of depression severity score was calculated to be  $10.73 \pm 9.02$ . This suggests that on average, the participants in current study were suffering mild levels of depression. Furthermore,  $11.02 \pm 4.25$  is the mean anxiety severity score, representing that the participants experienced moderate degrees of anxiety during the study period. Compared to the conditions of depression and anxiety, the mean stress severity score was  $11.86 \pm 8.63$ , indicating that the average stress level of the participants was within normal level.

Table 4.3 Total scores of different types of psychological factors.

<b>Psychological factors</b>	<b>Frequency, n (%)</b>	<b>Mean <math>\pm</math> SD</b>
<b>Depression</b>		$10.73 \pm 9.02$
Normal	182(50.0)	
Mild	44(12.1)	
Moderate	82(22.5)	
Severe	35(9.6)	
Extremely severe	21(5.8)	
<b>Anxiety</b>		$11.02 \pm 4.25$
Normal	149(40.9)	
Mild	21(5.8)	
Moderate	80(22.0)	
Severe	46(12.6)	
Extremely severe	68(18.7)	
<b>Stress</b>		$11.86 \pm 8.63$
Normal	241(66.2)	
Mild	44(12.1)	
Moderate	51(14.0)	
Severe	23(6.3)	
Extremely severe	5(1.4)	

Data are presented as total number, n (percentage), and means  $\pm$  standard deviations.

Table 4.3 illustrates the distribution of depression severity levels among the 364 participants, categorized as normal, mild, moderate, severe and extremely severe. The corresponding mean and standard deviation for depression severity were calculated to be  $10.73 \pm 9.02$ , respectively among 364 participants. Refer to the findings from Table 4.3, it can be seen that half of the total participants, comprising 182 participants (50.0%), showed no signs of depression, indicating a relatively evenly distribution. The remaining half of the participants experienced varying degrees of depression. Specifically, 44 participants (12.1%) fell into the mild depression category, while the majority of 82 participants (22.5%) experienced a moderate level of depression, nearly twice the number of mild depression cases. In comparing, 56 participants faced more severe depression, with 35 participants (9.6%) classified as having severe depression and only 21 participants (5.8) represented the least number experiencing extremely severe depression.

Besides, Table 4.3 states the distribution of anxiety severity levels among the 364 participants, categorized as normal, mild, moderate, severe and extremely severe. The average of anxiety severity level in the study is reported as  $11.02 \pm 4.25$ . According to the results, it indicates that less than half of the total participants, specifically only 149 participants (40.9 %) have no suffer from any symptoms of anxiety, meaning that more the half of the total participants experiences some degree of anxiety issue. Obviously, 21 participants (5.8%) represent the least number of participants who have mild symptoms of anxiety, while the majority, comprising 80 participants (22.0%) fall into the category of moderate anxiety levels. A total of 46 participants (12.6%) suffer severe anxiety and the number of participants who having the extremely severe levels of anxiety are 68 participants (18.7%) among the 364 participants. Notably, the frequency

of extremely severe anxiety levels was significantly higher compared to the corresponding levels of depression, as shown in Table 4.3.

Moreover, Table 4.3 delineates that the distribution of stress severity levels among the 364 participants, categorized as normal, mild, moderate, severe and extremely severe. The mean and standard deviation for stress severity levels are reported in Table 4.3, indicating an average of  $11.86 \pm 8.63$ . Throughout the data from Table 4.3, it seems that more than half of the total participants, specifically 241 participants (66.2%) who report no symptoms of stress. This implies that only 33.8% of participants experience varying degrees of stress during the study period. Notably, 44 participants (12.1%) reported having mild levels of stress while the majority, comprising 51 participants (14.0%) suffer from moderate degrees of stress among the 364 participants. In comparing to the cases of depression and anxiety severity levels, there are fewer participants reporting severe and extremely severe levels of stress, with 23 participants (6.3%) and 5 participants (1.4%), respectively.

#### 4.4 Test of Normality

This section presents the test of normality for all data in this study, including gender, six MFISI-sf subscales and three DASS-21 subscales by using Kolmogorov-Smirnov and Shapiro-Wilk test. Based on the result of these two tests, it shows that the p-value of all data (gender, general fatigue, physical fatigue, mental fatigue, emotional fatigue, vigor, total fatigue score, depression, anxiety and stress) are less than 0.05. Hence, all data in the study are significantly deviates from a normal distribution.

#### 4.5 Inferential analysis

This section will be illustrated the inferential analysis to evaluate the objectives and hypotheses in the research project through the use of independent t-test and Spearman's correlation test. Each subsection will provide detailed description and tabulations (Table 4.4 and Table 4.5) to comprehensively present the findings. IBM SPSS Software statistics version 29.0 was used for the inferential analysis.

##### 4.5.1 Independent t-test

Independent t-test aims to compare between genders on the different types of fatigue (general fatigue, physical fatigue, mental fatigue, emotional fatigue, vigor and total fatigue score) among the 364 participants. The purpose of the independent t-test is also to determine whether these variables affect participants in the area being assessed. The data were reported as Mean (M), Standard Deviation (SD), Standard Error (SE), t-value, degree of freedom, significant values, effect size, upper and lower limit of 95% confidence interval in Table 4.4.

On average, females have slightly higher scores for general fatigue ( $M=7.99$ ,  $SE= 0.35$ ) compared to males ( $M=7.35$ ,  $SE=0.47$ ). This difference,  $-0.64$ , 95% CI  $[-1.79, 0.50]$ , was not significant  $t(362) = -1.11$ ,  $p = 0.27$ ; however, it did represent a small-sized effect,  $d= -0.12$ . Similarly, females exhibit slightly higher scores for physical fatigue ( $M=5.59$ ,  $SE= 0.32$ ) than males ( $M=5.02$ ,  $SE=0.42$ ). This shows that a non-significant difference of  $-0.57$ , 95% CI  $[-1.59, 0.49]$ ,  $t(362) = -1.08$ ,  $p = 0.28$ ; however, it did represent a small-sized effect,  $d=-0.12$ . On average of mental fatigue scores, females have slightly higher scores ( $M=7.09$ ,  $SE= 0.31$ ) compared to males ( $M=6.68$ ,  $SE=0.42$ ). The observed difference,  $-0.41$ , 95% CI  $[-1.34, 0.69]$ , was not statistically significant  $t(362) = -0.77$ ,  $p = 0.45$ ; however, it did represent a small-sized effect,  $d=-0.08$ .

On average, females have slightly higher scores for emotional fatigue ( $M=8.51$ ,  $SE= 0.35$ ) compared to males ( $M=8.21$ ,  $SE=0.46$ ). This difference,  $-0.30$ , 95% CI  $[-1.44, 0.83]$ , was not significant  $t(362) = -0.53$ ,  $p = 0.60$ ; however, it did represent a small-sized effect,  $d=-0.06$ . In contrast, males exhibit slightly higher scores for vigor ( $M=11.51$ ,  $SE=0.46$ ) compared to females ( $M= 11.33$ ,  $SE=0.30$ ). This difference,  $0.18$ , 95% CI  $[-0.87, 1.22]$ , was not significant  $t(362) = 0.33$ ,  $p = 0.74$ ; however, it did represent a small-sized effect,  $d= 0.04$ . Lastly, in terms of total fatigue score, females show slightly higher score for total fatigue score ( $M= 17.85$ ,  $SE= 1.23$ ) compared to males ( $M=15.75$ ,  $SE=1.62$ ). This difference,  $-2.10$ , 95% CI  $[-6.12, 1.91]$ , was not significant  $t(362) = -1.03$ ,  $p = 0.30$ ; however, it did represent a small-sized effect,  $d=-0.11$ .

Table 4.4: The result of Independent t-test.

Type of fatigue	Gender	Mean	SD	SE	t	df	p value	95% CI		Effect size
								Lower	Upper	
General fatigue	Male	7.35	5.39	0.47	-1.11	362	0.27	-1.79	0.50	-0.12
	Female	7.99	5.30	0.35						
Physical fatigue	Male	5.02	4.76	0.42	-1.08	362	0.28	-1.59	0.49	-0.12
	Female	5.59	4.95	0.32						
Mental fatigue	Male	6.68	4.78	0.42	-0.77	362	0.45	-1.34	0.69	-0.08
	Female	7.09	4.79	0.31						
Emotional fatigue	Male	8.21	5.27	0.46	-0.53	362	0.60	-1.44	0.83	-0.06
	Female	8.51	5.30	0.35						
Vigor	Male	11.51	5.23	0.46	0.33	362	0.74	-0.87	1.22	0.04
	Female	11.33	4.62	0.30						
Total fatigue score	Male	15.75	18.49	1.62	-1.03	362	0.30	-6.12	1.91	-0.11
	Female	17.85	18.78	1.23						

p-value set as <0.05. SD = standard deviation, SE= standard error, t = t-value, df = degree of freedom, CI = confidence interval. Data are presented as Mean (M), Standard Deviation (SD), SE, t, df, p values, effect size, upper and lower limit of 95% confidence interval.

#### 4.5.2 Spearman's correlation test

Spearman's correlation test is used to determine the association between different types of fatigue (general fatigue, physical fatigue, mental fatigue, emotional fatigue, vigor and total fatigue score) and psychological factors (depression, anxiety and stress) among the 364 participants. The data were reported as correlation coefficient ( $r$ ) and its significant values (Table 4.5). The strength of the correlation will be presented in the detailed description by referring to the Table 3.4.

Based on the results from Table 4.5, all types of fatigue and depression are significantly correlated. A statistically significant linear correlation was observed between general fatigue and depression, with  $r = 0.591$  ( $p < 0.001$ ). This correlation is considered positive and moderate in strength. Similarly, a significant positive moderate correlation was identified between physical fatigue and depression, with  $r = 0.510$  ( $p < 0.001$ ). Additionally, there was a positive correlation between the mental fatigue and depression with  $r = 0.599$  ( $p < 0.001$ ), indicating a correlation strength that is approximately strong. Furthermore, the correlation between emotional fatigue and depression was a statistically significant correlation with  $r = 0.547$  ( $p < 0.001$ ), representing a positive direction and moderate strength of correlation. In contrast, a negative weak correlation was observed between vigor and depression with  $r = -0.262$  ( $p < 0.001$ ), although the correlation remained statistically significant. Lastly, there was positive strong correlation was found between the total fatigue score and depression with  $r = 0.687$  ( $p < 0.001$ ).

According to the findings presented in Table 4.5, all types of fatigue exhibit significantly correlated with anxiety. There was a statistically significant positive moderate correlation between

general fatigue and anxiety, with  $r = 0.545$  ( $p < 0.001$ ). Besides, a significant moderate correlation was identified between physical fatigue and anxiety, with  $r = 0.528$  ( $p < 0.001$ ), indicating the positive direction of the correlation. Similarly, the positive moderate correlation between mental fatigue and anxiety was found to be statistically significant, with  $r = 0.586$  ( $p < 0.001$ ). Moreover, there was a significant positive correlation found between emotional fatigue and anxiety, with  $r = 0.525$  ( $p < 0.001$ ), representing a moderate strength of correlation. Conversely, a statistically significant correlation was observed between vigor and anxiety even it is a negative and very weak correlation with  $r = -0.114$  ( $p = 0.029$ ). Lastly, the total fatigue score and anxiety demonstrated a statistically significant positive strong correlation with  $r = 0.624$  ( $p < 0.001$ ).

Referring to the outcomes outlined in Table 4.5, all types of fatigue and stress are statistically significant correlation. General fatigue and stress displayed a statistically significant positive strong correlation, with  $r = 0.608$  ( $p < 0.001$ ). Similarly, a significant moderate correlation was identified between physical fatigue and stress with  $r = 0.575$  ( $p < 0.001$ ). Besides, there was a statistically significant correlation between mental fatigue and stress with  $r = 0.635$  ( $p < 0.001$ ), representing a positive direction and strong correlation. The correlation between emotional fatigue and stress was significantly positive moderate correlation with  $r = 0.579$  ( $p < 0.001$ ). In contrast, the vigor and stress had a negative and very weak correlation, with  $r = -0.148$  ( $p = 0.005$ ), but was still considered statistically significant correlation. Lastly, there was a statistically significant positive strong correlation between total fatigue score and stress, with  $r = 0.690$  ( $p < 0.001$ ).



Table 4.5: The result of Spearman's correlation test between different types of fatigue and psychological factors.

	<b>Depression</b>		<b>Anxiety</b>		<b>Stress</b>	
	<b><u>r</u></b>	<b><u>p-value</u></b>	<b><u>r</u></b>	<b><u>p-value</u></b>	<b><u>r</u></b>	<b><u>p-value</u></b>
<b>General Fatigue</b>	0.591	<0.001	0.545	<0.001	0.608	<0.001
<b>Physical Fatigue</b>	0.510	<0.001	0.528	<0.001	0.575	<0.001
<b>Mental Fatigue</b>	0.599	<0.001	0.586	<0.001	0.635	<0.001
<b>Emotional Fatigue</b>	0.547	<0.001	0.525	<0.001	0.579	<0.001
<b>Vigor</b>	-0.262	<0.001	-0.114	0.029	-0.148	0.005
<b>Total fatigue score</b>	0.687	<0.001	0.624	<0.001	0.690	<0.001

r = sample correlation coefficient, p-values are set as <0.05. Data are presented as correlation coefficient and significant value.

## 4.6 Hypothesis Testing

**H01: There are no significant differences between genders on the different types of fatigue among undergraduate students.**

**HA1: There are significant differences between genders on the different types of fatigue among undergraduate students.**

The independent t-test is used to determine the differences between genders on the different types of fatigue. The confidence level in this test was set as  $\alpha = 0.05$  and two tailed significance tests is measured in the independent t-test. Based on the result from Table 4.4, the p-value for general fatigue, physical fatigue, mental fatigue, emotional fatigue, vigor and total fatigue score are 0.27, 0.28, 0.45, 0.60, 0.74 and 0.30, respectively, which are greater than  $\alpha$ . Hence, Levene's Test for equality of variance was assumed. Besides, the null hypothesis will be rejected when p-value  $< \alpha$  and failed to reject when p-value  $> \alpha$ . Therefore, the null hypothesis was accepted. There are no significant differences between genders on the different types of fatigue among undergraduate student.

**H02: There is no significant association between the different types of fatigue and psychological factors among undergraduate students.**

**HA2: There is a significant association between the different types of fatigue and psychological factors among undergraduate students.**

The Spearman's correlation test was conducted to assess the association between the different types of fatigue and psychological factors. The null hypothesis will be rejected when  $p\text{-value} < 0.05$  and failed to reject when  $p\text{-value} > 0.05$ . Referring to the findings from Table 4.5, all  $p\text{-values}$  are less than 0.05. Therefore, the null hypothesis was rejected. There is a significantly association between the different types of fatigue and psychological factors among undergraduate students.

## CHAPTER 5

### DISCUSSION

#### 5.1 Chapter overview

This chapter will be presented the discussion on the important outcomes from Chapter 4 aligned with the research objectives. The following part will be discussed the limitation of study, recommendations for future research, and conclusion of the research project.

#### 5.2 Discussion

##### 5.2.1 Prevalence of different types of fatigue and psychological factors among university students

In this discussion, the target population in this current study was the healthy population which is university students. As the literature mentions, fatigue is a feeling of exhaustion, extreme tiredness or lack of energy, leading to physical exertion, mental stress and/or emotional stress (Tang et al., 2016). In MFSI-sf instrument, the total fatigue score is ranging from -24 to 96 and the greater the score indicates the more pronounced the level of fatigue that the individual is experiencing. Based on the findings from Table 4.2, the average of the fatigue score among university students was  $17.10 \pm 18.68$ , representing  $-1.6\%$  to  $35.8\%$  of mean percentage range. This mean percentage range of total fatigue score indicated the prevalence of fatigue among university student in this current study was considered mild to moderate level. A previous study by Bouloukaki et al (2023) reported a prevalence of fatigue among university students at the beginning of semester reached up to 39% using Fatigue Severity Scale (FSS). The result of the

study is slightly higher than the current study, even though both studies recruited participants during the same study period, which is at the beginning of the semester. This can be explained that the university students might experience some sort of fatigue at the start of semester because of social and environmental changes. For example, university students may require time to readjust their daily routine from semester break back to study routine, leading feelings of fatigue at the beginning of the semester. Moreover, a cross-sectional study by Tanaka et al. (2018) revealed that the fatigue prevalence of 16.5% among healthy medical students using the Chalder Fatigue Scale (CFS). Similar with other previous study by Yoshikawa et al. (2014) who also used CFS instrument and reported there was 13.7% of fatigue prevalence among the healthy university students. The prevalence of fatigue in these previous studies were within the mean percentage range of fatigue in this current study.

In addition, the results from Table 4.2 also show average of different types of fatigue score among university students in this current study, including general, physical, mental, emotional fatigue, and vigor. Since there was previous study assess the prevalence of difference types of fatigue among healthy university students by using the Multidimensional fatigue symptom inventory-short form (MFSI-sf), this study will be difficulty to compare the difference between different types of fatigue prevalence rate with previous study. The mean percentage range of general fatigue among university students in this study was still considered low level of fatigue, which was 2.4% to 13.1% with mean and standard deviation of  $7.76 \pm 5.34$ . Similarly, a previous study reported there was 13.8% of students from Semnan University of Medical Sciences which considered low general fatigue that measured by similar instrument with the current study (Abdali et al., 2020). However, compared to another previous study by Mazurkiewivz et al. (2012), the

prevalence of general fatigue was as high as 71% among university students, especially medical students. Besides, the prevalence of physical fatigue is the lowest prevalence rate among the different types of fatigue which ranging from 0.5% to 10.3% with the mean and standard deviation of  $5.39 \pm 4.88$ . Besides, the lower prevalence rate of physical fatigue among university students may because out of the age range from 18-26 years old in the current study, the majority falling within 19-23 years old which was younger age groups (Table 4.1). Therefore, university students often have a level of youthful energy and maintain active lifestyle such as engaging in outdoor activities or sport activity with their friends, walking daily between school and their residence and so on. However, a previous study by Zhang et al. (2021) revealed that the prevalence of physical fatigue among medical students using Subjective Fatigue Scale (FS) was as high as 50.03% due to poor sleep quality that affect their overall physical well-being.

The prevalence of mental fatigue among university students ranged from 2.2% to 11.7% with the mean and standard deviation of  $6.94 \pm 4.79$ , which was slightly lower than general fatigue but higher than physical fatigue. In order to pursuit higher level of academic performance in university, students always required important cognitive skills such as critical thinking and problem-solving in their study, leading to some sort of mental fatigue. Besides, a previous study reported there was high frequency of relying on technology or digital devices such as Ipad, laptop, handphone among university students for entertainment, leading to higher level of mental fatigue experienced by them (Luo et al, 2022). The result from this previous study revealed that the prevalence of mental fatigue among the university students who played esports was 80.5% which is higher than the current study (Luo et al., 2022). Similar reason to the other study by Zhang et al. (2021), the researcher mentioned that the higher frequency of problematic smartphone use (PSU)

can lead to increase the prevalence of mental fatigue among university students up to 45.43% which was measured by the FS instrument. Furthermore, the prevalence of emotional fatigue is the highest among the different types of fatigue in this current study, ranging from 3.1% to 13.7% prevalence rate with  $8.40 \pm 5.28$ . University students were always solving with interpersonal conflicts to navigate and maintain social relationship with their friends, which may lead to emotional fatigue among them. Comparing with other previous study that used the Zoom Exhaustion & Fatigue Scale (ZEF) instrument, the prevalence of emotional fatigue among undergraduate IT programme students was up to 20.9% which was higher than the current study (Mariappan & Nordin, 2021). The prevalence of vigor among university students was ranging from 6.6% to 16.2% in the current study, which was relatively higher prevalence rate. This may due to the reason that most of university students have their own method to regulate their emotional and to relax themselves. However, a previous study by Swords & Ellis (2017) mentioned that there was more burnout (74.9%) and less vigor (31.8%) among medical student during their clinical posting due to higher level of stress and anxiety.

Referring to Table 4.3, the prevalence of depression, anxiety and stress among UTAR undergraduate students in the study was 50%, 59.1% and 33.8%, respectively. The prevalence of depression and anxiety during the study period was relatively higher because it consisted of half or more than half of our population. Among these three psychological factors, stress (33.8) was the lowest prevalence rate in this study. However, it can be explained that the study period for recruiting participants was around the first few weeks of the semester, which was the period that was not the examination week or the assignment's due date. Hence, most UTAR undergraduate students felt less stress during the study period. This reason also can be supported by a previous

study by Kulssom & Afsar (2015); they reported significant differences in the prevalence of depression, anxiety and stress before and after examination, from 43% to 63% and 41% reduced to 30% to, 47% and 30%, respectively. Hence, the examination could significantly affect the prevalence of psychological factors among university students. In this study, the most prevalent issue among our population was anxiety (59.1%), followed by depression (50%), and they might be due to academic pressure, uncertainty or loss of direction about their future, pressure from family or peers and so on. Based on a study by Mirza et al. (2021), they stated that changed of family relationships, finance issues, and worries about post-graduation life can increase the prevalence of depression among medical students, whereas a pack arrangement of timetable, high workload with a short due date, inadequate time for entertainment or non-academic activity can be highlighted the anxiety level of medical students.

A local study by Fauzi et al. (2021) also used DASS-21 measurement and reported that among university students, there were 51.4%, 85.1% and 65% of prevalence rates of depression, anxiety and stress, respectively, which was different from the study expect the depression prevalence is approximately similar to the current research. This is due to the reason that university students have to experience challenges to pursue a higher level of academic and performance standards in university compared to high schools (Fauzi et al., 2021). Therefore, they often encounter high levels of depression, anxiety and stress in their study. Similarly, by using DASS-21, the prevalence of depression, anxiety and stress among medical students found in the previous study was also much higher than the current study, which were 60%, 76% and 47%, respectively (Fuad et al., 2015). A cross-sectional study at Menoufiya University revealed that the prevalence of depression, anxiety and stress among first-year medical students by using similar instruments



were 63.7%, 78.4% and 57.8%, respectively (Abdallah & Gabr, 2014). The result of the previous study was also not similar to the current study. The findings found in a previous study by Asif et al (2020) showed that there were 75%, 88.4% and 84.4% of depression, anxiety and stress prevalence rate among university students, which is also differ from the current study result even though the similar instrument was used. Although all of the studies above used the DASS-21 instrument, there were various prevalence rates of depression, anxiety and stress between previous studies and the current study, which might be due to the different time frame of the study period. However, even though DASS-21 serves as a screening tool instead of a diagnostic tool, it can reveal higher levels of depression, anxiety, and stress, which can increase the concerns and attention of university administrators and healthcare professionals (Fauzi et al., 2021). This aligns with our initial hypothesis, emphasising that these three psychological factors are prevalent among undergraduate university students.

### 5.2.2 Comparison between gender on different types of fatigue

This current research solves the literature gap by comparing the gender on different types of fatigue. Referring to the findings from Table 4.4, there was no significant difference between all types of fatigue (general, physical, mental, emotional fatigue, vigor and total fatigue score) and gender. This might be due to male and female students experiencing the same level of academic stress or daily living challenges. Besides, they might have similar fatigue coping methods to control the level of fatigue. The result of the current research was unexpected because most previous studies reported that fatigue was significantly different with gender, especially female students who have higher fatigue levels than male students.

As mentioned above in the literature, a previous study by Nyer et al. (2015) reported a significant difference between general fatigue and gender through Pearson chi-square test. Their results showed that female students experienced mild fatigue (67.3%) and moderate or severe fatigue (74.4%), which was relatively higher than male students. Similar to other previous studies conducted at the Polish medical universities by Zdun-Ryżewska et al. (2021), the researchers believe that gender is associated with general fatigue and also proved that there was a statistically significant difference between general fatigue and male and female university students. They also found that coping with stress has a positive association with fatigue levels among male and female students. This statement can be supported by a previous study which indicated that female students have higher levels of stress and fatigue compared to males during chiropractic training programs because female students have a lower ability to cope with stress, leading to higher levels of general fatigue (Kizhakkeveetil et al., 2017). However, there were limited studies reported that there was no significant difference between gender and general fatigue.

There was no significant gender difference in physical fatigue among university students in this study. However, there was a lack of research supporting this statement. Conversely, a previous study by Frederick et al. (2022) revealed a statistically significant difference between physical fatigue and gender. They reported male students experienced higher physical fatigue than female students because male students possess a higher level of physical activity than female students. They often actively engage in sports or other outdoor exercises in their daily lives, which may lead to quickly experiencing higher levels of physical fatigue. Moreover, one of the reasons that males are more physically fatigued is that male students possess greater muscle mass, muscle strength, and muscle endurance than female students due to higher physical activity. A previous study in Japan supports this statement by indicating male students have a higher level of subjective muscle-fatigue sensation at the demand value of 40-60% maximal voluntary contraction. Therefore, this study concluded that there was a significant difference between gender and physical fatigue, with male students more likely to experience physical fatigue (Demura et al., 2015).

The results from Table 4.4 showed that there was also no statistically significant difference between mental fatigue and gender in this current study. Similarly, a previous study by Fard and Lavender (2018) conducted a reaction time task to assess mental fatigue among male and female students. Their results also reported no significant differences in mental fatigue between both genders, possibly because male and female students had similar fatigue in their study (Fard & Lavender, 2018). Besides, a study that utilized the Fatigue Assessment Scale (FAS) revealed that physical and mental fatigue were no significant differences between male and female students which may be due to both genders possess same management on handling physical and mental fatigue (Michielsen et al., 2013). However, there was a study by Seney & Sibille (2014), which

mentioned female students have higher levels of mental fatigue compared to male students because they tend to shift in negative mood states and maintain overthinking behaviour due to hormone level changes, resulting in mental exhaustion and arising some negative psychological issues such as depression and stress.

Not only that, there was no significant gender different in emotional fatigue among university students in the current research. The result in the current study are further supported by similar results examined by Kabunga et al. (2016) that indicated there was no significant difference in the levels of emotional fatigue. It seems that university students have similar experiences in their mood status regardless of gender. In contrast of the outcomes of the current study, another study reported that there were gender differences in emotional fatigue and mentioned female students experiences higher level of emotional fatigue due to females prone to be an emotional sensitive population compare to males (Worly et al., 2019). Lastly, Table 4.4 also showed that there was a not statistically difference between vigor and gender among university students in the present research. Similarly, some previous researches also proved that there was no gender difference in vigor because both genders may have only slightly difference or similar vigor level (Demirbatir et al., 2020; Demirbatir & Engur, 2018). However, a study by Ridner et al. (2016) revealed that female students always experience higher level of fatigue and lower level of vigor compared to male students. This statement was supported by another cross-sectional study which reported that there was a significant difference between gender and vigor and discovered that female athlete students have less vigor but more fatigue than male through the Multicomponent Training Distress Scale Scale (MTDS) questionnaire (Hagum et al., 2022).

### 5.2.3 Association between different types of fatigue and psychological factors

There were limited studies on the relationship between fatigue and psychological factors among healthy populations, especially university students. Therefore, this subsection filled the gap in the literature and used Spearman's correlation test to determine the association between different types of fatigue and psychological factors among university students. The different types of fatigue included general, physical, mental, emotional, vigor and total fatigue scores, while the various psychological factors refer to depression, anxiety and stress. Referring to the findings from Table 4.5, there was a significant correlation between different types of fatigue and psychological factors among university students. The possible reason for this finding is that, among 364 participants, most of the participants who experience some sort of fatigue will also face various degrees of psychological factors at the same time. It can be explained by fatigue and psychological factors related to each other. The higher level of exhaustion and feeling tired may worsen their overall mental health status, whereas the greater prevalence of psychological problems may lead to suffering from different types of fatigue.

There was a statistically significant positive, strong correlation between the total fatigue score and psychological factors, including depression, anxiety and stress, in the present study. Several previous studies also have findings similar to those of the present study. For example, a prior study by Nyer et al. (2015) revealed that 86.4% of university students with depressive symptoms were commonly experiencing at least mild fatigue in their study. They realized there was an association between moderate or severe levels of fatigue and frequency of suicidality among university students who experience depressive symptoms (Nyer et al., 2015). Besides, a study by Bitsika et al. (2018) reported a significant relationship between fatigue and depression,

and the relationship between these two variables was bi-directional. It means that a higher level of depression can cause a higher level of fatigue, while a higher level of fatigue can also impact a higher level of depression. A previous study has similar findings to the current study, showing a positive, strong correlation between fatigue and depression among nursing undergraduate students (Amaducci et al., 2015).

Besides, Table 4.5 showed a significant strong positive correlation between total fatigue and anxiety among university students in the current study. It can be proved that there was a strong correlation between overall fatigue and these three psychological factors among university students. The result was similar to a previous study by Nyer et al. (2015); they utilized the Anxiety Symptom Questionnaire (ASQ) and Beck Anxiety Inventory (BAI) to assess the severity of anxiety among university students. Their findings showed that students who experience moderate or severe fatigue has also significantly higher levels of anxiety compared to the students who suffer mild fatigue on both anxiety scales. Moreover, a previous study by Zdun-Ryżewska et al. (2021) reported a moderate correlation between total fatigue and anxiety. It concluded that anxiety is a potential factor that affects the total fatigue level among university students. Moreover, there was a statistically strong positive correlation between total fatigue and stress among university students in the present research. Similarly, a study by Zdun-Ryżewska et al. (2021) mentioned a significant moderate correlation between total fatigue and stress found in their study. It explained that there are a lot of stressors faced in university students' daily lives and the fatigue level will increase if students cannot cope or manage their stress well. This statement also can be supported by another study by Konaszewski et al. (2022) because they stated that good self-efficacy is a task-oriented style for managing stress levels among university students, and there was a negative correlation

between fatigue and self-efficacy, meaning that the higher self-efficacy can reduce the level of fatigue due to stress eliminated.

Based on the results from Table 4.5, there was a significant positive moderate correlation between general fatigue and depression and anxiety among university students in the current research. Similarly, a previous study used the Multidimensional Fatigue Inventory (MFI-20) and the Patient Health Questionnaire-9 (PHQ-9) to assess the severity of general fatigue and depression among e-learning-based computer programming students (Dirzyte et al., 2021). The result of their study indicated that the level of depression increases with the level of general fatigue. In the same previous study, the researchers also measured the anxiety level by utilizing the Generalized Anxiety Disorder scale (GAD-7). They found that there was a significant association between general fatigue and anxiety, respectively, representing a higher level of anxiety can increase the general fatigue level among computer programming e-learner students (Dirzyte et al., 2021). Besides, a previous study by Jiang et al. (2013) utilized the Fatigue Symptom Checklist and the State-Trait Anxiety Inventory (STAI) to evaluate general fatigue severity and anxiety levels among medical students. Their result was similar to the current study, which mentioned that the trait anxiety positively correlates to general fatigue. In the present study, the result in Table 4.5 showed a significant positive correlation between general fatigue and stress. The strength of correlation was stronger than other psychological factors, and hence, when there was a change in general fatigue level, the stress level would change by a significant amount, and vice versa.

Next, Table 4.5 showed that there was a statistically significant positive moderate correlation between physical fatigue and various psychological factors, including depression, anxiety and stress among university students. Similarly, a previous study in Taiwan by Chen et al. (2015) evaluated physical fatigue levels by MFSI-sf in the Chinese version. Also, it assessed the depressive symptoms of the Beck Depression Inventory-II in the Chinese version. The findings are similar to the current study, indicating a significant association between physical fatigue and depressive symptoms among university students. The previous study also highlighted that students in higher grades experienced higher levels of physical fatigue and depressive symptoms compared to lower grader students due to their profound academic (Chen et al., 2015). A cross-sectional study in Australia by Bitsika et al. (2018) stated that there was a significant relationship between anxiety, depression and physical fatigue among university students. The researchers explained that when the individual experiences a feeling of anxiety, the autonomic nervous system and somatic nervous system are activated, followed by responses of psychomotor agitation and increased muscle tension. This can lead to physical fatigue, such as muscle fatigue and pain, which can cause lethargy and change emotional states, which are common depressive symptoms (Bitsika et al., 2018). The anxiety-fatigue-depression progression is commonly seen among university students due to the pursuit of good academic performance in their study journey. Besides, a previous study by Doerr et al. (2015) utilized the Multidimensional Fatigue Inventory (MFI) to assess physical fatigue and also had the same result as the current study, which revealed that there was a reciprocal relationship between stress and physical fatigue among university students.

Moving on to the next types of fatigue, there was a statistically significant positive, strong correlation between mental fatigue and depression. Shim et al. (2018) mentioned that students



experience a significantly higher level of mental and physical fatigue when they have some degree of depression. The predicted reason is that university students are always busy with their studies and lack sleep duration, leading to an increased risk of depression and cognitive difficulties such as problems with paying attention during classes and memorizing. Over time, the level of mental fatigue will gradually increase. Besides, the current study showed that there was a significant positive moderate correlation between mental fatigue and anxiety among university students. However, there is a lack of evidence to support this finding because limited studies investigate the association between mental fatigue and anxiety among university students. Therefore, one of the possible causes of moderate correlation between mental fatigue and anxiety is due to the fact that most of university students have problems and anxiety in managing their academic tasks and goals due to the heavy syllabus offered by the lecturer and overthinking about their academic performance, leading to increase higher level of mental fatigue. Moreover, there was a significant positive strong correlation between mental fatigue and stress among university students in the current study. This means that students experiencing high stress levels are also more likely to experience mental fatigue and vice versa. However, a previous study by Smith (2018) revealed that there was a significant association between mental fatigue and student academic performance, but it may not directly lead to increased academic stress, which was predicted by conscientiousness and stressors among university students.

According to the outcomes from Table 4.5, emotional fatigue was significantly positively correlated with three types of psychological fatigue (depression, anxiety and stress) among university students. A possible reason for this correlation is that individual who has emotional fatigue often have difficulty controlling their emotions, leading to various psychological problems

such as depression, anxiety and stress. Besides, students with depression, anxiety or stress have a hard time maintaining their mood state and become emotional people. They may suffer from emotional fatigue, affecting their quality of life. Consistent with a previous study by Xu et al. (2019), their result found that there was a positive correlation between emotional fatigue and depressive symptoms among university student nurses. This is because students who have emotional fatigue tend to face sleep disturbance problems, which is a potential factor linked with emotional fatigue and further increases or worsens depressive symptoms (Xu et al., 2019). Moreover, this is consistent with a study by Johnson et al. (2020), which found that emotional fatigue has a strong relationship with anxiety and depression among physician assistant students. The researchers also found that the prevalence of anxiety among medical students was higher than among other faculty students and mentioned anxiety is strongly associated with increased emotional exhaustion among them, leading to a decrease in their academic performance. Similarly, further research also revealed that anxiety has been correlated with emotional fatigue, which is a common issue experienced by university students nowadays due to high workload and lack of free time for entertainment, especially medical students (Martínez-Líbano et al., 2022). Consistent with the current study, previous research by Araoz et al. (2022) indicated a direct and significant association between emotional fatigue and academic stress among university students. As emotional fatigue increases with academic stress, university student's psychological well-being and quality of life will be affected, and hence, suicide ideation may be increased.

Lastly, there was a statistically significant negative, weak correlation between vigor and depression, while there was a negative and very weak correlation between vigor and two psychological factors (anxiety and stress) among university students in this present study. This

inverse relationship indicates an individual will experience a high level of vigor if he/she has low levels of depression, anxiety and/or stress and vice versa. Similarly, a cross-sectional study revealed the relationship between psychological distress and vigor was a significantly negative and very weak correlation (Liébana-Presa et al., 2014). Consistent with another study by Dalir & Mazloun (2012), the study found that psychological factors were also significantly associated with motivation among university students. 32.1% of students who suffer from depression, anxiety or stress lack motivation or interest in performing any tasks which had a negative impact on their overall mental well-being (Dalir & Mazloun, 2012). Besides, a higher level of vigor has a good impact on physical and psychological well-being because university student with high vigor levels can increase their motivation and engagement in achieving their academic goal. To support this statement, a systematic review by Cortés-Denia et al. (2021), several studies proved that there was a relationship between vigor and psychological health and psychological disorder symptoms. Students who experience more vigor can reduce depressive symptoms, academic stress and negative emotional symptoms such as anxiety and hostility, resulting in improving their quality of life and life satisfaction (Adrian et al., 2018; Dugan & Barnes-Farrell, 2020).

### 5.3 Limitation of study

There are several limitations found in the current study. Firstly, the study period is insufficient to conduct this research project and collate data of participants. Research has to recruit participants in a limited period, within two to three weeks, through social media and face-to-face. There was a high chance of recruiting similar people who might feel annoyed and refuse to participate in this study. This cross-sectional study analyses the association between different types of fatigue and psychological factors at a single point period and the issue of short duration in collecting data; the researcher faced a challenge to define a causal relationship between different types of fatigue and psychological factors among university students.

Besides, the second limitation of the study is gender bias. This is due to the reason that the proportion of female students was much higher than that of male students on the Universiti Tunku Abdul Rahman Sungai Long campus. Therefore, the number of female participants was twice that of male participants in the current study, indicating an obvious imbalance in gender representation. Since one of the objectives of this study was to compare genders on the different types of fatigue among undergraduate students, the presence of gender bias may be one of the reasons that inadequately explore the potential differences between genders and different types of fatigue.

Moreover, the prevalence of different types of fatigue and psychological factors in this cross-sectional study varies from other studies because of differences in measurement instruments used to measure and conduct different lengths of the study period. The study period of the present study was at the beginning of the semester, when university students might feel less or no fatigue

and experience psychological factors such as depression, anxiety and stress because there was no examination and a higher workload at the beginning of the semester. Conversely, the study that starts at the middle or end of the semester may report a higher prevalence compared to the study that starts at the beginning of the semester. Hence, different timelines of investigation may influence varying the prevalence of fatigue and psychological factors. Lastly, other potential confounding factors may affect different types of fatigue among students such as body mass index (BMI), sleep quality and duration and levels of academic workload, which have not been examined in the current study. Hence, future studies need to investigate these associations between confounding factors with different types of fatigue.

#### 5.4 Recommendation for future research

There were several recommendations provided for future research. Firstly, the time frame for collecting data in the study could be extended to recruit more participants. The standard error can be minimized when the sample size is increasing, and all data will be approximately normal distribution. Therefore, researchers can report the mean score of samples can represent the mean score of the population if there is a normal distribution. Besides, the cross-sectional study only studied at a single point in time and could not analyse the relationship between the variables over time, leading to the inability to clarify the presence of a causal relationship. A longitudinal cohort study is recommended for use in future studies.

Besides, as the proportion of female students is more significant than that of male students in the current study, future research can include multiple educational institutions or universities to equal the number of both genders to prevent gender bias. Moreover, since there was a significant association between different types of fatigue and psychological factors among university students, future studies can further cooperate with healthcare professionals to investigate the potential intervention to manage different types of fatigue and improve overall psychological well-being among university students. Lastly, future studies could determine the effect of different types of fatigue on the physical and psychological well-being of university students. Therefore, university institutions and related authorities can collaborate to organize a fatigue management programme and physical and mental health awareness workshop to reduce the prevalence of fatigue or psychological problems among university students and enhance their physical and mental health, as well as quality of life.

## 5.5 Conclusion

In conclusion, the prevalence of total fatigue among university students was slightly higher but still not considered severe. Emotional fatigue is the most prevalent compared to general fatigue, physical fatigue and mental fatigue, while the vigor prevalence is slightly higher than the prevalence of different types of fatigue among university students. Besides, the present study found that the prevalence of anxiety was much higher than either stress or depression. Therefore, university institutions and healthcare professionals should focus on providing appropriate fatigue and mental health management programmes to reduce the prevalence of total fatigue among university students. Besides, healthcare professionals can cooperate with university administrative staff to conduct screening and intervention programs free of charge for university students to maintain their quality of life.

There was no statistically significant difference between genders on different types of fatigue among university students. This shows that although several studies revealed that females have higher fatigue levels and lower vigor levels than male students, in this study, the differences in different types of fatigue levels between both genders are approximately similar. Hence, university authorities should monitor both female and male students instead of only female students, helping them reduce fatigue and maintain mental well-being.

Furthermore, the current study addressed the literature gaps, revealing a significant association between different types of fatigue and psychological factors among university students. Therefore, it is essential to diagnose students who may have fatigue issues or psychological

symptom disorders early. Prevention is better than cure. Future studies should investigate the effect of different types of fatigue on psychological well-being among Malaysians and provide efficient management for preventing fatigue and mental health problems in the community.



## LIST OF REFERENCE

- Abdali, N., Nobahar, M., & Ghorbani, R. (2019). Evaluation of emotional intelligence, sleep quality, and fatigue among Iranian medical, nursing, and paramedical students: A cross-sectional study. *Qatar medical journal*, 2019(3), 15. <https://doi.org/10.5339/qmj.2019.15>
- Abdallah, A. R., & Gabr, H. M. (2014). Depression, anxiety and stress among first year medical students in an Egyptian public university. *Int Res J Med Med Sci*, 2(1), 11-19. <https://www.netjournals.org/pdf/IRJMMS/2014/1/14-005.pdf>
- Adrian, A. L., Adler, A. B., & Metzler, J. N. (2018). Vigor predicting health outcomes in a high risk occupational context. *Military Psychology*, 30(1), 54-62. <https://doi.org/10.1080/08995605.2017.1420975>
- Ahmadi, M., Choobineh, A., Mousavizadeh, A., & Daneshmandi, H. (2022). Physical and psychological workloads and their association with occupational fatigue among hospital service personnel. *BMC Health Services Research*, 22(1), 1-8. <https://doi.org/10.1186/s12913-022-08530-0>
- Ahmadi, M., Shariati, A., Poormansouri, S., & Hazeghi, N. (2015). The Effectiveness of Self-Management Program on Pain, Fatigue, Depression, Anxiety, and Stress in Sickle Cell Patients: A Quasi-Experimental Study. <http://dx.doi.org/10.17795/jjcdc-29521>
- Al Barmawi, M. A., Subih, M., Salameh, O., Sayyah Yousef Sayyah, N., Shoqirat, N., & Abdel -Azeez Eid Abu Jebbeh, R. (2019). Coping strategies as moderating factors to compassion fatigue among critical care nurses. *Brain and behavior*, 9(4), e01264. <https://doi.org/10.1002/brb3.1264>
- Al Maqbali, M., Al Sinani, M., Al Naamani, Z., & Al Badi, K. (2021). Prevalence of fatigue in patients with cancer: a systematic review and meta-analysis. *Journal of pain and symptom management*, 61(1), 167-189. <https://doi.org/10.1016/j.jpainsymman.2020.07.037>
- Amaducci, C. D. M., Mota, D. D. F. D. C., & Pimenta, C. A. D. M. (2015). Fatigue among nursing undergraduate students. *Revista da Escola de Enfermagem da USP*, 44, 1052-1058. <https://doi.org/10.1590/S0080-62342010000400028>
- Ancoli-Israel, S., Liu, L., Rissling, M., Natarajan, L., Neikrug, A. B., Palmer, B. W., ... & Maglione, J. (2014). Sleep, fatigue, depression, and circadian activity rhythms in women with breast cancer before and after treatment: a 1-year longitudinal study. *Supportive care in cancer*, 22, 2535-2545. <https://doi.org/10.1007/s00520-014-2204-5>
- Asif, S., Mudassar, A., Shahzad, T. Z., Raouf, M., & Pervaiz, T. (2020). Frequency of depression, anxiety and stress among university students. *Pakistan journal of medical sciences*, 36(5), 971. <https://doi.org/10.12669%2Fpjms.36.5.1873>
- Asvat, Y., Malcarne, V. L., Sadler, G. R., & Jacobsen, P. B. (2014). Validity of the multidimensional fatigue symptom inventory-short form in an African-American

- community-based sample. *Ethnicity & Health*, 19(6), 631-644.  
<https://www.sralab.org/rehabilitation-measures/multidimensional-fatigue-symptom-inventory-short-form>
- Bachleda, C., & Darhiri, L. (2018). Internet addiction and mental and physical fatigue. *The International Technology Management Review*, 7(1), 25-33.  
<https://doi.org/10.2991/itmr.7.1.3>
- Barker Steege, L. M., & Nussbaum, M. A. (2013). Dimensions of fatigue as predictors of performance: A structural equation modeling approach among registered nurses. *IIE Transactions on Occupational Ergonomics and Human Factors*, 1(1), 16-30.  
<https://doi.org/10.1080/21577323.2011.637153>
- Basu, N., Yang, X., Luben, R. N., Whibley, D., Macfarlane, G. J., Wareham, N. J., ... & Myint, P. K. (2016). Fatigue is associated with excess mortality in the general population: results from the EPIC-Norfolk study. *BMC medicine*, 14, 1-8. <https://doi.org/10.1186/s12916-016-0662-y>
- Bazazan, A., Dianat, I., Mombeini, Z., Aynehchi, A., & Jafarabadi, M. A. (2019). Fatigue as a mediator of the relationship between quality of life and mental health problems in hospital nurses. *Accident Analysis & Prevention*, 126, 31-36.  
<https://doi.org/10.1016/j.aap.2018.01.042>
- Billones, R., Liwang, J. K., Butler, K., Graves, L., & Saligan, L. N. (2021). Dissecting the fatigue experience: A scoping review of fatigue definitions, dimensions, and measures in non-oncologic medical conditions. *Brain, behavior, & immunity-health*, 15, 100266.  
<https://doi.org/10.1016%2Fj.bbih.2021.100266>
- Bitsika, V., Sharpley, C. F., & Bell, R. (2018). The contribution of anxiety and depression to fatigue among a sample of Australian university students: Suggestions for university counsellors. *Counselling Psychology Quarterly*, 22(2), 243-255.  
<https://doi.org/10.1080/09515070903216929>
- Bouloukaki, I., Tsiliogianni, I., Stathakis, G., Fanaridis, M., Koloi, A., Bakiri, E., ... & Schiza, S. (2023, August). Sleep Quality and Fatigue during Exam Periods in University Students: Prevalence and Associated Factors. In *Healthcare* (Vol. 11, No. 17, p. 2389). MDPI.  
<https://doi.org/10.3390/healthcare11172389>
- Chen, T. Y., Chou, Y. C., Tzeng, N. S., Chang, H. A., Kuo, S. C., Pan, P. Y., ... & Mao, W. C. (2015). Effects of a selective educational system on fatigue, sleep problems, daytime sleepiness, and depression among senior high school adolescents in Taiwan. *Neuropsychiatric disease and treatment*, 741-750.  
<https://doi.org/10.2147/NDT.S77179>
- CodeBlue (2023). CodeBlue: Depression and anxiety rates highest in federal territories.  
<https://codeblue.galencentre.org/2023/03/08/zaliha-depression-and-anxiety-rates-highest-in-federal-territories/>

- Coker, A. O., Coker, O. O., & Sanni, D. (2018). Psychometric properties of the 21-item depression anxiety stress scale (DASS-21). *African Research Review*, 12(2), 135-142. <https://doi.org/10.4314/afrr.v12i2.13>
- Cordero, E. D., Loredó, J. S., Murray, K. E., & Dimsdale, J. E. (2012). Characterizing Fatigue: The Effects of Ethnicity and Acculturation 1. *Journal of applied biobehavioral research*, 17(1), 59-78. <https://doi.org/10.1111/j.1751-9861.2012.00077.x>
- Cortés-Denia, D., Lopez-Zafra, E., & Pulido-Martos, M. (2023). Physical and psychological health relations to engagement and vigor at work: A PRISMA-compliant systematic review. *Current Psychology*, 42(1), 765-780. <https://doi.org/10.1007/s12144-021-01450-y>
- Courtney, D., Watson, P., Battaglia, M., Mulsant, B. H., & Szatmari, P. (2020). COVID-19 impacts on child and youth anxiety and depression: challenges and opportunities. *The Canadian Journal of Psychiatry*, 65(10), 688-691. <https://doi.org/10.1177/0706743720935646>
- Creedy, D. K., Sidebotham, M., Gamble, J., Pallant, J., & Fenwick, J. (2017). Prevalence of burnout, depression, anxiety and stress in Australian midwives: a cross-sectional survey. *BMC pregnancy and childbirth*, 17(1), 1-8. <https://doi.org/10.1186/s12884-016-1212-5>
- Dalir, Z., & Mazloum, S. R. (2012). Relationship between mental health and interest in field of study in nursing and midwifery students. *Life Science Journal*, 9(3), 1916-1921. [http://www.lifesciencesite.com/ljs/life0903/277\\_10666life0903\\_1916\\_1921.pdf](http://www.lifesciencesite.com/ljs/life0903/277_10666life0903_1916_1921.pdf)
- De Doncker, W., Dantzer, R., Ormstad, H., & Kuppuswamy, A. (2018). Mechanisms of poststroke fatigue. *Journal of Neurology, Neurosurgery & Psychiatry*, 89(3), 287-293. <http://dx.doi.org/10.1136/jnnp-2017-316007>
- De La Vega, R., Anabalon, H., Tannion, K., Purto, H., & Jara D, C. (2022). Gender differences in professional drivers' fatigue level measured with BAlert mobile app: A psychophysiological, time efficient, accessible, and innovative approach to fatigue management. *Frontiers in Psychology*, 13, 953959. <https://doi.org/10.3389/fpsyg.2022.953959>
- Demirbatir, R. E. (2020). Comparison of Burnout, Vigor and Education Satisfaction of Music and Art Majors in Department of Fine Arts Education. *International Journal of Evaluation and Research in Education*, 9(3), 478-485. <https://eric.ed.gov/?id=EJ1274709>
- Demirbatir, R. E., & Engür, D. (2018). Academicians' Burnout, Vigor and Occupational Satisfactions in the Department of Fine Arts Education: A Sample of Uludag University. *Journal of Education and Training Studies*, 6(7), 86-93. <https://doi.org/10.11114/jets.v6i7.3219>
- Demura, S., Nakada, M., & Nagasawa, Y. (2015). Gender difference in subjective muscle-fatigue sensation during sustained muscle force exertion. *The Tohoku journal of experimental medicine*, 215(3), 287-294. <https://doi.org/10.1620/tjem.215.287>

- Dirzyte, A., Vijaikis, A., Perminas, A., & Rimasiute-Knabikiene, R. (2021). Associations between depression, anxiety, fatigue, and learning motivating factors in e-learning-based computer programming education. *International journal of environmental research and public health*, 18(17), 9158. <https://doi.org/10.3390/ijerph18179158>
- Doerr, J. M., Ditzen, B., Strahler, J., Linnemann, A., Ziemek, J., Skoluda, N., ... & Nater, U. M. (2015). Reciprocal relationship between acute stress and acute fatigue in everyday life in a sample of university students. *Biological psychology*, 110, 42-49. <https://doi.org/10.1016/j.biopsycho.2015.06.009>
- Dugan, A. G., & Barnes-Farrell, J. L. (2020). Working mothers' second shift, personal resources, and self-care. *Community, Work & Family*, 23(1), 62-79. <https://doi.org/10.1080/13668803.2018.1449732>
- Dyrbye, L. N., Thomas, M. R., Massie, F. S., Power, D. V., Eacker, A., Harper, W., ... & Shanafelt, T. D. (2008). Burnout and suicidal ideation among US medical students. *Annals of internal medicine*, 149(5), 334-341. <https://doi.org/10.7326/0003-4819-149-5-200809020-00008>
- Engberg, I., Segerstedt, J., Waller, G., Wennberg, P., & Eliasson, M. (2017). Fatigue in the general population-associations to age, sex, socioeconomic status, physical activity, sitting time and self-rated health: the northern Sweden MONICA study 2014. *BMC public health*, 17(1), 1-9. <https://doi.org/10.1186/s12889-017-4623-y>
- Fauzi, M. F., Anuar, T. S., Teh, L. K., Lim, W. F., James, R. J., Ahmad, R., ... & Salleh, M. Z. (2021). Stress, anxiety and depression among a cohort of health sciences undergraduate students: the prevalence and risk factors. *International journal of environmental research and public health*, 18(6), 3269. <https://doi.org/10.3390/ijerph18063269>
- Fieo, R. A., Mortensen, E. L., Lund, R., & Avlund, K. (2014). Assessing fatigue in late-midlife: increased scrutiny of the Multiple Fatigue Inventory-20 for community-dwelling subjects. *Assessment*, 21(6), 706-712. <https://doi.org/10.1177/1073191114541143>
- Fond, G., Fernandes, S., Lucas, G., Greenberg, N., & Boyer, L. (2022). Depression in healthcare workers: results from the nationwide AMADEUS survey. *International journal of nursing studies*, 135, 104328. <https://doi.org/10.1016/j.ijnurstu.2022.104328>
- Frederick, G. M., Bub, K. L., Boudreaux, B. D., O'Connor, P. J., Schmidt, M. D., & Evans, E. M. (2022). Associations among sleep quality, sedentary behavior, physical activity, and feelings of energy and fatigue differ for male and female college students. *Fatigue: Biomedicine, Health & Behavior*, 10(1), 40-53. <https://doi.org/10.1080/21641846.2022.2034472>
- Friedberg, F., & Jason, L. A. (2001). Chronic fatigue syndrome and fibromyalgia: clinical assessment and treatment. *Journal of clinical psychology*, 57(4), 433-455. <https://doi.org/10.1002/jclp.1040>
- Fuad, M. D. F., Al-Zurfi, B. M. N., AbdulQader, M. A., Bakar, M. F. A., Elnajeh, M., & Abdullah, M. R. (2015). Prevalence and risk factors of stress, anxiety and depression among medical

- students of a private medical University in Malaysia in 2015. *Educ Med J*, 7. <https://www.researchgate.net/publication/277992468> Prevalence and Risk Factors of Stress Anxiety and Depression among Medical Students of a Private Medical University in Malaysia?enrichId=rgreq-8959e45228359672e535a6c1d8260b91-XXX&enrichSource=Y292ZXJQYWdlOzI3Nzk5MjQ2ODtBUzoyODU3MzAzMjU3MTI4OTZAMTQ0NTEzNDgyNjgzMg%3D%3D&el=1\_x\_2&esc=publicationCoverPdf
- Galland-Decker, C., Marques-Vidal, P., & Vollenweider, P. (2019). Prevalence and factors associated with fatigue in the Lausanne middle-aged population: a population-based, cross-sectional survey. *BMJ open*, 9(8), e027070. <https://doi.org/10.1136%2Fbmjopen-2018-027070>
- Hamzah, S. R., Musa, S. N. S., Mohamed, N. H., Osman, S., & Yahya, S. (2023). Youth and Mental Health Problems in Malaysia. *International Journal of Academic Research in Business and Social Sciences*, 13(5), 1707 – 1725. <http://dx.doi.org/10.6007/IJARBS/v13-i5/17165>
- Hanifah, M. S. A., & Ismail, N. (2020). Fatigue and its associated risk factors: a survey of electronics manufacturing shift workers in Malaysia. In *Fatigue*. (Vol. 8, No. 1, pp. 49-59). <https://doi.org/10.1080/21641846.2020.1739806>
- Haug, M.G. (2017). *Britannica: measure of association*. <https://www.britannica.com/topic/measure-of-association>
- Hegney, D. G., Craigie, M., Hemsworth, D., Osseiran - Moisson, R., Aoun, S., Francis, K., & Drury, V. (2014). Compassion satisfaction, compassion fatigue, anxiety, depression and stress in registered nurses in Australia: study 1 results. *Journal of nursing management*, 22(4), 506-518. <https://onlinelibrary.wiley.com/doi/abs/10.1111/jonm.12160>
- Henry, J. D., & Crawford, J. R. (2005). The short - form version of the Depression Anxiety Stress Scales (DASS - 21): Construct validity and normative data in a large non - clinical sample. *British journal of clinical psychology*, 44(2), 227-239. <https://doi.org/10.1348/014466505X29657>
- Hirshkowitz, M. (2013). Fatigue, sleepiness, and safety: definitions, assessment, methodology. *Sleep Medicine Clinics*, 8(2), 183-189. <http://dx.doi.org/10.1016/j.jsmc.2013.04.001>
- Ishii, A., Tanaka, M., & Watanabe, Y. (2014). Neural mechanisms of mental fatigue. *Reviews in the Neurosciences*, 25(4), 469-479. <https://doi.org/10.1515/revneuro-2014-0028>
- Jacob, T., Itzchak, E. B., & Raz, O. (2013). Stress among healthcare students—a cross disciplinary perspective. *Physiotherapy theory and practice*, 29(5), 401-412. <https://doi.org/10.3109/09593985.2012.734011>
- Jang, H. J., Kim, O., Kim, S., Kim, M. S., Choi, J. A., Kim, B., ... & Jung, H. (2021, February). Factors affecting physical and mental fatigue among female hospital nurses: The Korea

- Nurses' Health Study. In *Healthcare* (Vol. 9, No. 2, p. 201). MDPI. <https://doi.org/10.3390/healthcare9020201>
- Jaydari Fard, S., & Lavender, A. P. (2019). A comparison of task-based mental fatigue between healthy males and females. *Fatigue: Biomedicine, Health & Behavior*, 7(1), 1-11. <https://doi.org/10.1080/21641846.2019.1562582>
- Jiang, N., Sato, T., Hara, T., Takedomi, Y., Ozaki, I., & Yamada, S. (2013). Correlations between trait anxiety, personality and fatigue: study based on the Temperament and Character Inventory. *Journal of psychosomatic research*, 55(6), 493-500. [https://doi.org/10.1016/S0022-3999\(03\)00021-7](https://doi.org/10.1016/S0022-3999(03)00021-7)
- Johnson, A. K., Blackstone, S. R., Skelly, A., & Simmons, W. (2020). The relationship between depression, anxiety, and burnout among physician assistant students: a multi-institutional study. *Health Professions Education*, 6(3), 420-427. <https://doi.org/10.1016/j.hpe.2020.04.003>
- Kabunga, A., Mbugua, S., & Makori, G. (2016). Compassion fatigue: A study of psychotherapists' demographics in northern Uganda. <http://dx.doi.org/10.6007/IJARP/v3-i1/2377>
- Kalla, S. (2011). Relationship between variables. <https://explorable.com/relationship-between-variables>
- Kizhakkeveetil, A., Vosko, A. M., Brash, M., PH, D., & Philips, M. A. (2017). Perceived stress and fatigue among students in a doctor of chiropractic training program. *Journal of Chiropractic Education*, 31(1), 8-13. <https://doi.org/10.7899/JCE-15-27>
- Kluger, B. M., Krupp, L. B., & Enoka, R. M. (2013). Fatigue and fatigability in neurologic illnesses: proposal for a unified taxonomy. *Neurology*, 80(4), 409-416. <https://doi.org/10.1212%2FWNL.0b013e31827f07be>
- Konaszewski, K., Niesiołędzka, M., & Kolemba, M. (2022). Coping and Mental Health during Emerging Adulthood. The Relationships between Coping Strategies and Risk of Depression and Life Satisfaction among Students in Higher Education. *Polish Psychological Bulletin*, 112-121. <https://journals.pan.pl/dlibra/show-content?id=123361>
- Kumaraswamy, N. (2013). Academic stress, anxiety and depression among college students: A brief review. *International review of social sciences and humanities*, 5(1), 135-143. [https://www.academia.edu/download/31737829/12\\_IRSSH.pdf](https://www.academia.edu/download/31737829/12_IRSSH.pdf)
- Kutlubaev, M. A., & Mead, G. E. (2013). Fatigue after stroke. *The Behavioral and Cognitive Neurology of Stroke*, 375-386. [https://books.google.com/books?hl=en&lr=&id=s5FxFQ\\_3SAwC&oi=fnd&pg=PA375&dq=physiological+fatigue+and+pathological+fatigue&ots=50NEyYNRqr&sig=waALI3xVjj4Wrk4sEZHyXMmxdU](https://books.google.com/books?hl=en&lr=&id=s5FxFQ_3SAwC&oi=fnd&pg=PA375&dq=physiological+fatigue+and+pathological+fatigue&ots=50NEyYNRqr&sig=waALI3xVjj4Wrk4sEZHyXMmxdU)

- Labrague, L. J., & Ballad, C. A. (2021). Lockdown fatigue among college students during the COVID - 19 pandemic: Predictive role of personal resilience, coping behaviors, and health. Perspectives in psychiatric care. <https://doi.org/10.1111%2Fppc.12765>
- Lam, P., McNaught, C., Lee, J., & Chan, M. (2014). The impact of student workload on learning experiences. Hong Kong: Centre for Learning Enhancement and Research, the Chinese University of Hong Kong. Recuperado de <https://goo.gl/LCg2G8> (Consultado el 02/10/2017). [https://www.cuhk.edu.hk/clear/research/WP12\\_LMcNLC\\_2012.pdf](https://www.cuhk.edu.hk/clear/research/WP12_LMcNLC_2012.pdf)
- Lewis, G., & Wessely, S. (1992). The epidemiology of fatigue: more questions than answers. *Journal of epidemiology and community health*, 46(2), 92. <https://doi.org/10.1136%2Fjech.46.2.92>
- Li, W., Chen, J., Li, M., Smith, A. P., & Fan, J. (2022). The effect of exercise on academic fatigue and sleep quality among university students. *Frontiers in Psychology*, 13, 1025280. <https://doi.org/10.3389/fpsyg.2022.1025280>
- Liébana-Presa, C., Fernández-Martínez, M., Gándara, Á. R., Muñoz-Villanueva, M., Vázquez-Casares, A. M., & Rodríguez-Borrego, M. (2014). Psychological distress in health sciences college students and its relationship with academic engagement. *Revista da Escola de Enfermagem da USP*, 48, 715-722. <https://doi.org/10.1590/S0080-623420140000400020>
- Lopes, D. L. F., Chaves, B. M., Fabrício, A., Porto, A., Machado de Almeida, D., Obregon, S. L., ... & Flores Costa, V. M. (2020). Analysis of well-being and anxiety among university students. *International Journal of Environmental Research and Public Health*, 17(11), 3874. <https://doi.org/10.3390/ijerph17113874>
- Lun, K. W., Chan, C. K., Ip, P. K., Ma, S. Y., Tsai, W. W., Wong, C. S., ... & Yan, D. (2018). Depression and anxiety among university students in Hong Kong. *Hong Kong Medical Journal*, 24(5), 466. <https://pdfs.semanticscholar.org/3d4e/f2677042bf7f1575a477d09440295ff0939a.pdf>
- Luo, Y., Hutchinson, J. C., O'Connell, C. S., & Sha, Y. (2022). Reciprocal effects of esport participation and mental fatigue among Chinese undergraduate students using dynamic structural equation modeling. *Psychology of Sport and Exercise*, 62, 102251. <https://doi.org/10.1016/j.psychsport.2022.102251>
- Mangoulia, P., Koukia, E., Alevizopoulos, G., Fildissis, G., & Katostaras, T. (2015). Prevalence of secondary traumatic stress among psychiatric nurses in Greece. *Archives of psychiatric nursing*, 29(5), 333-338. <https://doi.org/10.1016/j.apnu.2015.06.001>
- Mariappan, S., & Nordin, N. M. (2021). Physical, mental, and emotional fatigue experienced by IT students during COVID-19 pandemic. *Journal of ICT in Education*, 8(3), 100-116. <https://doi.org/10.37134/jictie.vol8.sp.1.8.2021>
- Martínez, C. L., Moraga, S. P., Paredes, C. S., Vásquez, A. S., & Villarroel, C. M. V. (2019). Occupational fatigue and work absenteeism in female assistant nurses of a high-complexity

- hospital, Chile. *Ciencia & saude coletiva*, 25, 243-249. <https://doi.org/10.1590/1413-81232020251.28832019>
- Martínez-Líbano, J., Yeomans, M. M., & Oyanedel, J. C. (2022). Psychometric properties of the emotional exhaustion scale (ECE) in Chilean higher education students. *European Journal of Investigation in Health, Psychology and Education*, 12(1), 50-60. <https://doi.org/10.3390/ejihpe12010005>
- Mazurkiewicz, R., Korenstein, D., Fallar, R., & Ripp, J. (2012). The prevalence and correlations of medical student burnout in the pre-clinical years: a cross-sectional study. *Psychology, health & medicine*, 17(2), 188-195. <https://doi.org/10.1080/13548506.2011.597770>
- Michielsen, H. J., De Vries, J., & Van Heck, G. L. (2013). Psychometric qualities of a brief self-rated fatigue measure: The Fatigue Assessment Scale. *Journal of psychosomatic research*, 54(4), 345-352. [https://doi.org/10.1016/S0022-3999\(02\)00392-6](https://doi.org/10.1016/S0022-3999(02)00392-6)
- Mirza, A. A., Baig, M., Beyari, G. M., Halawani, M. A., & Mirza, A. A. (2021). Depression and anxiety among medical students: a brief overview. *Advances in Medical Education and Practice*, 393-398. <https://doi.org/10.2147/AMEP.S302897>
- Mohamed, N. A., D'Silva, J. L., Samah, A. A., Shafril, H. A. M., & Dahalan, D. (2018). Exploring contributing factors on holistic wellbeing among Malaysian youth. *International Journal of Academic Research in Business and Social Sciences*, 8(3), 391-400. <http://dx.doi.org/10.6007/IJARBS/v8-i3/3937>
- Moya, E., Larson, L. M., Stewart, R. C., Fisher, J., Mwangi, M. N., & Phiri, K. S. (2022). Reliability and validity of depression anxiety stress scale (DASS)-21 in screening for common mental disorders among postpartum women in Malawi. *BMC psychiatry*, 22(1), 352. <https://doi.org/10.1186/s12888-022-03994-0>
- Nikolopoulou, K. (2022). Scribbr: What is convenience sampling? Definition and examples. <https://www.scribbr.com/methodology/convenience-sampling/>
- Nyer, M., Mischoulon, D., Alpert, J. E., Holt, D. J., Brill, C. D., Yeung, A., ... & Farabaugh, A. (2015). College students with depressive symptoms with and without fatigue: Differences in functioning, suicidality, anxiety, and depressive severity. *Annals of clinical psychiatry: official journal of the American Academy of Clinical Psychiatrists*, 27(2), 100. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4539614/>
- Nyhus Hagum, C., Tønnessen, E., & Al Shalfawi, S. (2022). Progression in training volume and perceived psychological and physiological training distress in Norwegian student athletes: A cross-sectional study. *Plos one*, 17(2), e0263575. <https://doi.org/10.1371/journal.pone.0266313>
- Raaj, S., Navanathan, S., Tharmaselan, M., & Lally, J. (2021). Mental disorders in Malaysia: an increase in lifetime prevalence. *BJPsych international*, 18(4), 97-99. <https://doi.org/10.1192%2Fbjpi.2021.4>



- Ribeiro, Í. J., Pereira, R., Freire, I. V., de Oliveira, B. G., Casotti, C. A., & Boery, E. N. (2018). Stress and quality of life among university students: A systematic literature review. *Health Professions Education*, 4(2), 70-77. <https://doi.org/10.1016/j.hpe.2017.03.002>
- Ridner, S. L., Newton, K. S., Staten, R. R., Crawford, T. N., & Hall, L. A. (2016). Predictors of well-being among college students. *Journal of American college health*, 64(2), 116-124. <https://doi.org/10.1080/07448481.2015.1085057>
- Rimaud, D., Espeit, L., Franck, L. E., Cudel, C., Chaigneau, C., Lapole, T., & Millet, G. (2023). Fatigue in the general population: associations to age, gender, socioeconomic status, and physical activity-a web-based survey. <https://orcid.org/0000-0002-9862-158X>
- Roelen, C. A., van Rhenen, W., Groothoff, J. W., van der Klink, J. J., & Bültmann, U. (2014). Prolonged fatigue is associated with sickness absence in men but not in women: prospective study with 1-year follow-up of white-collar employees. *International archives of occupational and environmental health*, 87, 257-263. <https://doi.org/10.1007/s00420-013-0856-y>
- Russo, T. J., Fallon, M., Zhang, J., & Acevedo, V. (2014). Today's university students and their need to connect. <http://soar.suny.edu/handle/20.500.12648/2218>
- Sajadi, A., Farsi, Z., & Rajai, N. (2014). The relationship between sleep quality with fatigue severity and academic performance of nursing students. *Nursing Practice Today*, 1(4), 213-220. <http://npt.tums.ac.ir/index.php/npt/article/view/31>
- Salari, N., Hosseinian-Far, A., Jalali, R., Vaisi-Raygani, A., Rasoulpoor, S., Mohammadi, M., ... & Khaledi-Paveh, B. (2020). Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: a systematic review and meta-analysis. *Globalization and health*, 16(1), 1-11. <https://doi.org/10.1186/s12992-020-00589-w>
- Salehpoor, G., Rezaei, S., & Hosseinezhad, M. (2014). Quality of life in multiple sclerosis (MS) and role of fatigue, depression, anxiety, and stress: A bicenter study from north of Iran. *Iranian journal of nursing and midwifery research*, 19(6), 593. <https://pubmed.ncbi.nlm.nih.gov/25558256>
- Santana, L. D. L., Miranda, F. M. D. A., Karino, M. E., Baptista, P. C. P., Felli, V. E. A., & Sarquis, L. M. M. (2013). Description of workloads and fatigue experienced among health workers in a teaching hospital. *Revista gaucha de enfermagem*, 34, 64-70. <https://doi.org/10.1590/S1983-14472013000100008>
- Seney, M. L., & Sibille, E. (2014). Sex differences in mood disorders: perspectives from humans and rodent models. *Biology of sex differences*, 5(1), 1-10. <https://doi.org/10.1186/s13293-014-0017-3>
- Setia, M. S. (2016). Methodology series module 3: Cross-sectional studies. *Indian journal of dermatology*, 61(3), 261. <https://doi.org/10.4103%2F0019-5154.182410>

- Shamsuddin, K., Fadzil, F., Ismail, W. S. W., Shah, S. A., Omar, K., Muhammad, N. A., ... & Mahadevan, R. (2013). Correlates of depression, anxiety and stress among Malaysian university students. *Asian journal of psychiatry*, 6(4), 318-323. <https://doi.org/10.1016/j.ajp.2013.01.014>
- Sharpe, M. & Wilks, D. (2013). Fatigue. *National library of medicine*, 325(7362), 480-483. <https://doi.org/10.1136%2Fbmj.325.7362.480>
- Shim, E. J., Noh, H. L., Yoon, J., Mun, H. S., & Hahm, B. J. (2019). A longitudinal analysis of the relationships among daytime dysfunction, fatigue, and depression in college students. *Journal of American college health*, 67(1), 51-58. <https://doi.org/10.1080/07448481.2018.1462819>
- Sinclair, S., Raffin-Bouchal, S., Venturato, L., Mijovic-Kondejewski, J., & Smith-MacDonald, L. (2017). Compassion fatigue: A meta-narrative review of the healthcare literature. *International journal of nursing studies*, 69, 9-24. <https://doi.org/10.1016/j.ijnurstu.2017.01.003>
- Smith, A. P. (2018). Cognitive fatigue and the well-being and academic attainment of university students. *Journal of Education, Society and Behavioral Science*. <https://doi.org/10.9734/JESBS/2018/39529>
- Soylu, Y., Arslan, E., & Kilit, B. (2021). Psychophysiological responses and cognitive performance: a systematic review of mental fatigue on soccer performance. *International Journal of Sport Studies for Health*, 4(2). <https://doi.org/10.5812/intjssh.124244>
- Stein, K. D., Jacobsen, P. B., Blanchard, C. M., & Thors, C. (2004). Further validation of the multidimensional fatigue symptom inventory-short form. *Journal of pain and symptom management*, 27(1), 14-23. <https://doi.org/10.1016/j.jpainsymman.2003.06.003>
- Stewart, A. L., Hays, R. D., & Ware, J. E. (1992). Health perceptions, energy/fatigue, and health distress measures. *Measuring functioning and well-being: The medical outcomes study approach*, 143-172. [https://books.google.com/books?hl=en&lr=&id=Wy3dyI\\_lyb4C&oi=fnd&pg=PA143&dq=health,+energy/fatigue&ots=EuDfGn4z4A&sig=la6fdsJBOdfRo121iHtoE92oxhw](https://books.google.com/books?hl=en&lr=&id=Wy3dyI_lyb4C&oi=fnd&pg=PA143&dq=health,+energy/fatigue&ots=EuDfGn4z4A&sig=la6fdsJBOdfRo121iHtoE92oxhw)
- Swords, B. A., & Ellis, M. V. (2017). Burnout and vigor among health service psychology doctoral students. *The Counseling Psychologist*, 45(8), 1141-1161. <https://doi.org/10.1177/0011000017747548>
- Sy, M. A. P. C., Irena, M. G., Malabuyoc, F. L. S., Sobrevilla, M. D. M., & Gumasing, M. J. J. (2022). Effects of Academic Workload to the Mental Fatigue of Students during Online Class. <https://ieomsociety.org/proceedings/2022istanbul/710.pdf>
- Tang, F. C., Li, R. H., & Huang, S. L. (2016). The association between job-related psychosocial factors and prolonged fatigue among industrial employees in Taiwan. *PloS one*, 11(3), e0150429. <https://doi.org/10.1371/journal.pone.0150429>

- Thiyagarajan, A., James, T. G., & Marzo, R. R. (2022). Psychometric properties of the 21-item Depression, Anxiety, and Stress Scale (DASS-21) among Malaysians during COVID-19: a methodological study. *Humanities and Social Sciences Communications*, 9(1), 1-8. <https://doi.org/10.1057/s41599-022-01229-x>
- Tian, M., Fan, L., Shi, Y., Wei, X., Jiang, H., WU, Y., ... & Zhou, J. (2018). The current status and influencing factors of compassion fatigue in clinical nurses. *Chinese Journal of Nursing*, 76-82. <https://pesquisa.bvsalud.org/portal/resource/pt/wpr-708703>
- Tung, H. Y., Chao, T. B., Lin, Y. H., Wu, S. F., Lee, H. Y., Ching, C. Y., ... & Lin, T. J. (2016). Depression, fatigue, and QoL in colorectal cancer patients during and after treatment. *Western journal of nursing research*, 38(7), 893-908. <https://doi.org/10.1177/0193945916630256>
- Upton, J. (2013). Psychosocial factors. *Encyclopedia of behavioral medicine*. [https://doi.org/10.1007/978-1-4419-1005-9\\_422](https://doi.org/10.1007/978-1-4419-1005-9_422)
- Uzoigwe, A. G., Low, W. Y., & Noor, S. N. M. (2016). Predictors of work-family role conflict and its impact on professional women in medicine, engineering, and information technology in Nigeria. *Asia Pacific Journal of Public Health*, 28(7), 629-637. <https://doi.org/10.1177/1010539516667782>
- Vaes, A. W., Goërtz, Y. M., van Herck, M., Beijers, R. J., van Beers, M., Burtin, C., ... & Spruit, M. A. (2022). Physical and mental fatigue in people with non-communicable chronic diseases. *Annals of Medicine*, 54(1), 2521-2533. <https://doi.org/10.1080%2F07853890.2022.2122553>
- Van Bogaert, P., Kowalski, C., Weeks, S. M., & Clarke, S. P. (2013). The relationship between nurse practice environment, nurse work characteristics, burnout and job outcome and quality of nursing care: a cross-sectional survey. *International journal of nursing studies*, 50(12), 1667-1677. <https://doi.org/10.1016/j.ijnurstu.2013.05.010>
- Vizoso, C., Rodríguez, C., & Arias-Gundín, O. (2018). Coping, academic engagement and performance in university students. *Higher Education Research & Development*, 37(7), 1515-1529. <https://doi.org/10.1080/07294360.2018.1504006>
- Water, S. (2021). Better up: Is your brain tired? Here are 6 ways to treat mental fatigue. <https://www.betterup.com/blog/mental-fatigue>
- Williams, A. M., Khan, C. P., Heckler, C. E., Barton, D. L., Ontko, M., Geer, J., ... & Janelins, M. C. (2021). Fatigue, anxiety, and quality of life in breast cancer patients compared to non-cancer controls: a nationwide longitudinal analysis. *Breast cancer research and treatment*, 187, 275-285. <https://doi.org/10.1007/s10549-020-06067-6>
- Williamson, R. J., Purcell, S., Sterne, A., Wessely, S., Hotopf, M., Farmer, A., & Sham, P. C. (2005). The relationship of fatigue to mental and physical health in a community sample. *Social psychiatry and psychiatric epidemiology*, 40, 126-132. <https://doi.org/10.1007/s00127-005-0858-5>

- Wolbeek, T. M., Van Doornen, L. J., Kavelaars, A., & Heijnen, C. J. (2015). Severe fatigue in adolescents: a common phenomenon?. *Pediatrics*, 117(6), e1078-e1086. <http://www.pediatrics.org/cgi/doi/10.1542/>
- Worly, B., Verbeck, N., Walker, C., & Clinchot, D. M. (2019). Burnout, perceived stress, and empathic concern: differences in female and male Millennial medical students. *Psychology, health & medicine*, 24(4), 429-438. <https://doi.org/10.1080/13548506.2018.1529329>
- Wylie, G. R., Pra Sisto, A. J., Genova, H. M., & DeLuca, J. (2022). Fatigue across the lifespan in men and women: State vs. trait. *Frontiers in Human Neuroscience*, 16, 790006. <https://doi.org/10.3389/fnhum.2022.790006>
- Xing, X., Zhong, B., Luo, H., Rose, T., Li, J., & Antwi-Afari, M. F. (2020). Effects of physical fatigue on the induction of mental fatigue of construction workers: A pilot study based on a neurophysiological approach. *Automation in Construction*, 120, 103381. <https://dphysicaloi.org/10.1016/j.autcon.2020.103381>
- Xu, S., Ouyang, X., Shi, X., Li, Y., Chen, D., Lai, Y., & Fan, F. (2020). Emotional exhaustion and sleep-related worry as serial mediators between sleep disturbance and depressive symptoms in student nurses: A longitudinal analysis. *Journal of Psychosomatic Research*, 129, 109870. <https://doi.org/10.1016/j.jpsychores.2019.109870>
- Yoon, J. H., Park, N. H., Kang, Y. E., Ahn, Y. C., Lee, E. J., & Son, C. G. (2023). The demographic features of fatigue in the general population worldwide: a systematic review and meta-analysis. *Frontiers in Public Health*, 11. <https://doi.org/10.3389/fpubh.2023.1192121>
- Yoshikawa, T., Tanaka, M., Ishii, A., & Watanabe, Y. (2014). Association of fatigue with emotional-eating behavior and the response to mental stress in food intake in a young adult population. *Behavioral medicine*, 40(4), 149-153. <https://doi.org/10.1080/08964289.2013.833082>
- Yusoff, M. S. B., Rahim, A. F. A., Baba, A. A., Ismail, S. B., & Pa, M. N. M. (2013). Prevalence and associated factors of stress, anxiety and depression among prospective medical students. *Asian journal of psychiatry*, 6(2), 128-133. <https://doi.org/10.1016/j.ajp.2012.09.012>
- Zdun-Ryżewska, A., Nadrowska, N., Basiński, K., Walkiewicz, M., & Błazek, M. (2021). Who is a tired student? Fatigue and its predictors from a gender perspective. *Journal of University Teaching & Learning Practice*, 18(6), 139-154. <https://doi.org/10.53761/1.18.6.10>
- Zeidner, M., Hadar, D., Matthews, G., & Roberts, R. D. (2013). Personal factors related to compassion fatigue in health professionals. *Anxiety, Stress & Coping*, 26(6), 595-609. <http://dx.doi.org/10.1080/10615806.2013.777045>
- Zhang, M., Murphy, L. A., Fang, D., & Caban-Martinez, A. J. (2015). Influence of fatigue on construction workers' physical and cognitive function. *Occupational Medicine*, 65(3), 245-250. <https://doi.org/10.1093/occmed/kqu215>

# APPENDIX A – ETHICAL APPROVAL FORM



**UNIVERSITI TUNKU ABDUL RAHMAN**  
Wholly Owned by UTAR Education Foundation (Company No. 578227-M)

Re: U/SERC/248/2023

26 September 2023

Mr Muhammad Noh Zulfikri bin Mohd Jamali  
Head, Department of Physiotherapy  
M. Kandiah Faculty of Medicine and Health Sciences  
Universiti Tunku Abdul Rahman  
Jalan Sungai Long  
Bandar Sungai Long  
43000 Kajang, Selangor

Dear Mr Muhammad Noh,

### Ethical Approval For Research Project/Protocol

We refer to your application for ethical approval for your students' research project from Bachelor of Physiotherapy (Hons) programme enrolled in course UMFD3026. We are pleased to inform you that the application has been approved under Expedited Review.

The details of the research projects are as follows:

No	Research Title	Student's Name	Supervisor's Name	Approval Validity
48.	The Effects of Balancing Exercise on Balance, Jumping Performance and Agility in Recreational University Badminton Players	Khu Khang Zhuang	Mr Sathish Kumar Sadagobane	26 September 2023 – 25 September 2024
49.	Prevalence of Fatigue and Blood Pressure, and Its Association to Physical Activity among Post Covid-19 University Students	Chan Yi Fei	Ms Siti Hazirah Binti Samsuri	
50.	Association between Fatigue and Psychological Factors among Undergraduate University Students: A Cross-sectional Study	Chan Zhi Xin		
51.	Association between Sleep Quality, Life Satisfaction, and Health Related Quality of Life among Post Covid-19 Survivors	Chek Ru-E		
52.	Correlation Between Primary Dysmenorrhea and Level of Anxiety and Depression Among Female University Students in Selangor	Joshua Lau Libeng	Ms Swapneela Jacob	
53.	Prevalence of Primary Dysmenorrhea and Its Effect Towards Academic Performance Among Female Students in UTAR: A Cross Sectional Study	Jeffrey Ong Yeu Hern		
54.	Knowledge, Awareness and Perception of Pilates Based Exercises on Breast Cancer on Breast Cancer Patients in Klang Valley	Jesslyn Ng Chee Cheng		
55.	Prevalence of Obstructive Sleep Apnea and Associated Risk Factors Among University Staff: A Cross-Sectional Study	Tan Yin Zi	Mr Tarun Amalnerkar	
56.	Knowledge, Attitude, And Role of Physiotherapy Towards Patient with Epilepsy Among Undergraduate Physiotherapy Students	Tan Ying		
57.	Association of the Quality of Sleep Between Training Performance Among Elite Taekwondo Athletes: An Observational Study	Tan Xin Yue		

The conduct of this research is subject to the following:

- (1) The participants' informed consent be obtained prior to the commencement of the research;
- (2) Confidentiality of participants' personal data must be maintained; and
- (3) Compliance with procedures set out in related policies of UTAR such as the UTAR Research Ethics and Code of Conduct, Code of Practice for Research Involving Humans and other related policies/guidelines.
- (4) Written consent be obtained from the institution(s)/company(ies) in which the physical or/and online survey will be carried out, prior to the commencement of the research.

Should the students collect personal data of participants in their studies, please have the participants sign the attached Personal Data Protection Statement for records.

Thank you.

Yours sincerely,

**Professor Ts Dr Faiz bin Abd Rahman**  
Chairman  
UTAR Scientific and Ethical Review Committee

c.c Dean, M. Kandiah Faculty of Medicine and Health Sciences  
Director, Institute of Postgraduate Studies and Research

Kampar Campus : Jalan Universiti, Bandar Barat, 31900 Kampar, Perak Darul Ridzuan, Malaysia  
Tel: (605) 468 8888 Fax: (605) 466 1313  
Sungai Long Campus : Jalan Sungai Long, Bandar Sungai Long, Cheras, 43000 Kajang, Selangor Darul Ehsan, Malaysia  
Tel: (603) 9086 0288 Fax: (603) 9019 8868  
Website: www.utar.edu.my



## **APPENDIX B – PERSONAL DATA PROTECTION NOTICE**

### **Personal Data Protection Notice**

Please be informed that in accordance with Personal Data Protection Act 2010 ("PDPA") which came into force on 15 November 2013, Universiti Tunku Abdul Rahman ("UTAR") is hereby bound to make notice and require consent in relation to collection, recording, storage, usage and retention of personal information.

1. Personal data refers to any information which may directly or indirectly identify a person which could include sensitive personal data and expression of opinion. Among others it includes:

- a) Name
- b) Identity card
- c) Place of Birth
- d) Address
- e) Education History
- f) Employment History
- g) Medical History
- h) Blood type
- i) Race
- j) Religion
- k) Photo
- l) Personal Information and Associated Research Data

2. The purposes for which your personal data may be used are inclusive but not limited to:

- a) For assessment of any application to UTAR
- b) For processing any benefits and services
- c) For communication purposes
- d) For advertorial and news
- e) For general administration and record purposes
- f) For enhancing the value of education
- g) For educational and related purposes consequential to UTAR
- h) For replying any responds to complaints and enquiries
- i) For the purpose of our corporate governance
- j) For the purposes of conducting research/ collaboration

3. Your personal data may be transferred and/or disclosed to third party and/or UTAR collaborative partners including but not limited to the respective and appointed outsourcing agents for purpose of fulfilling our obligations to you in respect of the purposes and all such other purposes that are related to the purposes and also in providing integrated services, maintaining and storing records. Your data may be shared when required by laws and when disclosure is necessary to comply with applicable laws.

4. Any personal information retained by UTAR shall be destroyed and/or deleted in accordance with our retention policy applicable for us in the event such information is no longer required.

5. UTAR is committed in ensuring the confidentiality, protection, security and accuracy of your personal information made available to us and it has been our ongoing strict policy to ensure that your personal information is accurate, complete, not misleading and updated. UTAR would also ensure that your personal data shall not be used for political and commercial purposes.

Consent:

6. By submitting or providing your personal data to UTAR, you had consented and agreed for your personal data to be used in accordance to the terms and conditions in the Notice and our relevant policy.

7. If you do not consent or subsequently withdraw your consent to the processing and disclosure of your personal data, UTAR will not be able to fulfill our obligations or to contact you or to assist you in respect of the purposes and/or for any other purposes related to the purpose.

8. You may access and update your personal data by writing to us at [czhixin2002@1utar.my](mailto:czhixin2002@1utar.my).

## APPENDIX C – INFORMED CONSENT FORM

### Acknowledgement of Notice \*

I have read the provided information, or it has been read to me. I have had the opportunity to ask questions about it and any questions I have, has been answered to my satisfaction. I understand that I will be given a copy of this form, and the researcher will keep another copy on file. I consent voluntarily to be a participant in this study.

- I have been notified and that I hereby understood, consented and agreed per UTAR above notice.
- I disagree, my personal data will not be processed.

---

Date you filled in this questionnaire \*

Date

mm/dd/yyyy

---

IC No. \*

Your answer

---

Signature \*  
eg. Electronically s/d Chan Zhi Xin

Your answer



## APPENDIX D – DEMOGRAPHIC DATA

### Section A: Sociodemographic Information

Full Name \*

Your answer \_\_\_\_\_

Age \*

Your answer \_\_\_\_\_

Gender \*

Male

Female

Other: \_\_\_\_\_

Ethnicity \*

Malay

Chinese

Indian

Other: \_\_\_\_\_

Height (in cm) \*

Your answer \_\_\_\_\_

Weight(in kg) \*

Your answer \_\_\_\_\_

Phone number \*

Your answer \_\_\_\_\_

Email id (example: czhixin2002@1utar.my) \*

Your answer \_\_\_\_\_

Are you an undergraduate students from UTAR Sungai Long Campus? \*

Yes

No

---

Which faculty are you from? \*

MK FMHS

LKC FES

FAM

FCI

---

Year of study (example: Y3S1) \*

Your answer \_\_\_\_\_

---

Have you been infected with Covid-19 before? \*

Yes

No

---

Do you have any neurological impairment (example: multiple sclerosis, traumatic brain injury)? \*

Yes

No

---

Have you been diagnosed with cancer? \*

Yes

No

---

Do you have health condition for the past 6 months (example: thyroid disorder, diabetes, heart disease)? \*

Yes

No

Have you been diagnosed with physical disability or mental disease by doctor? \*

Yes

No

## APPENDIX E – MULTIDIMENSIONAL FATIGUE SYMPTOM INVENTORY- SHORT FORM (MFSI-sf)

### Section B: Fatigue assessment

This 30-item questionnaire assesses the severity and nature of fatigue experienced by participants.

Below is a list of statements that describe how people sometimes feel. Please read each item carefully, then circle the one number next to each item which best describes how true each statement has been for you in the past 7 days.

The rating scale is as follows:

0 = Not at all

1 = A little

2 = Moderately

3 = Quite a bit

4 = Extremely

#### Fatigue assessment \*

	Not at all	A little	Moderately	Quite a bit	Extremely
1. I have trouble remembering things	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. My muscles ache	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. I feel upset	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. My legs feel weak	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I feel cheerful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. My head feels heavy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. I feel lively	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. I feel nervous	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. I feel relaxed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. I feel pooped (exhausted)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. I am confused	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. I am worn out	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. I feel sad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. I feel fatigued	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. I have trouble paying attention	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. My arms feel weak	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. I feel sluggish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. I feel run down	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. I ache all over	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. I am unable to concentrate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21. I feel depressed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22. I feel refreshed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23. I feel tense	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24. I feel energetic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
25. I make more mistake than usual	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26. My body feels heavy all over	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
27. I am forgetful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28. I feel tired	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
29. I feel calm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
30. I am distressed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## APPENDIX F – DEPRESSION, ANXIETY, AND STRESS SCALE-21 (DASS-21)

### Section C: Depression, Anxiety and Stress assessment

This 21-items questionnaire is to assess the levels of depression, anxiety and stress of an individual.

Please read each statement and circle a number 0,1,2, or 3 which indicates how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

0 = Did not apply to me at all

1 = Applied to me to some degree, or some of the time

2 = Applied to me to a considerable degree or a good part of time

3 = Applied to me very much or most of the time


#### Depression, Anxiety and Stress Assessment \*

	Not at all	Some of the time	Good part of time	Most of the time
1. I found it hard to wind down	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I was aware of dryness of my mouth	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. I couldn't seem to experience any positive feeling at all	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I found it difficult to work up the initiative to do things	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I tended to over-react to situations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. I experienced trembling (eg, in the hands)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. I felt that I was using a lot of nervous energy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. I was worried about situations in which I might panic and make a fool of myself	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. I felt that I had nothing to look forward to	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. I found myself getting agitated	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. I found it difficult to relax	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. I felt down-hearted and blue	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. I was intolerant of anything that kept me from getting on with what I was doing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. I felt I was close to panic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. I was unable to become enthusiastic about anything	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. I felt I wasn't worth much as a person	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. I felt that I was rather touchy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. I felt scared without any good reason	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21. I felt that life was meaningless	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

# APPENDIX G – TURNITIN REPORT

## Turnitin Originality Report

 Turnitin Originality Report

association between different types of fatigue and psychological factors among undergraduate students by CHAN ZHI XIN  
From FYPP (FYP2023)

Similarity Index	Similarity by Source
16%	Internet Sources: 12% Publications: 12% Student Papers: N/A

Processed on 25-Dec-2023 13:11 +08  
ID: 2264700447  
Word Count: 17726

### sources:

- 1 < 1% match (Internet from 26-Feb-2010)  
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2547485/?tool=pubmed>

---

- 2 < 1% match ()  
[Yu Liang, Guo Wei Si, Hui Jie Hu, Zhen Wei Zhang, Qiu Ping Song, Qi Feng Dou, Jian Guo Wen. "Prevalence, Risk Factors, and Psychological Effects of Overactive Bladder in Chinese University Students". International Neurology Journal](#)

---

- 3 < 1% match ()  
[Yu Ouyang, Yu Hong, Jun Cheng, Hongmin Cao. "The association between duration of muscle exercise and psychological symptoms is higher in boys than in girls: A cross-sectional study based on Chinese college students during COVID-19". Frontiers in Pediatrics](#)

---

- 4 < 1% match ()  
[Pooja Nadholta, Krishan Kumar, Pradi Kumar Saha, Vanita Suri, Amit Singh, Akshay Anand. "Mind-body practice as a primer to maintain psychological health among pregnant women- YOGESTA-a randomized controlled trial". Frontiers in Public Health](#)

---

- 5 < 1% match (Internet from 29-Mar-2012)  
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3001790/pdf/aasm.34.1.121.pdf>

---

- 6 < 1% match ()  
[Noureddine Elboughdiri, Djamel Ghernaout, Karim Kriaa, Bassem Jamoussi. "Enhancing the Extraction of Phenolic Compounds from Juniper Berries Using the Box-Behnken Design". ACS Omega](#)

---

- 7 < 1% match ()  
[Nan Jiang, Hongling Zhang, Zhen Tan, Yanhong Gong et al. "The Relationship Between Occupational Stress and Turnover Intention Among Emergency Physicians: A Mediation Analysis". Frontiers in Public Health](#)

---

- 8 < 1% match ()  
[Yanqi Wang, Jian Gu, Feng Zhang, Xujuan Xu. "The effect of perceived social support on postpartum stress: the mediating roles of marital satisfaction and maternal postnatal attachment". BMC Women's Health](#)

---

- 9 < 1% match ()  
[Samuel Ken-En Gan, Yusong Zeng, Zihan Wang. "Social anxiety mediates workplace incivility and work engagement". Frontiers in Psychology](#)

---

- 10 < 1% match ()  
[Murat Yildirim, Ahmet Özarslan. "Worry, Severity, Controllability, and Preventive Behaviours of COVID-19 and Their Associations with Mental Health of Turkish Healthcare Workers Working at a Pandemic Hospital". International Journal of Mental Health and Addiction](#)

---

- 11 < 1% match ()  
[Ahmad Saad, Mariyah Ijaz, Muhammad Usman Asghar, Liu Yamin. "China-Pakistan economic corridor and its impact on rural development and human life sustainability: Observations from rural women". PLoS ONE](#)

---

- 12 < 1% match ()  
[Sicong Du, Yu Zhong, Shuai Zheng, Jun Lyu. "Analysis and Prediction of the Survival Trends of Patients with Clear-Cell Renal Cell Carcinoma: A Model-Based Period Analysis 2001-2015". Cancer Control : Journal of the Moffitt Cancer Center](#)

---

- 13 < 1% match ()  
[Jessie Hawkins, Christy Hires, Lindsey Keenan, Elizabeth Dunne. "Aromatherapy blend of thyme, orange, clove bud, and frankincense boosts energy levels in post-COVID-19 female](#)



Turnitin Originality Report

patients: A randomized, double-blinded, placebo-controlled clinical trial". *Complementary Therapies in Medicine*

14 < 1% match ()  
[Shahrzad Yektatab, Elaheh Ghanbari. "The Relationship between Anxiety and Self-Esteem in Women Suffering from Breast Cancer", \*Journal of Mid-Life Health\*](#)

15 < 1% match ()  
[Alemawelu Savih Belav, Aychew Kassie. "Emotional Intelligence and Clinical Performance of Undergraduate Nursing Students During Obstetrics and Gynecology Nursing Practice, Mizan-Tepi University, South West Ethiopia". \*Advances in Medical Education and Practice\*](#)

16 < 1% match ()  
[Wang-Da Liu, Ting-Yu Yen, Pe-Yo Liu, Un-In Wu, Prerana Bhan, Yu-Chi Li, Chih-Hung Chi, Wang-Huei Sheng. "Clinical Application of Metagenomic Next-Generation Sequencing in Patients with Hematologic Malignancies Suffering from Sepsis". \*Microorganisms\*](#)

17 < 1% match ()  
[Rumeysa Samanci, Sarfinaz Ataoğlu, Mustafa Özsehin, Handan Ankaralı, Özlem Admis. "An investigation of serum irisin levels and inflammatory markers in fibromyalgia syndrome", \*Northern Clinics of Istanbul\*](#)

18 < 1% match ()  
[Alessandro Vastolo, Sergio Iliano, Flavia Laperuta, Saverio Pennacchio, Marina Pompaneo, Monica Isabella Cutrignelli. "Hemp Seed Cake as a Novel Ingredient for Dog's Diet". \*Frontiers in Veterinary Science\*](#)

19 < 1% match ()  
[Jian Rong, Xuejin Wang, Yanhong Ge, Guimei Chen, Hong Ding. "Association between functional disability and depressive symptoms among older adults in rural China: a cross-sectional study". \*BMJ Open\*](#)

20 < 1% match ()  
[Yassir Edrees Almalki, Mohammad Abd Alkhalik Basha, Sharifa Khalid Alduraihi, Khalaf Alshamrani et al. "Diagnostic Validity and Reliability of Low-Dose Prospective ECG-Triggering Cardiac CT in Preoperative Assessment of Complex Congenital Heart Diseases \(CHDs\)". \*Children\*](#)

21 < 1% match ()  
[Samuel Kofi Odame, Emmanuel Nii-Boye Quarshie, Mabel Oti-Boadi, Johnny Andoh-Arthur, Kwaku Oppong Asante. "Adolescent Problem Gambling in Rural Ghana: Prevalence and Gender Differentiation". \*Journal of Gambling Studies\*](#)

22 < 1% match ()  
[Taylor Walters, Antonio Abeyta, Andrew J. Bean, Marenia A. Wilson. "The impact of holistic review on correlations between doctoral student outcomes, and GPA and GRE scores in the biomedical sciences". \*PLOS ONE\*](#)

23 < 1% match ()  
[Katarzyna Skorupska, Sara Wawrysiuk, Michal Bogusiewicz, Pawel Miolla et al. "Impact of Hysterectomy on Quality of Life, Urinary Incontinence, Sexual Functions and Urethral Length". \*Journal of Clinical Medicine\*](#)

24 < 1% match ()  
[Rafael Sánchez-Puertas, Pablo Ruisoto, Carla López-Núñez, Silvia Vaca-Gallegos. "Gender Differences in Transdiagnostic Predictors of Problematic Alcohol Consumption in a Large Sample of College Students in Ecuador". \*Frontiers in Psychology\*](#)

25 < 1% match ()  
[Muhammed Elhadi, Ahmed Msherghi, Moutaz Elqzairi, Ayman Alhashimi et al. "The Mental Well-Being of Frontline Physicians Working in Civil Wars Under Coronavirus Disease 2019 Pandemic Conditions". \*Frontiers in Psychiatry\*](#)

26 < 1% match ()  
[Assefa Philinos Kare, Ameln Bolka Gujo. "Anemia among Pregnant Women Attending Ante Natal Care Clinic in Adara General Hospital, Southern Ethiopia: Prevalence and Associated Factors". \*Health Services Insights\*](#)

27 < 1% match ()

#### Turnitin Originality Report

Anish J Kuriakose Kuzhyanjal, Gaurav B Nigam, George A Antoniou, Francis A Farraye, Raymond K Cross, Jimmy K Limdi, "Management of Inflammatory Bowel Disease Using E-health Technologies: A Systematic Review and Meta-Analysis", *Journal of Crohn's & Colitis*

- 
- 28 < 1% match ()  
[Sima Babaei, Marzieh Haratian, "Compassion Satisfaction and Fatigue in Cardiovascular Nurses: A Cross-sectional Descriptive Study", \*Iranian Journal of Nursing and Midwifery Research\*](#)
- 
- 29 < 1% match (Internet from 29-Jan-2023)  
[https://www.researchgate.net/publication/51506456\\_Absence\\_of\\_neuropsychological\\_impairment\\_in\\_hyperammonaemia\\_in\\_healthy\\_young](https://www.researchgate.net/publication/51506456_Absence_of_neuropsychological_impairment_in_hyperammonaemia_in_healthy_young)
- 
- 30 < 1% match (Internet from 20-Feb-2023)  
[https://www.researchgate.net/publication/347589806\\_Prevalence\\_And\\_Risk\\_Factors\\_Of\\_Work-Related\\_Musculoskeletal\\_Disorders\\_Among\\_Housewives](https://www.researchgate.net/publication/347589806_Prevalence_And_Risk_Factors_Of_Work-Related_Musculoskeletal_Disorders_Among_Housewives)
- 
- 31 < 1% match (Internet from 21-Feb-2023)  
[https://www.researchgate.net/publication/317780423\\_Evaluating\\_the\\_Perceived\\_Stress\\_Scale\\_among\\_UK\\_university\\_students\\_implications](https://www.researchgate.net/publication/317780423_Evaluating_the_Perceived_Stress_Scale_among_UK_university_students_implications)
- 
- 32 < 1% match (Internet from 21-Feb-2023)  
[https://www.researchgate.net/publication/343104691\\_Mental\\_Health\\_Status\\_of\\_Paediatric\\_Medical\\_Workers\\_in\\_China\\_During\\_the\\_COVID-19\\_Outbreak](https://www.researchgate.net/publication/343104691_Mental_Health_Status_of_Paediatric_Medical_Workers_in_China_During_the_COVID-19_Outbreak)
- 
- 33 < 1% match (Internet from 10-Feb-2023)  
[https://www.researchgate.net/publication/230817726\\_The\\_relationship\\_between\\_personality\\_coping\\_strategies\\_and\\_alcohol\\_use](https://www.researchgate.net/publication/230817726_The_relationship_between_personality_coping_strategies_and_alcohol_use)
- 
- 34 < 1% match (Internet from 23-Feb-2023)  
[https://www.researchgate.net/publication/309341681\\_Mental\\_health\\_literacy\\_as\\_a\\_mediator\\_in\\_use\\_of\\_mental\\_health\\_services\\_among\\_ol](https://www.researchgate.net/publication/309341681_Mental_health_literacy_as_a_mediator_in_use_of_mental_health_services_among_ol)
- 
- 35 < 1% match (Internet from 21-Dec-2023)  
<https://dspace.aljouds.edu/server/api/core/bitstreams/14c41734-7710-41a3-a9c3-36ff110f7bb/content>
- 
- 36 < 1% match (Elizabeth A. Prosek, Qian Wei, Chelsea M. Scoffone, Diana Gallardo, Amanda L. Giordano, "Guilt, Shame, and Empathy as Predictors of Coping Engagement among United States College Students", *International Journal for the Advancement of Counselling*, 2021)  
[Elizabeth A. Prosek, Qian Wei, Chelsea M. Scoffone, Diana Gallardo, Amanda L. Giordano, "Guilt, Shame, and Empathy as Predictors of Coping Engagement among United States College Students", \*International Journal for the Advancement of Counselling\*, 2021](#)
- 
- 37 < 1% match (Internet from 15-Oct-2022)  
<http://www.cas.usf.edu/~jacobsen/HANDOUT.FSI&MFSI.pdf>
- 
- 38 < 1% match (C. Airoidi, P. Girard Bosch, M. Benegas, V. Duarte et al. "OP0266-HPR WORK PRODUCTIVITY IN PATIENTS WITH AXIAL AND PERIPHERAL SPONDYLOARTHRITIS", *Annals of the Rheumatic Diseases*, 2020)  
[C. Airoidi, P. Girard Bosch, M. Benegas, V. Duarte et al. "OP0266-HPR WORK PRODUCTIVITY IN PATIENTS WITH AXIAL AND PERIPHERAL SPONDYLOARTHRITIS", \*Annals of the Rheumatic Diseases\*, 2020](#)
- 
- 39 < 1% match (Internet from 12-Nov-2022)  
<https://assets.researchsquare.com/files/rs-220601/v1/cc582623-0f84-421f-8229-83d9243325b.pdf?c=1631874084>
- 
- 40 < 1% match (Internet from 14-Oct-2022)  
[http://repository.jnmgmu.ac.in/12793/1/300107812neethu\\_mathews.pdf](http://repository.jnmgmu.ac.in/12793/1/300107812neethu_mathews.pdf)
- 
- 41 < 1% match (Shigeyuki Okahara, Satoshi Miyamoto, Zu Soh, Hideshi Itoh, Shinya Takahashi, Toshio Tsuji, "Online Prediction of Normal Blood Viscosity During Cardiopulmonary Bypass Using Hematocrit- and Temperature-Dependent Model", *IEEE Access*, 2020)

[Shigeoaki Okahara, Satoshi Miyamoto, Zu Soh, Hideshi Itoh, Shinya Takahashi, Toshio Tsuji, "Online Prediction of Normal Blood Viscosity During Cardiopulmonary Bypass Using Hematocrit- and Temperature-Dependent Model", IEEE Access, 2020](#)

- 
- 42 < 1% match ()  
[Salehi, Salimeh, Ghanizadeh, Afsaneh, Rostami, Soroor, "STRESS MANAGEMENT IN TAKING TESTS: THE ROLE OF EFL LEARNERS' STRESS COPING STRATEGIES IN THEIR TEST ANXIETY AND TEST-TAKING STRATEGIES", Open Access Publishing Group, 2017](#)
- 
- 43 < 1% match (Karin Ahlberg, "Fatigue, psychological distress, coping and quality of life in patients with uterine cancer", Journal of Advanced Nursing, 1/2004)  
[Karin Ahlberg, "Fatigue, psychological distress, coping and quality of life in patients with uterine cancer", Journal of Advanced Nursing, 1/2004](#)
- 
- 44 < 1% match (Internet from 06-Nov-2023)  
<https://worldwidescience.org/topicpages/s/stress+disorders+depression.html>
- 
- 45 < 1% match (Internet from 06-Nov-2023)  
<https://worldwidescience.org/topicpages/s/stimulating+hormone+subunit.html>
- 
- 46 < 1% match (Internet from 08-Nov-2022)  
<https://www.researchsquare.com/article/rs-1682985/v1>
- 
- 47 < 1% match (Internet from 24-May-2023)  
<https://www.researchsquare.com/article/rs-190652/v1>
- 
- 48 < 1% match ()  
[Kugbey, Nuworza, Osei-Roadi, Samuel, Atefio, Ethel Akpene, "The Influence of Social Support on the Levels of Depression, Anxiety and Stress among Students in Ghana", The International Institute for Science, Technology and Education \(IISTE\), 2015](#)
- 
- 49 < 1% match ("85th Annual Scientific Meeting "Charting New Frontiers in Aging", The Gerontologist, 2012.)  
["85th Annual Scientific Meeting "Charting New Frontiers in Aging", The Gerontologist, 2012.](#)
- 
- 50 < 1% match (Internet from 21-Aug-2022)  
[https://internationaljournalofcaringsciences.org/docs/31\\_rathnayaky\\_original\\_9\\_3.pdf](https://internationaljournalofcaringsciences.org/docs/31_rathnayaky_original_9_3.pdf)
- 
- 51 < 1% match (Micol Artom, Rona Moss-Morris, Fergus Caskey, Joseph Chilcot, "Fatigue in advanced kidney disease", Kidney International, 2014)  
[Micol Artom, Rona Moss-Morris, Fergus Caskey, Joseph Chilcot, "Fatigue in advanced kidney disease", Kidney International, 2014](#)
- 
- 52 < 1% match ()  
[Stabb, Katharine, "An examination of the integrated cognitive affective model and weight regain in obesity: a pilot study", Memorial University of Newfoundland, 2017](#)
- 
- 53 < 1% match (Internet from 26-Aug-2023)  
<https://www.frontiersin.org/articles/10.3389/fpsyg.2023.1207265/full>
- 
- 54 < 1% match (Internet from 04-Jul-2020)  
<https://www.frontiersin.org/articles/10.3389/fphys.2018.01944/full>
- 
- 55 < 1% match (Internet from 11-Oct-2023)  
<https://www.frontiersin.org/articles/10.3389/fpsyg.2021.762310/full>
- 
- 56 < 1% match (Internet from 05-Dec-2023)  
<https://nordigen.nord.no/nord-xmlui/bitstream/handle/11250/3100889/HaveegPettersen.pdf?isAllowed=y&sequence=1>
- 
- 57 < 1% match (Internet from 16-Oct-2023)  
<https://ojs.ijcp.in/IJCP/article/download/572/430/871>
- 
- 58 < 1% match (Internet from 02-Nov-2023)  
[https://repository.uel.ac.uk/download/1ca1249611a0386a533088fbb54852d021a7a2f5697483d383871e19da/2f904680045/2023\\_DEdChPa](https://repository.uel.ac.uk/download/1ca1249611a0386a533088fbb54852d021a7a2f5697483d383871e19da/2f904680045/2023_DEdChPa)

Turnitin Originality Report

- 59 < 1% match (Internet from 01-Feb-2023)  
<https://www.coursehero.com/file/144563419/Duplicheckerpdf/>
- 
- 60 < 1% match (Internet from 15-Sep-2023)  
<https://www.coursehero.com/file/209454006/Teachers-Burnout-Workload-Stress-and-Perceived-Self-Efficacy-as-Correlates-of-Job-Satisfaction-in-I/>
- 
- 61 < 1% match (Bimali Sanjeevani Weerakoon, Nishadi Rangana Chandrasiri. "Anxiety, depression, and stress among radiography undergraduates during the COVID-19 pandemic", Journal of Medical Imaging and Radiation Sciences, 2022)  
[Bimali Sanjeevani Weerakoon, Nishadi Rangana Chandrasiri. "Anxiety, depression, and stress among radiography undergraduates during the COVID-19 pandemic". Journal of Medical Imaging and Radiation Sciences, 2022](#)
- 
- 62 < 1% match (Internet from 24-Sep-2022)  
[https://vtechworks.lib.vt.edu/bitstream/handle/10919/78082/eid-12282015-101540\\_Swain\\_DMS\\_T\\_2015.pdf?isAllowed=y&sequence=1](https://vtechworks.lib.vt.edu/bitstream/handle/10919/78082/eid-12282015-101540_Swain_DMS_T_2015.pdf?isAllowed=y&sequence=1)
- 
- 63 < 1% match (Internet from 22-Dec-2023)  
<https://www.mdpi.com/2071-1050/16/1/96>
- 
- 64 < 1% match (Internet from 18-Mar-2020)  
<https://www.mdpi.com/2071-1050/7/8/11098/html>
- 
- 65 < 1% match (Internet from 17-Sep-2023)  
<https://www.mdpi.com/2076-2607/11/2/443>
- 
- 66 < 1% match (Obay A. Al-Maraira, Sami Z. Shennag. "Investigation of depression, anxiety and stress levels of health-care students during COVID-19 pandemic", Mental Health Review Journal, 2021)  
[Obay A. Al-Maraira, Sami Z. Shennag. "Investigation of depression, anxiety and stress levels of health-care students during COVID-19 pandemic". Mental Health Review Journal, 2021](#)
- 
- 67 < 1% match (Internet from 30-Oct-2022)  
<https://eprints.ouj.edu.au/207826/2/Haruka%20Kamura%20Thesis.pdf>
- 
- 68 < 1% match (Internet from 05-Dec-2020)  
[https://kclpure.kcl.ac.uk/portal/en/publications/fatigue-in-advanced-kidney-disease\(c630fa1-ebb6-4d3e-8b39-79d993840b85\).html](https://kclpure.kcl.ac.uk/portal/en/publications/fatigue-in-advanced-kidney-disease(c630fa1-ebb6-4d3e-8b39-79d993840b85).html)
- 
- 69 < 1% match (Internet from 13-Oct-2022)  
<https://www.ijrpr.org/research-paper-0622/ijrpr-p12604.pdf>
- 
- 70 < 1% match (Gabrielle Allen, Richard Logan, Tom Revesz, Dorothy Keefe, Sam Gue. "The Prevalence and Investigation of Risk Factors of Oral Mucositis in a Pediatric Oncology Inpatient Population; a Prospective Study", Journal of Pediatric Hematology/Oncology, 2018)  
[Gabrielle Allen, Richard Logan, Tom Revesz, Dorothy Keefe, Sam Gue. "The Prevalence and Investigation of Risk Factors of Oral Mucositis in a Pediatric Oncology Inpatient Population: a Prospective Study". Journal of Pediatric Hematology/Oncology, 2018](#)
- 
- 71 < 1% match (Fahad Saad Algarni, Abdulmajeed Nasser Alotaibi, Abdulrahman Mohammed Altowajri, Hana Al-Sobayel. "Cross-Cultural Adaptation and Validation of the Arabic Version of Musculoskeletal Health Questionnaire (MSK-HQ-Ar)", International Journal of Environmental Research and Public Health, 2020)  
[Fahad Saad Algarni, Abdulmajeed Nasser Alotaibi, Abdulrahman Mohammed Altowajri, Hana Al-Sobayel. "Cross-Cultural Adaptation and Validation of the Arabic Version of Musculoskeletal Health Questionnaire \(MSK-HQ-Ar\)". International Journal of Environmental Research and Public Health, 2020](#)
- 
- 72 < 1% match (Ramkumar Mohan, Stefanie Wei Lynn Goh, GuanWei Tan, Sameer P. Junnarkar, CheongWei Huey, Vishal G. Shelat. "Validation of TG07 and TG13/TG18 criteria for acute cholangitis and predictors of in-hospital mortality in patients over 80 years old", Clinical and Experimental Hepatology, 2021)  
[Ramkumar Mohan, Stefanie Wei Lynn Goh, GuanWei Tan, Sameer P. Junnarkar, CheongWei Huey, Vishal G. Shelat. "Validation of TG07 and TG13/TG18 criteria for acute cholangitis and predictors of in-hospital mortality in patients over 80 years old". Clinical and Experimental Hepatology, 2021](#)

Turnitin Originality Report

- 73 <http://orca.cf.ac.uk/129286/1/A%20multi-period%20inventory%20transportation%20model%20for%20tactical%20planning%20of%20food%20grain%20supply%20chain.pdf>
- 74 < 1% match (Internet from 29-Nov-2023)  
<https://cdt.lib.unc.edu/downloads/5f34sq043>
- 75 < 1% match (Internet from 18-Dec-2018)  
[http://shodhganga.inflibnet.ac.in/bitstream/10603/101927/12/12\\_chapter%204.pdf](http://shodhganga.inflibnet.ac.in/bitstream/10603/101927/12/12_chapter%204.pdf)
- 76 < 1% match (Kim, S.H.. "Fatigue and Depression in Disease-Free Breast Cancer Survivors: Prevalence, Correlates, and Association with Quality of Life", Journal of Pain and Symptom Management, 200806)  
[Kim, S.H., "Fatigue and Depression in Disease-Free Breast Cancer Survivors: Prevalence, Correlates, and Association with Quality of Life", Journal of Pain and Symptom Management, 200806](#)
- 77 < 1% match (Salim Saeed Azzez, Deldar Morad Abdulah, Rasoul Sabri Piro, Salim Saadi Miho Alhakem. "Sleep severity and fatigue manifestations in relation to the doctor-patient relationship", Sleep Medicine, 2019)  
[Salim Saeed Azzez, Deldar Morad Abdulah, Rasoul Sabri Piro, Salim Saadi Miho Alhakem. "Sleep severity and fatigue manifestations in relation to the doctor-patient relationship", Sleep Medicine, 2019](#)
- 78 < 1% match (Internet from 17-Sep-2023)  
<https://dmp.umw.edu/pl/pdf/2023/60/2/issue.pdf>
- 79 < 1% match (Internet from 01-Nov-2020)  
<https://www.tandfonline.com/doi/full/10.1080/07347332.2020.1801943>
- 80 < 1% match (Internet from 21-Oct-2021)  
<https://www.tandfonline.com/doi/full/10.1080/15502724.2020.1808014>
- 81 < 1% match (publications)  
[Hennessy, Ellis, Heary, Caroline, Michail, Maria. "Understanding Youth Mental Health: Perspectives from Theory and Practice", Understanding Youth Mental Health: Perspectives from Theory and Practice, 2022](#)
- 82 < 1% match (Internet from 15-Apr-2010)  
[http://adt.lib.wain.edu.au/uploads/approved/adt-VSWT20070927\\_084941/public02whole.pdf](http://adt.lib.wain.edu.au/uploads/approved/adt-VSWT20070927_084941/public02whole.pdf)
- 83 < 1% match (Internet from 27-Oct-2017)  
<https://emedicine.medscape.com/article/306920-clinical>
- 84 < 1% match (Internet from 11-Dec-2023)  
<http://irj.usar.ac.ir/article-1-1508-en.pdf>
- 85 < 1% match (Internet from 27-Oct-2023)  
<https://wiredspace.wits.ac.za/server/api/core/bitstreams/d4bb5b9c-fdb1-45ec-b2c4-af558ec3fbc2/content>
- 86 < 1% match (Li-Chung Pien. "Reliability and validity of a Chinese version of the Multidimensional Fatigue Symptom Inventory-Short Form (MFSI-SF-C): Multidimensional Fatigue Symptom Inventory SF", Journal of Clinical Nursing, 08/2011)  
[Li-Chung Pien. "Reliability and validity of a Chinese version of the Multidimensional Fatigue Symptom Inventory-Short Form \(MFSI-SF-C\): Multidimensional Fatigue Symptom Inventory SF", Journal of Clinical Nursing, 08/2011](#)
- 87 < 1% match (Seyed Shahab Ghazimirsaeid, Alireza Sadeghi, Mohammadreza Boustani, Reza Gerami. "Evaluation of Effect of Modic Changes on Treatment Outcomes of Nonspecific Low Back Pain Patients Presenting to 501 Hospitals Receiving Conservative Treatments", Annals of Military and Health Sciences Research, 2023)  
[Seyed Shahab Ghazimirsaeid, Alireza Sadeghi, Mohammadreza Boustani, Reza Gerami. "Evaluation of Effect of Modic Changes on Treatment Outcomes of Nonspecific Low Back Pain Patients Presenting to 501 Hospitals Receiving Conservative Treatments", Annals of Military and Health Sciences Research, 2023](#)
- 88 < 1% match (Internet from 22-Oct-2017)  
[https://espace.library.uq.edu.au/data/UQ\\_348090/UQ348090\\_OA.pdf?Expires=1508806942&Key-Pair=](https://espace.library.uq.edu.au/data/UQ_348090/UQ348090_OA.pdf?Expires=1508806942&Key-Pair=)



Turnitin Originality Report

- 101** < 1% match (Gan Sing Joo, Daniel Mahalingam Owen Devan, Chuah Shao Qi, Sapna Shridhar Patil. "Association between depression, anxiety, stress and perceived quality of life in a Malaysian B40 urban community during the COVID-19 lockdown: A cross-sectional study", F1000Research, 2021)  
[Gan Sing Joo, Daniel Mahalingam Owen Devan, Chuah Shao Qi, Sapna Shridhar Patil. "Association between depression, anxiety, stress and perceived quality of life in a Malaysian B40 urban community during the COVID-19 lockdown: A cross-sectional study", F1000Research, 2021](#)
- 
- 102** < 1% match (Go Owari, Kenichi Kono, Daiki Kanouchi, Masayoshi Uchiyama, Yusuke Nishida. "The Relationship Between Depressive Symptoms and Physical Activity in Rehabilitation Patients: A Cross-Sectional Study", Physical & Occupational Therapy In Geriatrics, 2023)  
[Go Owari, Kenichi Kono, Daiki Kanouchi, Masayoshi Uchiyama, Yusuke Nishida. "The Relationship Between Depressive Symptoms and Physical Activity in Rehabilitation Patients: A Cross-Sectional Study", Physical & Occupational Therapy In Geriatrics, 2023](#)
- 
- 103** < 1% match (Linda Kahr Andersen, Mette Aadahl, John Vissing. "Fatigue, physical activity and associated factors in 779 patients with Myasthenia Gravis", Neuromuscular Disorders, 2021)  
[Linda Kahr Andersen, Mette Aadahl, John Vissing. "Fatigue, physical activity and associated factors in 779 patients with Myasthenia Gravis", Neuromuscular Disorders, 2021](#)
- 
- 104** < 1% match (Theodoros A. Kyriazos, Anastassios Stalikas, Konstantina Prassa, Vasiliki Yotsidi. "Can the Depression Anxiety Stress Scales Short Be Shorter? Factor Structure and Measurement Invariance of DASS-21 and DASS-9 in a Greek, Non-Clinical Sample", Psychology, 2018)  
[Theodoros A. Kyriazos, Anastassios Stalikas, Konstantina Prassa, Vasiliki Yotsidi. "Can the Depression Anxiety Stress Scales Short Be Shorter? Factor Structure and Measurement Invariance of DASS-21 and DASS-9 in a Greek, Non-Clinical Sample", Psychology, 2018](#)
- 
- 105** < 1% match ()  
[Simpson, Robert John. "Mindfulness-based interventions for people with multiple sclerosis", 2017](#)
- 
- 106** < 1% match (Ray Pritchard, Dominik Bucher, Yngve Frøyen. "Does new bicycle infrastructure result in new or rerouted bicyclists? A longitudinal GPS study in Oslo", Journal of Transport Geography, 2019)  
[Ray Pritchard, Dominik Bucher, Yngve Frøyen. "Does new bicycle infrastructure result in new or rerouted bicyclists? A longitudinal GPS study in Oslo", Journal of Transport Geography, 2019](#)
- 
- 107** < 1% match (Shin Shen Yong, Suganthy Robinson, Zhenli Kwan, Ee Ming Khoo, Winn Hui Han, Leng Leng Tan, Su-Ming Wong, Min Moon Tang. "Psychological well-being, quality of life and patient satisfaction among adults with chronic spontaneous urticaria in a multi-ethnic Asian population", Psychology, Health & Medicine, 2022)  
[Shin Shen Yong, Suganthy Robinson, Zhenli Kwan, Ee Ming Khoo, Winn Hui Han, Leng Leng Tan, Su-Ming Wong, Min Moon Tang. "Psychological well-being, quality of life and patient satisfaction among adults with chronic spontaneous urticaria in a multi-ethnic Asian population", Psychology, Health & Medicine, 2022](#)
- 
- 108** < 1% match (Internet from 13-Jan-2023)  
<https://files.eric.ed.gov/fulltext/EJ1299818.pdf>
- 
- 109** < 1% match (Zeinab Abd Elmaksoud, Nermin Hussein, Eblesam Ahmed. "Job Analysis of Head Nurse Role at Benha and Menoufia University Hospitals", Journal of Nursing Science Benha University, 2021)  
[Zeinab Abd Elmaksoud, Nermin Hussein, Eblesam Ahmed. "Job Analysis of Head Nurse Role at Benha and Menoufia University Hospitals", Journal of Nursing Science Benha University, 2021](#)
- 
- 110** < 1% match (Internet from 03-Mar-2023)  
[https://repository.essex.ac.uk/35050/1/AMENDED%20MURPHY%20Thesis%201908305%2024\\_02\\_23.pdf](https://repository.essex.ac.uk/35050/1/AMENDED%20MURPHY%20Thesis%201908305%2024_02_23.pdf)
- 
- 111** < 1% match (Internet from 10-May-2023)  
[https://ro.ecu.edu.au/cgi/viewcontent.cgi?params=%2Fcontext%2Ftheses%2Farticle%2F1998%2F&path\\_info=Faraq\\_A\\_comparison\\_of\\_advanced\\_time\\_series\\_models\\_for\\_environmental\\_data](https://ro.ecu.edu.au/cgi/viewcontent.cgi?params=%2Fcontext%2Ftheses%2Farticle%2F1998%2F&path_info=Faraq_A_comparison_of_advanced_time_series_models_for_environmental_data)
- 
- 112** < 1% match ("Abstracts", Palliative Medicine, 2008)  
["Abstracts", Palliative Medicine, 2008](#)
- 
- 113** < 1% match (Jianwen Liang, Jiuqi Zhang, Bowen Dong, Anquan Xu, Zhenning Ba. "Shaking table tests on the seismic performance of prefabricated T-shaped cross utility tunnel", Structures, 2023)

## Turnitin Originality Report

Jianwen Liang, Jiluo Zhang, Boyen Dong, Anquan Xu, Zhenning Ba. "Shaking table tests on the seismic performance of prefabricated T-shaped cross utility tunnel". *Structures*, 2023

114 < 1% match (Stein, K.D.. "Further validation of the multidimensional fatigue symptom inventory-short form". *Journal of Pain and Symptom Management*, 200401)  
[Stein, K.D. "Further validation of the multidimensional fatigue symptom inventory-short form". \*Journal of Pain and Symptom Management\*, 200401](#)

115 < 1% match (Internet from 03-Jun-2023)  
<https://codeblue.galencentre.org/2023/03/08/zaliha-depression-and-anxiety-rates-highest-in-federal-territories/>

116 < 1% match (Internet from 25-May-2021)  
<https://repositori.unizg.hr/islandora/object/afzg:879/datastream/PDF>

117 < 1% match (Soonhwan Kim, Kyoryoung Kim, Yunha Hwang. "Examining the intercultural competence of early-childhood teachers", *European Early Childhood Education Research Journal*, 2022)  
[Soonhwan Kim, Kyoryoung Kim, Yunha Hwang. "Examining the intercultural competence of early-childhood teachers". \*European Early Childhood Education Research Journal\*, 2022](#)

118 < 1% match (Yelena Petrosyan, John-Graydon Simmons, Erin Kelly, Curtis L Cooper. "Uptake and factors associated with direct-acting antiviral therapy for hepatitis C and treatment outcomes among Canadian immigrants: A retrospective cohort analysis", *Canadian Liver Journal*, 2022)  
[Yelena Petrosyan, John-Graydon Simmons, Erin Kelly, Curtis L Cooper. "Uptake and factors associated with direct-acting antiviral therapy for hepatitis C and treatment outcomes among Canadian immigrants: A retrospective cohort analysis". \*Canadian Liver Journal\*, 2022](#)

119 < 1% match (Internet from 11-Jan-2023)  
<https://egrove.olemiss.edu/cgi/viewcontent.cgi?article=3053&context=zeld>

120 < 1% match (Internet from 28-Feb-2023)  
[https://go.gale.com/ps/i.do?aid=4f59f286&it=GALE%7CA728699995&it=i&p=GPS&sid=bookmark-GPS&reflet\\_q\\_bqd&v=2.1](https://go.gale.com/ps/i.do?aid=4f59f286&it=GALE%7CA728699995&it=i&p=GPS&sid=bookmark-GPS&reflet_q_bqd&v=2.1)

121 < 1% match ()  
[Freire, Filipa Ramos. "Outness, internalized homophobia and intimate partner violence in same gender couples". 2022](#)

122 < 1% match ()  
[YAMADA, Ken, TEERAWICHITCHAINAN, Bussarawan. "Living arrangements and psychological well-being of the elderly after the economic transition in Vietnam". Oxford University Press, 2015](#)

123 < 1% match (Internet from 01-Jan-2020)  
<https://www.scirp.org/Journal/PaperInformation.aspx?PaperID=65698>

124 < 1% match (Anitha R. "Nature, Prevalence, and Impact of Undernutrition on Intelligence Among School Children: A Cross-Sectional Study from South India", *ECS Transactions*, 2022)  
[Anitha R. "Nature, Prevalence, and Impact of Undernutrition on Intelligence Among School Children: A Cross-Sectional Study from South India". \*ECS Transactions\*, 2022](#)

125 < 1% match (Gemechu Kumera, Kalkidan Haile, Nurilgn Abebe, Tefera Marie, Tewodros Eshete. "Anemia and its association with coffee consumption and hookworm infection among pregnant women attending antenatal care at Debre Markos Referral Hospital, Northwest Ethiopia", *PLOS ONE*, 2018)  
[Gemechu Kumera, Kalkidan Haile, Nurilgn Abebe, Tefera Marie, Tewodros Eshete. "Anemia and its association with coffee consumption and hookworm infection among pregnant women attending antenatal care at Debre Markos Referral Hospital, Northwest Ethiopia". \*PLOS ONE\*, 2018](#)

126 < 1% match (Meulu Primananda, Budi Anna Keliat. "Risk and Protective Factors of Suicidal Ideation in Adolescents", *Comprehensive Child and Adolescent Nursing*, 2019)  
[Meulu Primananda, Budi Anna Keliat. "Risk and Protective Factors of Suicidal Ideation in Adolescents". \*Comprehensive Child and Adolescent Nursing\*, 2019](#)

127 < 1% match (Sarah Geroges, Janet A. DiPietro, Sahar Obeid, Feten Fekih-Romdhane, Souheil Hallit. "Psychometric performance assessment of the Arabic version of the



pregnancy experience scale–brief version (PES–brief) in an Arabic-speaking population", *Journal of Psychosomatic Research*, 2023)

[Sarah Georges, Janet A. DiPietro, Sahar Obeid, Feten Fekih-Romdhane, Souheil Hallit. "Psychometric performance assessment of the Arabic version of the pregnancy experience scale–brief version \(PES–brief\) in an Arabic-speaking population". \*Journal of Psychosomatic Research\*, 2023](#)

---

128 < 1% match ()

[Ferris, Catherine A. "Social Ecological Factors Associated with Parental Vaccination Decisions and Perceptions of Barriers to Childhood Immunizations", \*Digital USD\*, 2017](#)

---

129 < 1% match (Internet from 06-Mar-2023)

<https://boisestatejournalaccess.dovepress.com/correlation-of-circadian-rhythms-of-heart-rate-variability-indices-wit-peer-reviewed-fulltext-article-NSS>

---

130 < 1% match (Internet from 15-Aug-2023)

[https://www.nature.com/articles/s41598-018-20993-y?code=9af492f5-e9ae-47f3-a543-33b0c35cfb3&error=cookies\\_not\\_supported](https://www.nature.com/articles/s41598-018-20993-y?code=9af492f5-e9ae-47f3-a543-33b0c35cfb3&error=cookies_not_supported)

---

131 < 1% match (A. Fabi, R. Bhargava, S. Fatigoni, M. Guglielmo, M. Horneber, F. Roila, J. Weis, K. Jordan, C.I. Ripamonti. "Cancer-related fatigue: ESMO Clinical Practice Guidelines for diagnosis and treatment", *Annals of Oncology*, 2020)

[A. Fabi, R. Bhargava, S. Fatigoni, M. Guglielmo, M. Horneber, F. Roila, J. Weis, K. Jordan, C.I. Ripamonti. "Cancer-related fatigue: ESMO Clinical Practice Guidelines for diagnosis and treatment". \*Annals of Oncology\*, 2020](#)

---

132 < 1% match (Batool Pouraboli, Faroukh Abazari, Tahere Abbasi, Ali Mehdizadeh, Yunes Jahani. "The relationship between anxiety and social support in male and female students in high schools in the southeast of Iran", *International Journal of Adolescent Medicine and Health*, 2021)

[Batool Pouraboli, Faroukh Abazari, Tahere Abbasi, Ali Mehdizadeh, Yunes Jahani. "The relationship between anxiety and social support in male and female students in high schools in the southeast of Iran". \*International Journal of Adolescent Medicine and Health\*, 2021](#)

---

133 < 1% match (Benjamin R. Tukamuhabwa, Musa Mbago, Henry Mutebi, Mercy Kyoshabire. "Gender, family background, cynicism and ethical sensitivity of future procurement professionals in a developing country context: evidence from Ugandan universities", *International Journal of Ethics and Systems*, 2022)

[Benjamin R. Tukamuhabwa, Musa Mbago, Henry Mutebi, Mercy Kyoshabire. "Gender, family background, cynicism and ethical sensitivity of future procurement professionals in a developing country context: evidence from Ugandan universities". \*International Journal of Ethics and Systems\*, 2022](#)

---

134 < 1% match (Davina Porock. "Nutritional, Functional, and Emotional Characteristics Related to Fatigue in Patients During and After Biochemotherapy", *Oncology Nursing Forum*, 05/01/2005)

[Davina Porock. "Nutritional, Functional, and Emotional Characteristics Related to Fatigue in Patients During and After Biochemotherapy". \*Oncology Nursing Forum\*, 05/01/2005](#)

---

135 < 1% match (Faezeh Asadollahpour, Kowsar Baghban, Mojgan Asadi, Ehsan Naderifar, Maryam Dehghani. "Oropharyngeal Dysphagia in Acute Stroke Patients", *Zahedan Journal of Research in Medical Sciences*, 2015)

[Faezeh Asadollahpour, Kowsar Baghban, Mojgan Asadi, Ehsan Naderifar, Maryam Dehghani. "Oropharyngeal Dysphagia in Acute Stroke Patients". \*Zahedan Journal of Research in Medical Sciences\*, 2015](#)

---

136 < 1% match (Filipe Smith Buarque, Marcelle A. Farias, Júlio Cesar Soares Sales, Adriano Camiel et al. "Valorization of Macuba (*Acronia aculeata*) for Integrated Production of Lipase by *Yarrowia lipolytica* and Biodiesel Esters", *Fermentation*, 2023)

[Filipe Smith Buarque, Marcelle A. Farias, Júlio Cesar Soares Sales, Adriano Camiel et al. "Valorization of Macuba \(\*Acronia aculeata\*\) for Integrated Production of Lipase by \*Yarrowia lipolytica\* and Biodiesel Esters". \*Fermentation\*, 2023](#)

---

137 < 1% match (Frances P. Thorndike, Lee M. Ritterband, Linda A. Gonder-Frederick, Holly R. Lord, Karen S. Ingersoll, Charles M. Morin. "A Randomized Controlled Trial of an Internet Intervention for Adults with Insomnia: Effects on Comorbid Psychological and Fatigue Symptoms", *Journal of Clinical Psychology*, 2013)

[Frances P. Thorndike, Lee M. Ritterband, Linda A. Gonder-Frederick, Holly R. Lord, Karen S. Ingersoll, Charles M. Morin. "A Randomized Controlled Trial of an Internet Intervention for Adults with Insomnia: Effects on Comorbid Psychological and Fatigue Symptoms". \*Journal of Clinical Psychology\*, 2013](#)

---

138 < 1% match (P. Stone. "A systematic review of the scales used for the measurement of cancer-related fatigue (CRF)", *Annals of Oncology*, 08/04/2008)

Turnitin Originality Report

[P. Stone. "A systematic review of the scales used for the measurement of cancer-related fatigue \(CRF\)". \*Annals of Oncology\*. 09/04/2008.](#)

- 
- 139** < 1% match (Rachel M. Lee, Joshua A. Rash, Melanie Seal, Joy McCarthy, Sheila N. Garland. "Early change in fatigue, insomnia, and cognitive impairment and symptom severity at 3-years post-treatment in breast cancer survivors", Research Square Platform LLC, 2023)  
[Rachel M. Lee, Joshua A. Rash, Melanie Seal, Joy McCarthy, Sheila N. Garland. "Early change in fatigue, insomnia, and cognitive impairment and symptom severity at 3-years post-treatment in breast cancer survivors". Research Square Platform LLC, 2023.](#)
- 
- 140** < 1% match (Siti Mariam Mad Jusoh, Ahmad Faizal Salleh, Khairul Salleh Basaruddin, Mohammad Shahril Salim et al. "Influence of simulated leg length discrepancy on the spinal kinematics during stance phases", Journal of Physics: Conference Series, 2019)  
[Siti Mariam Mad Jusoh, Ahmad Faizal Salleh, Khairul Salleh Basaruddin, Mohammad Shahril Salim et al. "Influence of simulated leg length discrepancy on the spinal kinematics during stance phases". Journal of Physics: Conference Series, 2019.](#)
- 
- 141** < 1% match (Soheila Fallah, Ghorban Taghizadeh, Zahra Parnain, Moslem Cheraghifard et al. "Persian version of the Chalder Fatigue Questionnaire and Multidimensional Fatigue Symptom Inventory-Short Form: psychometric properties in Iranian chronic stroke survivors", Topics in Stroke Rehabilitation, 2023)  
[Soheila Fallah, Ghorban Taghizadeh, Zahra Parnain, Moslem Cheraghifard et al. "Persian version of the Chalder Fatigue Questionnaire and Multidimensional Fatigue Symptom Inventory-Short Form: psychometric properties in Iranian chronic stroke survivors". Topics in Stroke Rehabilitation, 2023.](#)
- 
- 142** < 1% match (Xin Li, He Zhao, Mengqi Liu, Zhiye Chen. "Increased Brain Iron Deposition in Episodic Migraine: A Pilot Voxel-based Quantitative Susceptibility Mapping", Current Medical Imaging Reviews, 2023)  
[Xin Li, He Zhao, Mengqi Liu, Zhiye Chen. "Increased Brain Iron Deposition in Episodic Migraine: A Pilot Voxel-based Quantitative Susceptibility Mapping". Current Medical Imaging Reviews, 2023.](#)
- 
- 143** < 1% match (Yiming Wang, Lv Tian, Xia Liu, Hao Zhang, Yongchun Tang, Hong Zhang, Wenbo Nie, Lisheng Wang. "Multidimensional Predictors of Cancer-Related Fatigue Based on the Predisposing, Precipitating, and Perpetuating (3P) Model: A Systematic Review", Cancers, 2023)  
[Yiming Wang, Lv Tian, Xia Liu, Hao Zhang, Yongchun Tang, Hong Zhang, Wenbo Nie, Lisheng Wang. "Multidimensional Predictors of Cancer-Related Fatigue Based on the Predisposing, Precipitating, and Perpetuating \(3P\) Model: A Systematic Review". Cancers, 2023.](#)
- 
- 144** < 1% match ()  
[Greaney, Mary L, Puelo, Elaine, Sprunck-Hamild, Kim, Haines, Jess, Houghton, Serena C, Emmons, Karen M. "Social Support for Changing Multiple Behaviors: Factors Associated With Seeking Support and the Impact of Offered Support". SAGE Publications, 2017.](#)
- 
- 145** < 1% match (Internet from 11-May-2023)  
[https://doxsci.com/genetic-counselling-in-parents-of-children-with-congenital-heart-disease-signifi\\_5a7b8298d84ab2bcc4dd292d.html](https://doxsci.com/genetic-counselling-in-parents-of-children-with-congenital-heart-disease-signifi_5a7b8298d84ab2bcc4dd292d.html)
- 
- 146** < 1% match (Internet from 16-Oct-2022)  
[https://eprints.nottingham.ac.uk/31114/1/Michele%20Lam\\_Applied%20Psychology\\_Dec%202015.pdf](https://eprints.nottingham.ac.uk/31114/1/Michele%20Lam_Applied%20Psychology_Dec%202015.pdf)
- 
- 147** < 1% match ()  
[Suganda, Prana Iryani, Santosa, Made Hery, Suprianti, G.A.P. "Literacy-based instruction with ICT on English learning in junior high school". State University of Malang \(UIM\), 2023.](#)
- 
- 148** < 1% match (Internet from 23-Sep-2022)  
<http://openaccess.ahievran.edu.tr/xmlui/bitstream/handle/20.500.12513/4438/atasyv%2c%20murat.pdf?isAllowed=y&sequence=1>
- 
- 149** < 1% match ()  
[Abdel Maqsood, Sabreim Elsayed Mahmoud, Hassan, Salma Elsayed, El-Ghadban, Fathia Elsayed, Ismail, Safaa Salah. "The Effect of Family Centered Care Model on Caregivers of Children with Hemophilia". ASSOC ADVANCEMENT ZOOLOGY, AZADANAGAR COLONY, RUSTAMPUR, GORAKHPUR, INDIA, 273001, 2023.](#)
- 
- 150** < 1% match (Internet from 25-Jun-2020)  
<https://www.mydepressionrelieftools.com/depression-anxiety-stress-scale-21-dass-21>
-

- 151 <https://www.revistas.usp.br/jgd/article/download/141277/136897/278110>
- 
- 152 < 1% match (Abouzar Raeisvandi, Mohammad Amerzadeh, Fatemeh Hajjabadi, Zahra Hosseinkhani. "Prevalence, modifiable and risk factors of depression, anxiety and stress (DASS) among elders in the northwest of Iran", Research Square Platform LLC, 2022)  
[Abouzar Raeisvandi, Mohammad Amerzadeh, Fatemeh Hajjabadi, Zahra Hosseinkhani. "Prevalence, modifiable and risk factors of depression, anxiety and stress \(DASS\) among elders in the northwest of Iran". Research Square Platform LLC, 2022](#)
- 
- 153 < 1% match (Andréa Neiva da Silva, Mario Vianna Vettore. "Associations of academic environment, lifestyle, sense of coherence and social support with self-reported mental health status among dental students at a university in Brazil: a cross-sectional study", BMJ Open, 2023)  
[Andréa Neiva da Silva, Mario Vianna Vettore. "Associations of academic environment, lifestyle, sense of coherence and social support with self-reported mental health status among dental students at a university in Brazil: a cross-sectional study". BMJ Open, 2023](#)
- 
- 154 < 1% match (Audronė Telešienė, Jelle Boeve-de Pauw, Daphne Goldman, Ralph Hansmann. "Evaluating an Educational Intervention Designed to Foster Environmental Citizenship among Undergraduate University Students", Sustainability, 2021)  
[Audronė Telešienė, Jelle Boeve-de Pauw, Daphne Goldman, Ralph Hansmann. "Evaluating an Educational Intervention Designed to Foster Environmental Citizenship among Undergraduate University Students". Sustainability, 2021](#)
- 
- 155 < 1% match (ELIZABETH D. CORDERO. "Characterizing Fatigue: The Effects of Ethnicity and Acculturation1 : CHARACTERIZING FATIGUE IN HISPANICS", Journal of Applied Biobehavioral Research, 03/2012)  
[ELIZABETH D. CORDERO. "Characterizing Fatigue: The Effects of Ethnicity and Acculturation1 : CHARACTERIZING FATIGUE IN HISPANICS". Journal of Applied Biobehavioral Research, 03/2012](#)
- 
- 156 < 1% match (Gramignano, G.. "Efficacy of l-carnitine administration on fatigue, nutritional status, oxidative stress, and related quality of life in 12 advanced cancer patients undergoing anticancer therapy", Nutrition, 200602)  
[Gramignano, G.. "Efficacy of l-carnitine administration on fatigue, nutritional status, oxidative stress, and related quality of life in 12 advanced cancer patients undergoing anticancer therapy". Nutrition, 200602](#)
- 
- 157 < 1% match (Hamza F. Ratrouf, Ayman M. Hamdan-Mansour. "Factors Associated with Secondary Traumatic Stress among Emergency Nurses: An Integrative Review", Open Journal of Nursing, 2017)  
[Hamza F. Ratrouf, Ayman M. Hamdan-Mansour. "Factors Associated with Secondary Traumatic Stress among Emergency Nurses: An Integrative Review". Open Journal of Nursing, 2017](#)
- 
- 158 < 1% match (Hui-Ying Chang, Pei-Fang Lai, Jjin-Ling Jiang. "Nurses' Acceptance of and Satisfaction With the Advanced Cardiac Life Support Electronic Information System in Emergency Departments and Critical Care Units", CIN: Computers, Informatics, Nursing, 2022)  
[Hui-Ying Chang, Pei-Fang Lai, Jjin-Ling Jiang. "Nurses' Acceptance of and Satisfaction With the Advanced Cardiac Life Support Electronic Information System in Emergency Departments and Critical Care Units", CIN: Computers, Informatics, Nursing, 2022](#)
- 
- 159 < 1% match (Jian Chen, Yuzhu Hu, Qifeng Lai, Wei Wang, Junxin Chen, Han Liu, Gautam Srivastava, Ali Kashif Bashir, Xiping Hu. "IIFDD: Intra and inter-modal fusion for depression detection with multi-modal information from Internet of Medical Things", Information Fusion, 2024)  
[Jian Chen, Yuzhu Hu, Qifeng Lai, Wei Wang, Junxin Chen, Han Liu, Gautam Srivastava, Ali Kashif Bashir, Xiping Hu. "IIFDD: Intra and inter-modal fusion for depression detection with multi-modal information from Internet of Medical Things". Information Fusion, 2024](#)
- 
- 160 < 1% match (Jiatong Xiao, Bolong Liu, Juliet Matsika, Ronghua Wu et al. "Evaluating male sexual function and reproductive health during Omicron outbreak in China", Research Square Platform LLC, 2023)  
[Jiatong Xiao, Bolong Liu, Juliet Matsika, Ronghua Wu et al. "Evaluating male sexual function and reproductive health during Omicron outbreak in China". Research Square Platform LLC, 2023](#)
- 
- 161 < 1% match (Jisung Ahn, Sang Won Lee, Kyunmin Kim, Bohyun Jin, Un Sun Chung. "The Relationship Between Childhood Trauma Experience and Complicated Grief: The Importance of Psychological Support for Individuals Coping With Pet Loss in Korea", Journal of Korean Medical Science, 2023)  
[Jisung Ahn, Sang Won Lee, Kyunmin Kim, Bohyun Jin, Un Sun Chung. "The Relationship Between Childhood Trauma Experience and Complicated Grief: The Importance of Psychological Support for Individuals Coping With Pet Loss in Korea". Journal of Korean Medical Science, 2023](#)
- 
- 162 < 1% match (Juliano dos Santos, Dálete Delalibera Corrêa de Faria Mota, Cibele Andruccioli de Mattos Pimenta. "Co-morbidade fadiga e depressão em pacientes com

Turnitin Originality Report

câncer colo-retal", Revista da Escola de Enfermagem da USP, 2009)

[Juliano dos Santos, Dálete Delalibera Corrêa de Faria Mota, Cibele Andrucio de Mattos Pimenta, "Co-morbidade fadiga e depressão em pacientes com câncer colo-retal". Revista da Escola de Enfermagem da USP, 2009](#)

---

163 < 1% match ()  
[Lavinia McLean, David Gaul, Rebecca Penco, "Perceived Social Support and Stress: a Study of 1st Year Students in Ireland", International Journal of Mental Health and Addiction](#)

---

164 < 1% match (Lianqi Liu, "The relationship between fatigue and light exposure during chemotherapy", Supportive Care in Cancer, 12/2005)  
[Lianqi Liu, "The relationship between fatigue and light exposure during chemotherapy", Supportive Care in Cancer, 12/2005](#)

---

165 < 1% match (Norhan Salah, Dalia Mostafa Osman, Rasha Safwat, Heba Mahmoud Farag, "Development of a questionnaire to measure the knowledge, expectations, and challenges of parents of children with cochlear implants", The Egyptian Journal of Otolaryngology, 2022)  
[Norhan Salah, Dalia Mostafa Osman, Rasha Safwat, Heba Mahmoud Farag, "Development of a questionnaire to measure the knowledge, expectations, and challenges of parents of children with cochlear implants", The Egyptian Journal of Otolaryngology, 2022](#)

---

166 < 1% match (publications)  
[Norman Jan, Rylie Jain, "The Art and Science of Mental Health Nursing: Principles and Practice", The Art and Science of Mental Health Nursing: Principles and Practice, 2018](#)

---

167 < 1% match (Veronika Vicić, Anthony J. Saliba, Michael A. Campbell, Gang Xie, Jane C. Quinn, "Producer practices and attitudes: Non-replacement male calf management in the Australian dairy industry", Frontiers in Veterinary Science, 2022)  
[Veronika Vicić, Anthony J. Saliba, Michael A. Campbell, Gang Xie, Jane C. Quinn, "Producer practices and attitudes: Non-replacement male calf management in the Australian dairy industry", Frontiers in Veterinary Science, 2022](#)

---

168 < 1% match (Zdenko Franić, Nevenka Lokobauer, Gordana Marović, "Radioactive Contamination of Cistern Waters Along the Croatia Coast of the Adriatic Sea by 90Sr", Health Physics, 1999)  
[Zdenko Franić, Nevenka Lokobauer, Gordana Marović, "Radioactive Contamination of Cistern Waters Along the Croatia Coast of the Adriatic Sea by 90Sr", Health Physics, 1999](#)

---

169 < 1% match (Internet from 02-Feb-2023)  
[http://digital\\_collect.lib.buu.ac.th/dcms/files/57910209.pdf](http://digital_collect.lib.buu.ac.th/dcms/files/57910209.pdf)

---

170 < 1% match (Internet from 05-May-2023)  
[https://digitalcommons.usf.edu/cgi/viewcontent.cgi?params=%2Fcontext%2Fed4%2Farticle%2F9450%2F&path\\_info=McDonald\\_usf\\_0208M\\_15906.pdf](https://digitalcommons.usf.edu/cgi/viewcontent.cgi?params=%2Fcontext%2Fed4%2Farticle%2F9450%2F&path_info=McDonald_usf_0208M_15906.pdf)

---

171 < 1% match (Internet from 18-Jun-2018)  
<http://docplayer.es/53197822-Tesis-doctoral-universidad-de-granada.html>

---

172 < 1% match (Internet from 11-Jan-2023)  
[https://doi.nrcl.gov.th/ListDoi/Download/519099/7cccebe8072c2d32d593f43c9dae2996?Resolve\\_DOI=10.14457%2FMJU.the.2013.350](https://doi.nrcl.gov.th/ListDoi/Download/519099/7cccebe8072c2d32d593f43c9dae2996?Resolve_DOI=10.14457%2FMJU.the.2013.350)

---

173 < 1% match (Internet from 19-Jun-2023)  
[http://educationdocbox.com/Homework\\_and\\_Study\\_Tips/70087045-Information-technology\\_and-development-of-education-itro-2015.html](http://educationdocbox.com/Homework_and_Study_Tips/70087045-Information-technology_and-development-of-education-itro-2015.html)

---

174 < 1% match ()  
[Corin Alicia, Nerp, "The Effects of Gender and Reading Mediums on Comprehension", Universiti Malaysia Sarawak \(UNIMAS\), 2019](#)

---

175 < 1% match (Internet from 01-Jul-2023)  
[https://journals.lww.com/mjnp/Fulltext/2022/07000/Sense\\_of\\_Efficacy\\_and\\_Psychological\\_Distress\\_among\\_3.aspx](https://journals.lww.com/mjnp/Fulltext/2022/07000/Sense_of_Efficacy_and_Psychological_Distress_among_3.aspx)

---

176 < 1% match (Internet from 25-Oct-2020)  
<https://onlinelibrary.wiley.com/doi/10.1002/acr.24246>

---

Turnitin Originality Report

- 177 <https://ourarchive.otago.ac.nz/bitstream/handle/10523/6375/AimerPhillipaC2016PhD.pdf?isAllowed=y&sequence=1>
- 
- 178 < 1% match ()  
 Kluijtenberg, B. (Bas), Middelkoop, M. (Marienke), van Diercks, R. (Ron), Worp, H. (Henk) van der. "What are the Differences in Injury Proportions Between Different Populations of Runners?", Springer Science and Business Media LLC, 2015
- 
- 179 < 1% match (Internet from 16-Jan-2023)  
<https://vdoc.pub/documents/principles-and-applications-of-assessment-in-counseling-2gmscrvk73g>
- 
- 180 < 1% match (Internet from 19-Nov-2022)  
<https://www.academicresearchjournals.org/IJABER/E-book%20PDF/2021/June-November%20Edition%20%202021.pdf>
- 
- 181 < 1% match (Internet from 12-Jul-2023)  
<https://www.divya-portal.org/smash/get/diva2-1774080/FULLTEXT01.pdf>
- 
- 182 < 1% match (Internet from 13-Nov-2022)  
<https://www.dovepress.com/getfile.php?fileID=21174>
- 
- 183 < 1% match (Internet from 05-Feb-2022)  
<https://www.rjmanager.com/mnsteps/51/51-1620245275.pdf?i=1644047484>
- 
- 184 < 1% match (Internet from 23-Mar-2016)  
<http://www.medicaljournals.se/jrn/content/download.php?doi=10.2340%2F16501977-0634>
- 
- 185 < 1% match (Internet from 04-Oct-2022)  
<https://www.seawatchfoundation.org.uk/wp-content/uploads/2012/08/Natalie-Bush-thesis1.pdf>
- 
- 186 < 1% match (Internet from 18-Mar-2023)  
<https://zero.sci-hub.se/6467/e7bd5fa201930794c13e1d2d82dcfae/al-hussain2017.pdf>
- 
- 187 < 1% match ()  
 Taha, Zainab, Hassan, Ahmed Ali, Wikkeling-Scott, Ludmilla, Panandreu, Dimitrios. "Risk factors associated with initiation of breastfeeding among mothers with low birth weight babies: A cross-sectional multicenter study in Abu Dhabi, United Arab Emirates", ZU Scholars, 2020
- 
- 188 < 1% match ("Seminars", Annals of Behavioral Medicine, 12/2007)  
 "Seminars", Annals of Behavioral Medicine, 12/2007
- 
- 189 < 1% match (Alexandre Chan, Claire Lew, Xiao Jun Wang, Terence Ng, Jung-woo Chae, Hui Ling Yeo, Maung Shwe, Yan Xiang Gan. "Psychometric properties and measurement equivalence of the Multidimensional Fatigue Syndrome Inventory- Short Form (MFSI-SF) amongst breast cancer and lymphoma patients in Singapore", Health and Quality of Life Outcomes, 2018)  
<https://doi.org/10.1186/s12916-018-1111-1>  
 Alexandre Chan, Claire Lew, Xiao Jun Wang, Terence Ng, Jung-woo Chae, Hui Ling Yeo, Maung Shwe, Yan Xiang Gan. "Psychometric properties and measurement equivalence of the Multidimensional Fatigue Syndrome Inventory- Short Form (MFSI-SF) amongst breast cancer and lymphoma patients in Singapore", Health and Quality of Life Outcomes, 2018
- 
- 190 < 1% match (C. Cathalin Pressy Dalia, V. Sujatha, S. Nalini. "Effect of emotional regulation training on depression, anxiety and stress among the patients with alcohol dependence admitted in selected de-addiction centers at south India", Journal of Complementary and Integrative Medicine, 2019)  
<https://doi.org/10.1007/s12075-019-0911-1>  
 C. Cathalin Pressy Dalia, V. Sujatha, S. Nalini. "Effect of emotional regulation training on depression, anxiety and stress among the patients with alcohol dependence admitted in selected de-addiction centers at south India", Journal of Complementary and Integrative Medicine, 2019
- 
- 191 < 1% match (Joan Norrie, Marcus Heitger, Janet Leatham, Tim Anderson, Richard Jones, Ross Flett. "Mild traumatic brain injury and fatigue: A prospective longitudinal study", Brain Injury, 2010)  
<https://doi.org/10.1080/17445019.2010.500000>  
 Joan Norrie, Marcus Heitger, Janet Leatham, Tim Anderson, Richard Jones, Ross Flett. "Mild traumatic brain injury and fatigue: A prospective longitudinal study", Brain Injury, 2010
- 
- 192 < 1% match (Li-Ling Chuang, Yu-Fen Chuang, Miao-Ju Hsu, Ying-Zu Huang, Alice M. K. Wong, Ya-Ju Chang. "Validity and reliability of the Traditional Chinese version of the Multidimensional Fatigue Inventory in general population", PLOS ONE, 2018)

Turnitin Originality Report

[Li-Ling Chuang, Yu-Fen Chuang, Miao-Ju Hsu, Ying-Zu Huang, Alice M. K. Wong, Ya-Ju Chang. "Validity and reliability of the Traditional Chinese version of the Multidimensional Fatigue Inventory in general population". PLOS ONE. 2018](#)

---

**193** < 1% match ()  
[Primi, Caterina, Donati, Maria Anna, Chiesi, Francesca, Morsanyi, Kinga. "Are there gender differences in cognitive reflection? Invariance and differences related to mathematics." Informa UK Limited. 2017.](#)

---

**194** < 1% match ()  
[Dian, Trifena, Maramis, Margarita M., Maria, Edith. "Social Engagement With Cognitive Function In The Elderly At Posyandu Lanjut Usia Mekar Sari, RW.V. Mojo, Surabaya". Universitas Katolik Widya Mandala Surabaya. 2019.](#)

---

**195** < 1% match (Alexandra M. Adamis, Bunmi O. Olatunji. "Specific emotion regulation difficulties and executive function explain the link between worry and subsequent stress: A prospective moderated mediation study", Journal of Affective Disorders, 2024)  
[Alexandra M. Adamis, Bunmi O. Olatunji. "Specific emotion regulation difficulties and executive function explain the link between worry and subsequent stress: A prospective moderated mediation study". Journal of Affective Disorders. 2024.](#)

---

**196** < 1% match (Amal Al Sharji, Fawwaz Alaloul, Basma Al Yazeedi, Maryam Alharrasi. "Fatalistic and Optimistic Coping Strategies Predict Depression in Arab Muslim Patients With End-Stage Renal Disease", Journal of Transcultural Nursing, 2023)  
[Amal Al Sharji, Fawwaz Alaloul, Basma Al Yazeedi, Maryam Alharrasi. "Fatalistic and Optimistic Coping Strategies Predict Depression in Arab Muslim Patients With End-Stage Renal Disease". Journal of Transcultural Nursing. 2023.](#)

---

**197** < 1% match (Ashley G. B. Willmott, Mark Hayes, Kirsty A. M. Waldock, Rebecca L. Relf et al. "Short-term heat acclimation prior to a multi-day desert ultra-marathon improves physiological and psychological responses without compromising immune status", Journal of Sports Sciences, 2016)  
[Ashley G. B. Willmott, Mark Hayes, Kirsty A. M. Waldock, Rebecca L. Relf et al. "Short-term heat acclimation prior to a multi-day desert ultra-marathon improves physiological and psychological responses without compromising immune status". Journal of Sports Sciences. 2016.](#)

---

**198** < 1% match (Maira Lorenzo de Sá e Camargo, Raquel Vieira Torres, Keylla Cássia Gomes Cotta, Oscarina da Silva Ezequiel et al. "Mental health throughout the medical career: A comparison of depression, anxiety, and stress levels among medical students, residents, and physicians", International Journal of Social Psychiatry, 2023)  
[Maira Lorenzo de Sá e Camargo, Raquel Vieira Torres, Keylla Cássia Gomes Cotta, Oscarina da Silva Ezequiel et al. "Mental health throughout the medical career: A comparison of depression, anxiety, and stress levels among medical students, residents, and physicians". International Journal of Social Psychiatry. 2023.](#)

---

**199** < 1% match (Nazire Burcin Hamutoglu, Deniz Mertkan Gezgin, Gozde Sezen-Gultekin, Orhan Gemikonakli. "Relationship between nomophobia and fear of missing out among Turkish university students", Cypriot Journal of Educational Sciences, 2018)  
[Nazire Burcin Hamutoglu, Deniz Mertkan Gezgin, Gozde Sezen-Gultekin, Orhan Gemikonakli. "Relationship between nomophobia and fear of missing out among Turkish university students". Cypriot Journal of Educational Sciences. 2018.](#)

---

**200** < 1% match (Peter J. Norton. "Depression Anxiety and Stress Scales (DASS-21): Psychometric analysis across four racial groups", Anxiety, Stress & Coping, 2007)  
[Peter J. Norton. "Depression Anxiety and Stress Scales \(DASS-21\): Psychometric analysis across four racial groups". Anxiety, Stress & Coping. 2007.](#)

---

**201** < 1% match ()  
[박선진, 정선재. "Application of a joint latent space item response model to clustering stressful life events and the Beck Depression Inventory-II: results from Korean epidemiological survey data". Epidemiology and Health. 2022.](#)