RELATIONSHIP BETWEEN SMARTPHONE ADDICTION AND SLEEP QUALITY AMONG UNIMAS UNDERGRADUATES NURSING STUDENTS

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This graduation exercise is submitted in partial fulfillment of requirement for the degree of Bachelor of Nursing with Honours

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Final Year Project Report	√
Masters	
PhD	

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ABSTRACT

Introduction: The rapid development in technologies which creates lots of tools and smartphones is one of them. However, despite the benefits in exchanging information and communication, excessive dependency may lead to smartphone addiction. This results in poor sleep quality particularly among younger generations. For example, nursing students. **Objective:** The main objective of this study is to assess the prevalence of smartphone addiction among UNIMAS undergraduate nursing students. Whereas the second objective is to determine sleep quality of UNIMAS undergraduate nursing students. While the third objective is to assess the relationship between smartphone addiction and sleep quality among UNIMAS undergraduate nursing students. **Method:** This study used a quantitative, descriptive cross-sectional study that uses self-administered questionnaires to collect the data among a simple random sample of 161 student nurses. The data was analyzed using Spearman Correlation. **Result:** Most of the respondent's age range between 19 to 25 years old (M=21.59, SD= ±1.25). The prevalence of smartphone addiction among UNIMAS undergraduate nursing students was found by almost half of the UNIMAS undergraduate nursing students. Whereas more than half of respondents were discovered to be considered at high risk of serious sleep problems or poor sleep quality. There was a significant positive correlation between smartphone addiction and sleep quality.

Keywords: Sleep quality, nursing students, addiction, smartphone.

ABSTRAK

Pengenalan: *Perkembangan pesat dalam teknologi yang penciptaan banyak peralatan dan telefon pintar adalah salah satu darinya. Walau bagaimanapun, walaupun terdapat faedah dalam bertukar-tukar maklumat dan komunikasi, kebergantungan berlebihan boleh menjurus kepada ketagihan telefon pintar. Ini mengakibatkan kualiti tidur yang kurang baik terutamanya dalam kalangan generasi muda. Contohnya, pelajar kejururawatan.* ***Objektif:*** *Objektif utama kajian ini adalah untuk menilai kelaziman ketagihan telefon pintar dalam kalangan pelajar kejururawatan sarjana muda UNIMAS. Manakala objektif kedua adalah untuk menentukan kualiti tidur pelajar kejururawatan sarjana muda UNIMAS. Manakala objektif ketiga adalah untuk menentukan hubungan antara ketagihan telefon pintar dan kualiti tidur dalam kalangan pelajar kejururawatan sarjana muda UNIMAS.* ***Kaedah:*** *Kajian ini menggunakan kajian kuantitatif, deskriptif keratan rentas yang menggunakan soal selidik yang dijalankan sendiri untuk mengumpul data dalam kalangan sampel mudah rawak 161 pelajar jururawat. Data dianalisis menggunakan Korelasi Spearman.* ***Keputusan:*** *Kebanyakan responden dalam lingkungan umur diantara 19 hingga 25 tahun (M=21.59, SD= ±1.25). Kelaziman ketagihan telefon pintar dalam kalangan pelajar kejururawatan sarjana muda UNIMAS didapati hampir separuh daripada pelajar kejururawatan sarjana muda UNIMAS. Manakala lebih separuh daripada responden didapati dianggap berisiko tinggi mengalami masalah tidur yang serius atau kualiti tidur yang lemah. Terdapat korelasi positif yang signifikan antara ketagihan telefon pintar dan kualiti tidur.*

Kata Kunci: *Kualiti tidur, pelajar kejururawatan, ketagihan, telefon pintar*

CONTENT

List of Acronyms

MCMC	Malaysian Communications and Multimedia Commission
SPAI	Smartphone Addiction Inventory
UGT	Uses and Gratification Theory
NS	Novelty seeking
HA	Harm avoidance
PSQI	Pittsburgh Sleep Quality Index
SQS	Sleep Quality Scale

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CHAPTER 1: INTRODUCTION

Section 1.0: Introduction

This chapter presents the study's background, statement of problems, research questions, research goals, importance of the study, definition of terms, operational definitions and summary of the chapter.

1.1 Background of The Study

Smartphone addiction is characterized as a condition involving the uncontrollable overuse of mobile devices. This condition is typically measured based on how frequently users utilize their smartphones or how much time they spend online overall during a specific period of time (Wigmore, 2018). With smartphone dependence leading to an unhealthy lifestyle, sleeping issues and poor sleep quality have grown more common in this era of globalization (Wang et al., 2019). Technology has advanced to the point where everyone now views smartphones as fantastic tools that people are beginning to use to replace everything while also offering additional purposes such as information, education, entertainment, games, communication, and much more. Due to smartphone's great characteristics that make peoples' life more convenient and portable to bring everywhere and across all generations. Therefore, it can be considered that everyone across all generations start to use a smartphone due to smart features that make people's lives more

comfortable compared to the other things. Due to all these capabilities that are offered by smartphones, people are prone to get addicted to spending more time on their smartphone.

When the eyes are closed, the body is at rest, and the mind is unconscious, this is generally referred to as sleep in the context of living beings. Whereas the definition of sleep quality is a person's level of pleasure with every component of their sleep experience (Nelson, 2022). Period of sleep, sleep effectiveness, sleep quiescence and wake up following the beginning of sleep are the four components that make up sleep quality. In simple words, sleep quality focuses more on quantifying how well peoples' sleep to determine either people having a good sleep quality or poor sleep quality. Additionally, social obligations, environmental circumstances, physiological issues, and psychological considerations may contribute to effects of sleep quality. Some people suffer from poor sleep quality over years which can progress to other chronic or acute health problems. Around the world, it is estimated that between 7% and 19% of adults do not get enough sleep, 40% do so at least once a month, and a persistent sleep issue affects between 50 million and 70 million Americans (Single Care Team, 2022). However, Malaysia discovered that more than 53% of its workforce sleeps less than the recommended seven hours per day and that at least 51% experience stress at work, and that about 35% have some form of sleeping disturbance. (Malek, 2020).

However, prior research showed that women are more likely than males to become dependent on their smartphone because of how they use it such as for camera, music and

education while males were more likely to use smartphones for socializing, listening to music and playing games (Dr. Vaidya et al.,2016). In other words, women are more expected to become dependent toward smartphones, which might result in issues related to sleep quality. Due to poor sleep quality caused by smartphone dependence, numerous health problems may develop such as insomnia, vision problems, wrist or hand pain and much more since they may not get a good quality of sleep (Kwon et al., 2013). Even though smartphones have numerous advantages, it also brings a negative effect on the people worldwide. These negative effects include physical, psychological and physiological related problems (Randler et al., 2016).

Being nursing students, therefore they are also struggling with these problems related to smartphone addiction and poor sleep quality. They frequently spend lots of time on their smartphone for entertainment, gaming, social connection and notably for educational purposes, which may develop smartphone addiction and in the same time leads to sedentary lifestyle, physical activity decline and also affect their sleep quality. Majority of the nursing students will become nurses who will care for their patients and clients in future. So it is crucial for them to understand how smartphone addiction and sleep quality is related to nursing. Nurses are essential in promoting restful sleep and helping patients or clients avoid sleep problems and the effects of smartphone addiction. Given the difficulties that smartphone addiction has caused in people's lives today, it is vital to spread awareness in order to enhance people to come out with great and effective strategies for overcoming and preventing peoples from getting addicted toward smartphones.

1.2 Statement of Problems

The main implications of smartphone addiction on students nowadays are psychological and physical issues, and these effects are progressively getting worse. Students who experience this problem may develop problems related to sleeping quality and quantity, which could result in other health issues. According to Robinson in 2022, smartphone addiction will have a profoundly negative impact on people's lives by increasing feelings of isolation and sadness, escalating worry, building up stress, and making it harder to concentrate. The smartphone overuse among the younger generation has been gradually increasing particularly in tertiary education. Previous research found that 75.6 percent of people aged 21 to 25 years old showed signs of smartphone addiction (Parasuraman et al., 2017). This is a result of how frequently students use their smartphones for communication, entertainment, educational material, and much more. Even though smartphone features give lots of benefits and make students' lives easier, drawbacks that directly or indirectly harm students and other people draw more attention to and understanding of smartphone addiction.

According to Malaysian Communications and Multimedia Commission (MCMC) in 2014, it reported approximately 1.5 billion smartphone users worldwide, and that among 2401 smartphone users, around 71.4 percent continued to check their device even when there were no incoming calls or notifications. Due to smartphone features and apps, students have a tendency to spend a lot of time using them, which puts them at risk for poor sleep quality and the development of sleeping disorders. In addition, roughly 51.5 percent of smartphone users demonstrated that their devices are crucial to their lives (MCMC,

2014). Prior studies revealed that 25.6 percent of college students use their smartphone which influences how well they sleep (Star, 2018). Additionally, several studies documented the consequences of smartphone addiction towards health especially on physical and psychological aspects which may cause the students to have poor academic performance, unable to focus well, neglect their health and may develop into various health problems. For nursing students, it is important to have good critical judgment, good concentration and a healthy body and mind in order to perform well in academic, clinical settings and to provide care for those in need. It is important to care for themselves before they care for other people because they are the future face of nursing itself. According to studies, smartphone addiction and restless sleep are strongly correlated. Which has led to an increase in sleep disorders, sleeping issues, and sleep disturbances. All of this is more likely to affect the students.

Despite the fact that smartphone addiction and poor sleep quality are strongly correlated, yet lots of individuals are unaware of their addiction towards smartphones, which might develop into negative impacts due to the smart features and apps that are offered by smartphones. According to Khan in 2016, students are more likely to use their smartphones before going to bed, which prolongs their sleep period and may prevent them from getting adequate sleep. This results in students getting less than seven hours of sleep each day, which is not appropriate. The nursing students need to understand and be aware about the negative impacts of smartphone addiction in order to promote a healthy life, provide good care and at same time for early prevention before it develops into the worst health condition. To investigate the connection between smartphone addiction and sleep

quality, numerous studies have been conducted. However, only a few studies have been carried out among undergraduate nursing students and healthcare professionals worldwide. Moreover, UNIMAS nursing students' prevalence and impacts of smartphone addiction on sleep quality is also not known. The conduct of this study will be an eye opener and at the same time raise awareness and attention regarding this matter. In addition, early awareness and early detection of this smartphone addiction is very crucial to create early strategies and implementations which are able to confront and cope before these problems become out of control in future.

1.3 Research Question

1.3.1 What is the prevalence of experiences on smartphone addiction among UNIMAS undergraduate nursing students'?

1.3.2 What is the sleep quality among UNIMAS undergraduate nursing students'?

1.3.3 What is the correlation between smartphone addiction and sleep quality status among UNIMAS undergraduate nursing students?

1.4 Research Objectives

1.4.1 To assess the prevalence of experiences on smartphone addiction among UNIMAS undergraduate nursing students'.

1.4.2 To determine the sleep quality among UNIMAS undergraduate nursing students'.

1.4.3 To determine the correlation between smartphone addiction and sleep quality status among UNIMAS undergraduate nursing students.

1.5 Significance of Study

The findings of this research can be used to understand the prevalence of smartphone addiction and sleep quality among UNIMAS undergraduate nursing students as well as the relationship between smartphone addiction and sleep quality. Baseline data on smartphone addiction and sleep quality among UNIMAS nursing students can be obtained by evaluating the prevalence of smartphone addiction, sleep quality, and the connection between smartphone addiction and sleep quality. Hence, the result from this study would provide evidence related to smartphone addiction and sleep quality among nursing students. If the prevalence and relationship of smartphone addiction and sleep

quality were neglected, it could lead to various health problems especially psychological and physiology of mankind in the future and affect nurses' careers. It is crucial to provide awareness regarding smartphone addiction and sleep quality to those who have never experienced it as well as to the future nursing students who will be in the clinical field in future as a nurse.

Besides, since there are few recent studies on the prevalence and connection between smartphone addiction and poor sleep quality, particularly among nursing students and healthcare workers, the results of this study can be used to further research or as a reference for future research in Malaysia. These study findings would provide the baseline data and preventive measures once the prevalence and relationship between smartphone addiction and sleep quality among UNIMAS undergraduate nursing students have been reported. It is essential to implement early awareness, prevention and education regarding smartphone addiction, especially among students, because the majority of nurses are less aware of the detrimental effects that smartphone addiction has on their ability to sleep.

1.6 Definition of Term

The terms below are defined in order to better comprehend this study:

a) Smartphone Addiction

Smartphone addiction is characterized as a problem involving uncontrollable overuse of mobile telephones, which is typically assessed by the frequency of user access to their device and the total amount of time they spend online within a specific time period (Wigmore, 2018). The Smartphone Addiction Inventory scale (SPAI) will be used to assess the level of addiction towards the smartphone in this study. The Smartphone Addiction Scale consists of 4 factors and 26 items which include obsessive behavior, functional degradation, withdrawal, and smartphone tolerance. The Smartphone Addiction Inventory scale (SPAI) will be used to assess the intensity and severity of the addiction towards smartphones in the last few months. The measurement labels on this Smartphone Addiction Inventory scale (SPAI) range from 1 to 4. 0 represents strongly disagree, while 4 represents strongly agree.

b) Sleep Quality

A person's satisfaction with all aspects of their sleep experience, which includes four factors: sleep effectiveness, sleep latency, waking after sleep start, and sleep duration, is referred to as their sleep quality. (Nelson et.al, 2022). The Sleep Quality Scale will be used to evaluate and quantify the quality of sleep. The Sleep Quality Scale contained 28 items that involved six domains of sleep quality which are restoration after sleep, daytime symptoms, problems beginning and maintaining sleep, sleep satisfaction and difficulty walking. The measurement labels on this Sleep Quality Scale range from 0 to 4. 0 represents a few times, while 3 represents almost always.

c)Nursing Student

According to the International Council of Nurses (2022), nursing is described as an important component of the healthcare system that enhances health, prevents illness and cares for psychology and physiology ill and disabled individuals of all ages in health care settings. Whereas the term "student" refers to those who have enrolled in educational institutions in order to acquire particular knowledge and abilities under the direction of lecturers and instructors (Wikipedia, 2022). Furthermore, in this study, a nursing student is defined as a person who has spent four years enrolled in the Bachelor of Nursing with Honors programme at UNIMAS.

1.7 Operational Definition

a) Smartphone Addiction

The Smartphone Addiction Inventory scale (SPAI) will be used to assess the level of addiction towards the smartphone in this study. The Smartphone Addiction Scale consists of 4 factors and 26 items which include obsessive behavior, functional degradation, withdrawal, and smartphone tolerance. In this study, Smartphone Addiction Inventory scale (SPAI) will be used to assess the intensity and severity of the addiction towards smartphones in the last few months of UNIMAS undergraduate nursing students.

b) Sleep Quality

The Sleep Quality Scale will be used to evaluate and quantify the quality of sleep. The Sleep Quality Scale contained 28 items that involved six domains of sleep quality which are restoration after sleep, daytime symptoms, problems beginning and maintaining sleep, sleep satisfaction and difficulty walking. In this study, Sleep Quality Scale will be used to evaluate and explore the quality of sleep among UNIMAS undergraduate nursing students.

1.8 Summary

This chapter provides an overview of the study, starting with a discussion on the background of smartphone addiction and sleep quality. It also addresses the problem statement, highlighting the limited research conducted on the prevalence and relationship between smartphone addiction and sleep quality among undergraduate nursing students in Malaysia. The research objectives and research questions of the study are outlined as well. Moreover, this chapter emphasizes the purposes and significance of conducting the current study. The literature review relevant to this research will be presented in Chapter 2.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

The prevalence and connections between smartphone addiction and poor sleep quality are covered in this review of the literature. This chapter describes the prevalence of smartphone addiction and sleep quality among people around the world. The link between smartphone addiction, people's ability to sleep, the theoretical framework that is related to this research topic and an overview of the literature review are presented in this chapter also. The articles used in this literature review are from trusted sources such as ResearchGate, PubMed, Google Scholar and Science Direct. The articles reviewed are retrieved from 2012 to 2022. This literature review excluded articles published more than ten years and articles that did not mention the date of publication.

2.1 Theoretical Framework

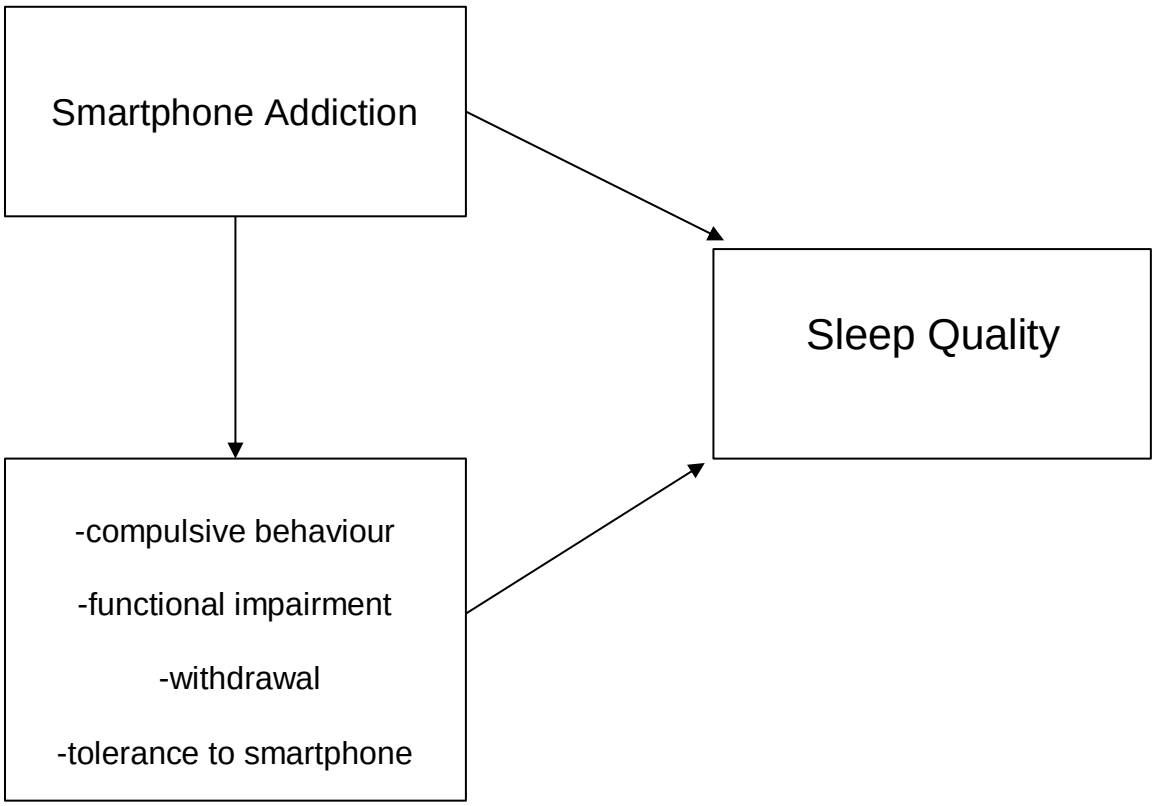
According to Mehrad et al. (2016), Uses and Gratification Theory (UGT) is one of the theories of interactions that relate to social interaction and communication. UGT used to understand how and why people actively seek specific media to satisfy specific needs caused by the psychological and social situation. According to prior studies, UGT can be classified into instrumental and conventional purposes in which instrumental needs of technology are goal-oriented while conventional needs are perpetual and diversionary.

According to previous study, the five needs summarized in this theory are affective needs, cognitive, social need, personal consolidation need and escapism needs.

However, according to Joo and Sang in 2013, UGT may classify media usage into two different kinds which are instrumental and ritualized. The ritual helps to fulfill abstract requirements like adventure, seeking advice and curiosity. Meanwhile the instrumental gives information demand that satisfies the users' goal-directed needs such as financial issues, information about mental issues and daily life hints. Besides, the entertainment and information that act as instruments may affect the attitude toward media technology particularly smartphones. This causes people to become more dependent on smartphones due to satisfaction and excitement provided by the smartphone and media technology features. The more satisfaction and excitement from the smartphone, the more it affects the sleep quality in order to satisfy the specific needs.

2.2 Conceptual Framework

Figure 2.2 Conceptual Framework Model.



Based on previous studies regarding smartphone addiction and sleep quality, the conceptual framework model is proposed and demonstrated as shown in Figure 2.2. The purpose of this conceptual framework is to briefly describe the relationship between smartphone addiction and sleep quality in UNIMAS undergraduate nursing students. In Figure 2.2, smartphone addiction is the predictor variable, meanwhile the sleep quality is

the outcome variable. Furthermore, it has been explained that smartphone addiction affects sleep quality.

However, the severity of the impact of smartphone addiction on sleep quality still needs more research to explore. This is because individuals are prone to get addicted to smartphones to satisfy their desire for entertainment and want to escape from undesired or unbearable situations. Smartphone addiction is developed from excessive use of smartphones. Hence, this study aims to explore the relationship between smartphone addiction and sleep quality.

2.3 Prevalence of Smartphone Addiction

Smartphones have become a norm among people around the world with a variety of ages. Numerous studies involving college or university students have been undertaken. According to a study by Lane et al. (2021) among university or college students, 38.63% of them showed a significant propensity for smartphone addiction. This is due to higher novelty seeking (NS) and harm avoidance (HA) scores were found in smartphone addict (SPA) group compared to the non-SPA group. Moreover, the impulsivity and disorderliness of parts of NS were found to be connected to the SPA group which showed that a high risk of being SPA may be caused by poor impulse control. This phenomenon of smartphone addiction explains where the SPA group have difficulty to organize their life and are prone to become addicted. While the higher score on the subcomponents of fear

and uncertainty and shyness that parts of HA were found in the SPA group. It indicates that the SPA group tends to use the device application and the smartphone features to develop social interaction which is more prone to become addicted.

Besides, a study in Malaysia by Rathakrishnan et al. (2021), which was conducted in a public university in Sabah, reported that the majority of the respondents struggled to focus in class and during other learning activities due to their smartphone overuse, which is an issue for most of them. This is explained by a theory called The Uses and Gratification Theory that describes how people will seek the media when they get satisfaction from the media. People more likely use the smartphone to release stress, communicate with others, search for information and gaming to fulfill their needs. This smartphone becomes crucial in daily life, especially adolescence, which could turn out to become dependent on smartphones and may start to affect their academic performance. However, due to various research purposes or objectives, there is no precise percentage reported in this research compared to a study by Lane et al. in 2021. Nevertheless, according to a study by Al-Anazi et al. (2022), 85% of secondary school students in Al-Madinah, Saudi Arabia use their smartphones every day and right before going to bed on weekends. Before going to bed, most of the respondents in this study utilized different kinds of electronic devices but particularly the majority of them utilized their smartphone instead of tablets, play station and television. Compared to the previous two investigations, a research by Al-Anazi et al. (2022) reported a greater percentage.

On the other hand, based on recent study, mobile devices were used exclusively by nearly half of the students (42.4%). Similarly, research found about half of nursing students use their smartphones excessively (Trishan et al., 2021). Smartphones have many advantages, particularly for students who use them for communication, entertainment, and educational purposes. However, there is not much data on how common smartphone addiction is among nursing students. Nursing students who use their smartphones excessively risk psychological and physical harm as well as learning disruptions during lectures and clinical experiences (Gutiérrez-Puertas et al., 2021, Osorio-Molina et al., 2021). Besides, it may affect the competency to interact and provide nursing care to patients. Numerous research has been done on the incidence of smartphone addiction in different parts of the world. However, smartphone addiction prevalence among nurses may vary across industrialized and developing countries, between countries and across regions. For example, Uzunçakmak et al. (2022) conducted a study on the incidence of smartphone addiction at two universities in Turkey's nursing programmes, and showed that 42.4% of nursing students were addicted to their smartphones. The significant risk factors for smartphone addiction is academic success, daily smartphone use duration, owing of smartphone duration and daytime sleepiness. A study by Osorio-Molina et al. (2021) a meta-analysis conducted in Turkey found that 22% of nursing students had smartphone addiction. The main factors for utilizing the smartphone among nursing students is to communicate and they would feel anxious if the battery of the smartphone ran out. In this case nomophobia was measured with different instruments which lead to a variety of percentages from different research instruments that have been utilized. This happens particularly may be due to the gap of habits and how they manage it.

2.4 Sleep Quality

Generally, sleep efficiency, sleep latency, sleep length, and waking after sleep onset are the four main components of sleep quality (Nelson et al., 2021). 53.9% of students at Kermanshah University of Medical Sciences in Iran, according to a study by Saman et al. (2020), experienced inadequate sleep. According to the results of the correlation test, there was a positive and significant correlation between sleep quality and social networks addiction score and cell phone overuse. Whereas a study by Ozcan et al. (2021) conducted in Pamukkale University students reported that 52.4% of students had a PSQI total score higher than five and had poor sleep quality. Both these studies reported a similar percentage, in which more than 50% of respondents in both studies reported having poor sleep quality. Furthermore, a study by Rathakrishnan et al. (2021) conducted in Malaysia discovered that the majority of the respondents had the issues with subjective sleep quality, sleep latency, sleep disruption and daytime dysfunction. The issues of poor sleep quality may also be significantly related to stress levels.

On the other hand, a research by Uzunçakmak et al. (2022) conducted on nursing students at two Turkish institutions found that 57.3% of students had poor sleep quality. It is thought that the poor sleep quality of the students can be related to the daily smartphone usage duration per day. The present study found that the majority of students utilize smartphones for over three hours per day. However, a study by Abdul Rahman et al. (2022) conducted in Brunei reported that contrary to nursing students, hospital nurses were 4.29

times more likely to have poor sleep quality. Although students had significantly good sleep latency, needing less time to fall asleep, students experienced significantly more sleep disturbance, shorter sleep duration and less sleep efficiency. Whereas a study by Paudel et al. (2021) conducted in undergraduate medical students and allied sciences in Nepal discovered that about 42.3% of them had inadequate sleep. Most of the respondents reported either controlled use of the internet or mild problems with internet use. A study by Uzunçakmak et al. (2022) produced results that were slightly lower in this study because of the various research settings and research samples. The difference of result may be due to the gap of self-control and daily routine of a particular area.

2.5 Correlation between Smartphones Addiction and Sleep Quality

Various variables that may influence the sleep quality of a person and smartphone usage may be one of those variables that may negatively affect the sleep quality. Nowadays, due to their functionality and portability, smartphones have become a necessity in modern life. A study by Ozcan et al. (2021) on undergraduates at Pamukkale University found that smartphone addiction was one of the risk factors for poor sleep quality. Daily smartphone usage hours of students with poor sleep quality were also significantly higher than others. As students, they are prone to spend on smartphones for a learning purpose and entertainment to release the stress. Spending excessive amounts of money on a smartphone, however, might have detrimental effects, such as poor academic performance and lackluster attention brought on by bad sleep. For example, a study by Rathakrishnan et

al. in 2021 suggested that university students' sleep quality as well as academic performance are both impacted by smartphone addiction. The contributing factors may be caused by blue light from smartphones that affect sleep quality. When the body is exposed to blue light during night time, it causes changes in the body's biological clock and inhibits the production of melatonin by the brain, which acts to help humans fall asleep.

Whereas a study by Lane et al. (2021) reported that excessive use of smartphones has adverse effects on sleep quality, sleep latency and daytime dysfunction. The poor sleep quality was reported more in the SPA group than in the non-SPA group. The possible associated factors of their sleep quality were the withdrawal component of Smartphone Addiction Inventory (SPAI) and the domain of anticipator worry which represent similar behavioral impacts of withdrawal symptoms on the quality of their sleep. Based on these three studies, smartphone addiction may be one of the contributing elements that affects the quality of sleep, particularly among university students.

On the other hand, a recent study focuses on poor sleep hygiene and smartphone addiction as risk factors for drowsiness during the day. As a nursing student, daytime sleepiness may impair the ability to concentrate on learning activity and ability for critical judgment that are crucial components to be a good nurse in future. According to Uzunçakmak et al. (2022), more than half of nursing students reported having restless nights, and this could be attributed to how much time they spent each day using their smartphones. Sleep is an essential component of basic human need which is required for

humans to have enough and proper sleep in order to function properly to do their daily activities. Additionally, a few research revealed that due to a lack of social activities, countryside nursing students are more prone to have poor sleep quality which makes them more likely to spend money on smartphones.

Whereas a study by Paudel et al. (2021) discovered a substantial link between internet and smartphone addiction and poor sleep quality and depression. Furthermore, a study by Saman et al. (2020) reported that there was a statistically significant relationship between students' quality of sleep and their use of social media and smartphones. Saman et al. (2020) concluded that respondents who had smartphone addiction had poorer sleep quality. The utilization of smartphones directly replaces sleep and leads to reduction of sleep time, the cognitive, physiological and emotional consciousness may increase while using smartphones and stimulus from smartphone screen can stimulate retina and send signals to hypothalamus which lead to interruption the production of melatonin. They reported a similar conclusion in their research that smartphone addiction has a statistically significant association with sleep quality compared to these three studies.

2.6 Summary

In conclusion, a significant research gap exists regarding the prevalence of smartphone addiction, sleep quality and relationship between smartphone addiction and sleep quality among undergraduate nursing students in Malaysia. While numerous studies

have been conducted locally and internationally on various populations, such as high school adolescents, university students and health workers, limited research has specifically focused on prevalence of smartphone addiction, sleep quality and relationship between smartphone addiction and sleep quality among undergraduate nursing students, particularly at UNIMAS. Therefore, it is crucial to undertake this study to assess the prevalence of smartphone addiction, sleep quality and relationship between smartphone addiction and sleep quality among undergraduate nursing students, with a specific focus on UNIMAS. Subsequent measures can then be implemented to address the severity of smartphone addiction and acquire sleep quality, then promote the optimal management to ensure the individuals with this problem no longer suffer from compromised psychological and physiological well-being due to this smartphone addiction.

CHAPTER 3: METHODOLOGY

3.0 Introduction

To accomplish the research objective, the methodology is discussed and divided into a few subheadings in this chapter. This includes research design, research setting, inclusion and exclusion criteria, sampling method and sample size, study instrument, ethical consideration, data collection procedure and lastly data analysis method.

3.1 Research Design

Quantitative method was applied in this research study. Quantitative research is gathering and interpreting numerical data (Bhandari, 2020). The method was chosen because it is more scientific and objective. According to Bhandari in 2020, it can be used to find trends and averages, formulate hypotheses, determine causality, and extrapolate findings to bigger populations. A descriptive cross-sectional research design was used for this research among nursing students at University Malaysia Sarawak. Descriptive cross-sectional research design is using the scientific approach that includes analyzing and evaluating a subject's activity without making any modifications to it (Simkus, 2021). A descriptive research design is the best way to assess the prevalence of smartphone addiction

and sleep quality and correlation between smartphone addiction and sleep quality experienced by UNIMAS undergraduate nursing students.

3.2 Research Setting

The research was conducted at the Faculty of Medicine and Health Sciences at University Malaysia Sarawak (UNIMAS). UNIMAS is located in Sarawak, Malaysia, in Kota Samarahan. It is approximately 25 kilometers from Sarawak's capital, Kuching. Medical and nursing students are enrolled in the Faculty of Medicine and Health Science. The study's target population was UNIMAS nursing students in year 1 to year 4. The whole student population at UNIMAS enrolled in the Bachelor of Nursing degree programme is 236.

3.3 Inclusion and Exclusion Criteria

3.3.1 Inclusion Criteria

UNIMAS nursing undergraduate students were the inclusion criterion for this study which ranged from year 1 to year 4. In addition, the students were selected for the study's respondents based on their willingness to participate.

3.3.2 Exclusion Criteria

The exclusion criteria for this study were undergraduate medical students and postgraduate nursing students. Undergraduate nursing students who participated in the pilot study were exempted from this study.

3.4 Sampling Method and Sampling Size

The study's population sample includes nursing undergraduate students in UNIMAS. This study used simple random sampling to select the respondents. A simple random sampling method will represent the complete data set by selecting a small, arbitrary sample of the overall population. Every respondent has an equal likelihood of being selected (Hayes,2022). The respondent can then be chosen using a method such as random drawings. The list of the students from year 1 until year 4 was collected from the Faculty of Medicine and Health Sciences. There are 236 students in all, encompassing year 1 until year 4. The Krejcie and Morgan formula was used to calculate the sample size (Krejcie & Morgan,1970).

Calculation of the Krejcie & Morgan formula:

$$s = \frac{X^2 NP (1 - P)}{d^2 (N - 1) + X^2 P (1 - P)}$$

Where,

s = sample size.

X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841)

N= the population size

P= the population proportion (assumed to be 0.50 since this would provide the maximum sample size

d= the degree of accuracy expressed as a proportion (0.05)

The calculation for sample size in this study is as the following: -

$$s = \frac{(1.96)^2 (236) (0.50) (1 - 0.50)}{(0.05)^2 (236 - 1) + (1.96)^2 (0.50) (1 - 0.50)}$$

= 146 samples

Plus 15 (additional 10% in case of missing respondents) = **161 samples**

The sample size calculated for this study is 146 samples. For the compensation of the respondents that the researcher is unable to approach or contact, the majority of

researchers commonly add 10% to the sample size (Duntoye, 2015). As a result, the overall sample size for this study will be 161 individuals after adding 10% of the predicted sample size which is an extra 15 respondents. Randomizer.org's random number generator software generated 161 random numbers ranging from 1 to 235. This study involved students who get the number randomly chosen using the random number generator software based on the number in the list name.

3.5 Study Instrument

A structured questionnaire was used in the study. The instruments were categorized into three parts which include section 1: socio-demographic data, section 2: prevalence of smartphone addiction, and section 3: sleep quality.

In section 1, it focused on the socio-demographics information of the respondents, such as age, gender and year of study. This section consists of either filling the blanks or multiple-choice questions. Whereas, in section 2 the prevalence of smartphone addiction experienced by respondents was measured. The questionnaire named as Smartphone Addiction Inventory scale (SPAI) was adopted from Lin et al. (2014) which consists of 26 items. The 26 items are separated into four domains which includes compulsive behavior, functional impairment, withdrawal and tolerance to the smartphone where this scale was aiming to determine the severity of smartphone addiction. Students were provided with the definition of each item. This questionnaire was measured by using a 4-point Likert scale,

1-strongly disagree, 2-somewhat disagree, 3-somewhat agree, 4-strongly agree. Each point was represented as the frequency of the prevalence of smartphone addiction that UNIMAS nursing students have experienced. Next, each item will be totaled up to get the final score. Higher scores indicate a higher risk of smartphone addiction and the total score of the Smartphone Addiction Inventory can vary between 26 and 104.

Furthermore, the sleep quality experienced by UNIMAS undergraduate nursing students was measured in section 3. The questionnaire named as Sleep Quality Scale (SQS) was adopted from Yi (2006). This questionnaire contained 28 items which include restoration after sleep, daytime symptoms, problems beginning and maintaining sleep, sleep satisfaction and difficulty waking. This questionnaire was measured by using a 4-point Likert scale which is 0-few, 1-sometimes, 2-often, 3-almost always. The total score of these components range from 0 to 84, with higher scores indicating lesser serious sleep problems. Furthermore, two domains which are restoration after sleep and satisfaction with sleep were analyzed as reversed scores before being tallied.

3.6 Ethical Consideration

Ethical approval for conducting the study was obtained from the Research and Ethics Committee of Faculty of Medicine and Health Science, University Malaysia Sarawak. Each questionnaire was included with a consent form and should be signed by respondents by clicking the agree box provided before they participate in this study. The

respondents were required to fill the consent form before proceeding to another section. In the Google form, respondents were also brought to the attention that they could withdraw the study at any time without incurring any consequences or penalty before gaining the respondents' consent. To protect the respondents' privacy and confidentiality, the researchers assured all data and respondent information were kept securely. Confidentiality of the respondents' data also were mentioned in the Google form before gaining the respondents' consent.

3.7 Data Collection Procedure

3.7.1 Pilot Study

Prior to gathering actual data, a pilot research was carried out. According to Leon, Davis, and Kraemer (2011), a pilot study's purpose is to identify if the instrument that will be utilized in a large-scale study is feasible. Johanson and Brooks (2010) has mentioned that the recommended sample size of pilot study is a sample size of 10 to 15 respondents. Therefore, the pilot study was conducted with 10 respondents from consecutive years: year 1, year 2, year 3 and year 4. The actual study did not include the respondents that were chosen for the pilot study. The collected data from the pilot study was entered and analyzed using the Statistical Package for Social Science (SPSS version 26) to check for the reliability of the instrument. The data was analyzed using Cronbach's alpha which functions to measure the consistency and the reliability of the instrument (Glen, 2021). Glen (2021) also mentioned that the reliability coefficient of Cronbach's Alpha must achieve 0.7 and above. Cronbach's Alpha values of 0.7 and above indicate an acceptable

value for internal consistency (Taber, 2017). The Cronbach's Alpha recorded according to previous study, for Smartphone Addiction Inventory (SPAI) is ranged from 0.80 to 0.91. (Lin et al., 2014). Meanwhile Cronbach's alpha for Sleep Quality Scale (SQS) showed as 0.81 (Yi et al., 2006). In this study, the Cronbach Alpha for this study was 0.919 for the Smartphone Addiction Inventory (SPAI). Meanwhile the Cronbach Alpha for Sleep Quality Scale (SQS) was 0.847 before performing the reverse score. Hence after carried out a reverse score for domains 2 and 5 which consist of restoration after sleep and sleep satisfaction, the Cronbach Alpha was 0.882. Thus, the values for all domains were acceptable values for internal consistency.

3.7.2 Actual Study

Once the ethical approval for conducting the study from the Research and Ethics Committee of Faculty and Medicine and Health Science, University Malaysia Sarawak have been approved, the data collection was immediately commenced. Data collection occurred approximately around early- March till mid- April. A set of questionnaires used for data collection were distributed online. The questionnaire was created using Google form and was distributed via WhatsApp platform. respondents were enlightened about the study's objective to obtain their cooperation via WhatsApp platform and a link to the questionnaire was attached together with the information.

The link and the purpose of study were distributed to UNIMAS undergraduate nursing students who are in the inclusion criteria via their class representative of each consecutive year. The respondent's consent was obtained by clicking the agree box before answering the questionnaire. During data collection the respondent entered their matric number to prevent redundancy. They were required to answer all questions before clicking the submit button for submission. The estimated time to answer all questions was approximately about 7 to 10 minutes. The researcher expressed a word of gratitude to the respondents for their time and participation in this study after submission was done.

The researcher counted the number of respondents who have already answered the question to determine the quantity of respondents necessary to generate the specified sample size. The researcher personally contacted them and asked for their help to answer the questionnaire after the researcher received a low response from the respondents. However, respondents were excluded in this study after respondents refused to answer the questionnaire.

3.8 Data Analysis Method

The data was entered and analyzed in IBM SPSS Statistics 26. Descriptive statistics used to show the prevalence of smartphone addiction and sleep quality, and the correlation between smartphone addiction and sleep quality experience by UNIMAS nursing students. Frequency was used to summarize the finding in section I as most of the variables are

categorical data. Whereas mean, median, and standard deviation used to summarize the finding in sections II and III as both variables are continuous data. The correlation between smartphone addiction and sleep quality tested using inferential statistics. A normality's assumption that consists of Skewness and Kurtosis will be conducted to observe the distribution of the data. To identify the association between smartphone addiction and sleep quality among UNIMAS nursing students, a non-parametric Spearman rank-order correlation coefficient will be utilized as the data was not normally distributed with the *p*-value for Sleep Quality Scale was $p<0.05$.

3.9 Summary

The methodologies used to assess the prevalence of smartphone addiction, sleep quality and relationship between smartphone addiction and sleep quality among undergraduate nursing students in UNIMAS were described in detail in this chapter. A quantitative cross-sectional study was chosen for the research design. The research was conducted at the Faculty of Medicine and Health Sciences, UNIMAS. A total of 161 undergraduate nursing students from UNIMAS participated in the study. A self-administered questionnaire was distributed to the respondents via WhatsApp. The data obtained were analyzed using the IBM SPSS software version 26.0. Descriptive and inferential statistics were used, including Spearman Correlation Coefficient to identify the relationship between smartphone addiction and sleep quality.

CHAPTER 4: RESULT

4.0 Introduction

Chapter 4 presents the result of the data. This chapter consists of five sections. This chapter describes the normality test between smartphone addiction inventory and sleep quality scales, socio demographic characteristics of the respondents, the prevalence of smartphone addiction among UNIMAS undergraduate nursing students, the sleep quality among UNIMAS undergraduate nursing students, relationship between smartphone addiction and sleep quality among UNIMAS undergraduate nursing students and summary of this chapter. The data collected was analyzed by using SPSS version 26. The data is reported by using the frequency, mean, percentage and standard deviation.

4.1 Normality test

A normality test was conducted before choosing the statistical test for inferential statistics. This test is used to determine whether the data collected is normally distributed and represents the study population or not. A parametric test is used if the data is normally distributed, while a non-parametric test is used for non-normal distribution.

Table 4.1:

Normality Test for Total Smartphone Addiction Inventory and Total Sleep Quality Scale.

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Total Score SPAI	.045	161	.200	.996	161	.963
Total Score SQS	.075	161	.0025	.989	161	.250

Table 4.1 shows the insignificant value of Kolgomorov-Smirnov for the total score of smartphone addiction inventory. The insignificant value for total score for smartphone addiction inventory was .200, with the value of Skewness .032 and Kurtosis -.142. On the other hand, the significant value for the total score of sleep quality scale was .025 with a skewness value of .200, and Kurtosis was -.133. The insignificant value for total score of SPAI was $p > .05$, while the significant value for total score of SQS was $p < .05$. Based on Figure 4.1 was normally distributed, while Figure 4.2 was not normally distributed, and a non-parametric test was used.

Figure 4.1:

Skewness of the total score of smartphone addiction inventory.

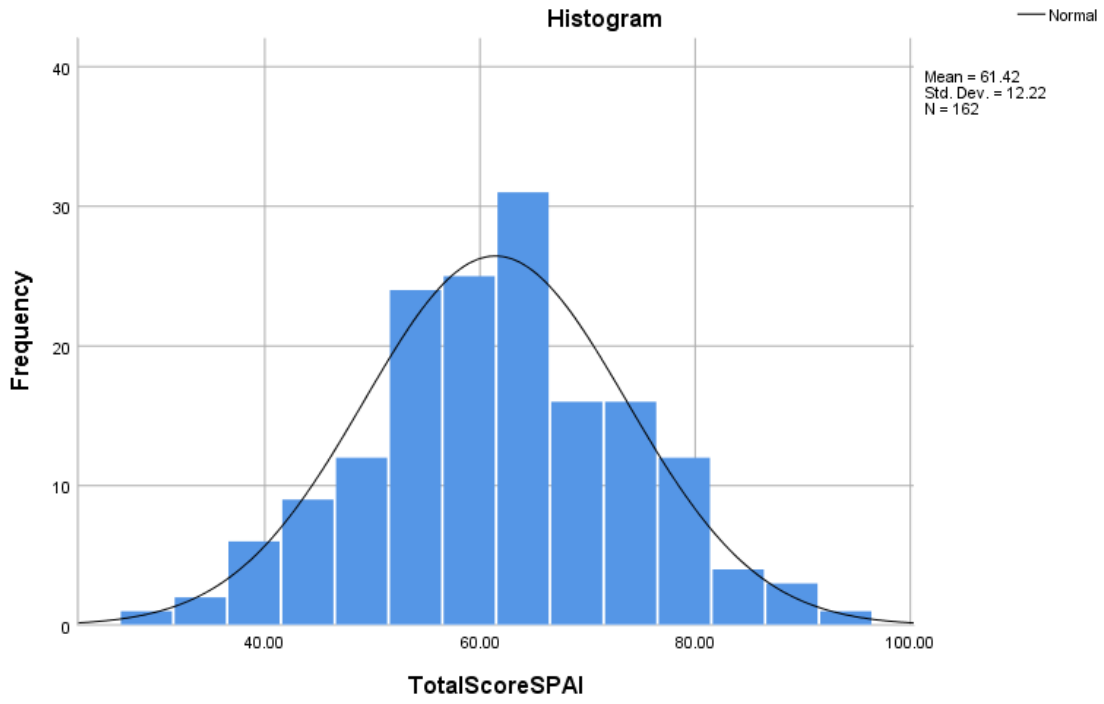
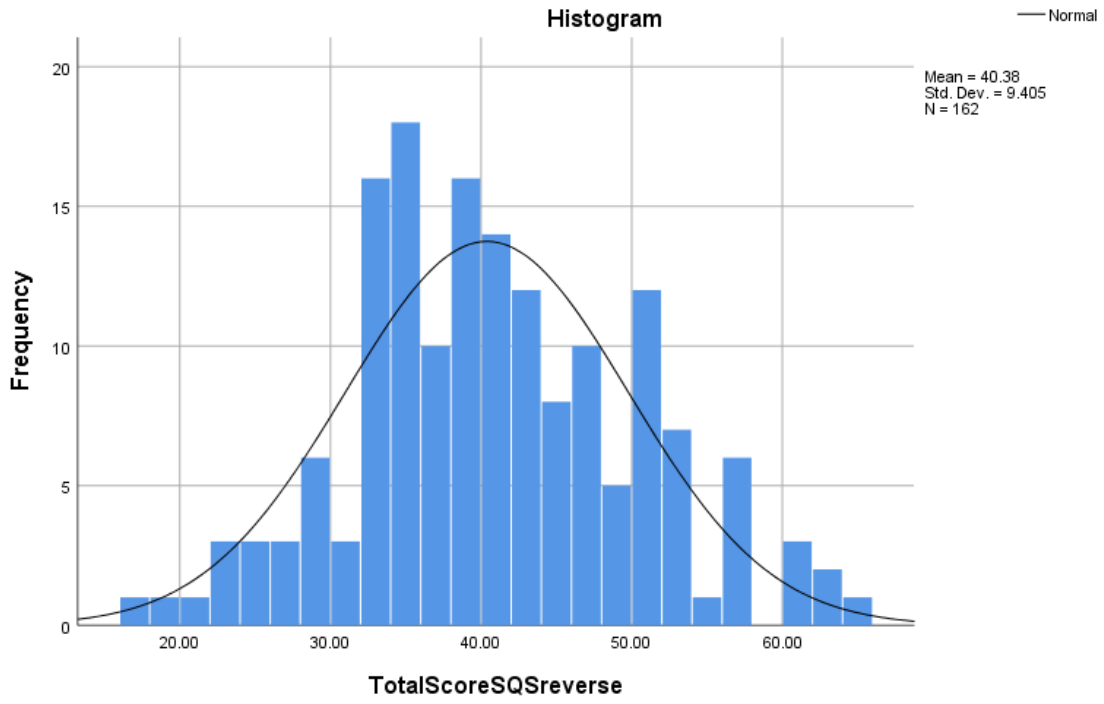


Figure 4.2:

Skewness of the total score of sleep quality scale.



4.2 Sociodemographic characteristics of the respondents

Table 4.2:

Sociodemographic profile of the respondents (n=161).

Variables	**n (%)**	***M (SD)***
Age (Years)		21.59 (1.249)
≤20	36 (22.4)	
21-23	116 (72.0)	
24≥	9 (5.6)	
Gender		1.86 (0.344)
Male	22 (13.6)	

Female	139 (86.4)	
Ethnicity		3.35 (2.122)
Malay	60 (37.0)	
Chinese	14 (8.6)	
Indian	1 (0.6)	
Iban	31 (19.1)	
Variables	**n (%)**	***M (SD)***
Bidayuh	8 (5.6)	
Others	47 (29.0)	
Year Of Study		2.38 (1.110)
Year 1	46 (28.4)	
Year 2	42 (25.9)	
Year 3	39 (24.7)	
Year 4	34 (21.0)	
Do You Have Smartphone		1.99 (0.079)
No	1 (0.6))	
Yes	160 (99.4)	
How Many Hours do you sleep in a day		6.09 (1.122)
≤5	48 (29.8)	
6-8	110 (68.3)	
9≥	3 (1.9)	
How many hours do you spend on your smartphone		8.30 (4.259)
≤5	40 (24.8)	
6-8	65 (40.4)	
9≥	56 (34.8)	

The result in Table 4.2 indicates Year 1, Year 2, Year 3 and Year 4. Year 1 was the highest number of respondents with a total of 46 (28.4%), followed by Year 2 (n=42, 25.9%), Year 3 (n=39, 24.7%) and Year 4 (n=34, 21.0%). There were six groups of ethnicities out of 161 respondents. The highest was Malay with a total of 60 (37.0%), the second highest was Others with total respondents of 47 (29.0%) and the third highest was Iban with a total of 31 (19.1%) and next highest was Chinese with a total 14 (8.6%) followed by Bidayuh and Indian with a total of 9 (9.2%) respondents.

A total of 161 nursing students from 236 respondents who were contacted to answer the questionnaire had participated in this study. Out of 161 respondents, the youngest respondents were 19 years old, and the oldest respondent was 25 years old with only 3 respondents aged 19 (1.9%) while only one respondent were aged 25 (0.6%). Another 34 respondents were aged 20 (21.0%), 42 respondents aged 21 (25.9%), 40 respondents aged 22 (25.3%), 33 respondents aged 23 (20.4%), and 8 respondents aged 24 (4.9%). The respondents in this study were majority young adults with an age range between 19 to 25 years old (M=21.59, SD= $\pm$1.25). Among 161 respondents, 139 (86.4%) were female, and 22 (13.6%) were male students (Table 4.2).

Table 4.2 shows that 160 (99.4%) of the respondents had smartphones, while 1 (0.6%) had no smartphone. The highest number of duration respondents spent on

smartphones was 6 hours with a total respondent of 33 (20.4%), while the 2 hours and 11 hours share the lowest hours of respondents spend on their phone with a total of 1 (0.6%) respondent each.

Table 4.2 also shows how many hours respondents sleep in a day. The highest number of respondents was 6 hours in a day with a total of 61 (37.7%) respondents. Meanwhile the 3 hours, 9 hours, 10 hours and 11 hours were shared the lowest hours respondents sleep per day with a total 1 (0.6%) each.

4.3 Prevalence of Smartphone Addiction among UNIMAS undergraduate nursing students.

Table 4.3.1:

The prevalence of smartphone addiction of the respondents (n = 161).

Variables	**n (%)**	**M (SD)**	**Median**
Total Score SPAI		61.42 (12.22)	62.00
≤62	5 (3.1)		
63≥	156 (96.9)		

Table 4.3.2:

The domains of smartphone addiction experienced by respondents (n =161).

Variables	**M (SD)**	**Median**
Total Score SPAI	61.42 (12.22)	62.00
Compulsive Behaviour	20.98 (4.66)	21.00
Functional Impairment	18.37 (4.36)	19.00
Withdrawal	14.48 (3.41)	14.00
Tolerance	7.59 (1.64)	8.00

Table 4.3.1 shows the frequency, percentage, median and mean of smartphone addiction experienced by UNIMAS undergraduate nursing students (N=161) which the median of the study was 62.00 for total score of smartphone addiction, while the mean was 61.42 (*SD*= ±12.22). The higher the total score more than median indicates the higher the risk of smartphone addiction. 52.2% (n=84) of UNIMAS undergraduate nursing students were considered at low risk of smartphone addiction. Meanwhile, 47.8% (n=77) of UNIMAS undergraduate nursing students were considered at high risk of smartphone addiction.

Table 4.3.2 shows the mean, standard deviation and median of 4 domains of smartphone addiction experienced by UNIMAS undergraduate nursing students: compulsive behavior, functional impairment, withdrawal and tolerance to the smartphone. Each domain was calculated by using 4-points Likert scale where 1=strongly disagree, 2-somewhat disagree, 3-somewhat agree, 4-strongly agree. All domains reported a presence of smartphone addiction experienced by UNIMAS undergraduates nursing students. The most highest domain was compulsive behavior (*M*=20.98, *SD*=±4.66) that consists of 9 items, followed by functional impairment (*M*=18.37, *SD*=±4.36) that consists of 8 items and withdrawal (*M*=14.48, *SD*=±3.41) that consists of 6 items. The lowest domain was tolerance (*M*=7.59, *SD*=±1.64) which consists of 3 items.

Table 4.3.3:

The items of smartphone addiction experienced by respondents (n =161).

Smartphone Addiction Scale	Strongly disagree n (%)	Somewhat disagree n (%)	Somewhat agree n (%)	Strongly agree n (%)	Mean (SD)
1.I was told more than once that I spent too much time on smartphone.	17 (10.5)	56 (34.6)	82 (50.6)	7 (4.3)	2.49 (.741)
2.I feel uneasy once I stop smartphone for a certain period of time.	31 (19.1)	74 (45.7)	48 (29.6)	9 (5.6)	2.22 (.817)
3.I find that I have been hooking on smartphone longer and longer.	5 (3.1)	53 (32.7)	76 (46.9)	28 (17.3)	2.78 (.762)
4.I feel restless and irritable when the smartphone is unavailable.	26 (16.0)	74 (45.7)	49 (30.2)	13 (8.0)	2.30 (.835)
5.I feel very vigorous upon smartphone use regardless of the fatigues experienced.	24 (14.8)	78 (48.1)	52 (32.1)	8 (4.9)	2.27 (.772)
6.I use smartphone for a longer period of time and spend more money that I had intended.	27 (16.7)	82 (50.6)	41 (25.3)	12 (7.4)	2.23 (.816)
7.Although using smartphone has brought negative effects on my interpersonal relationships, the amount of time spent on internet remains unreduced.	20 (12.3)	69 (42.6)	58 (35.8)	15 (9.3)	2.42 (.825)
8.I have slept less than four hours due to using smartphone more than once.	40 (24.7)	64 (39.5)	41 (25.3)	17 (10.5)	2.22 (.937)

Smartphone Addiction Scale	Strongly disagree n (%)	Somewhat disagree n (%)	Somewhat agree n (%)	Strongly agree n (%)	Mean (SD)
9.I have increased substantial amount of time using smartphone per week in recent 3 months.	18 (11.1)	82 (50.6)	55 (34.0)	7 (4.3)	2.31 (.726)
10.I feel distressed or down once I cease using smartphone for a certain period of time.	30 (18.5)	89 (54.9)	39 (24.1)	4 (2.5)	2.10 (.719)
11.I fail to control impulse to use smartphone.	30 (18.5)	72 (44.4)	47 (29.0)	13 (8.0)	2.27 (.855)
12.I find myself indulged on the smartphone at the cost of hanging out with friends.	29 (17.9)	89 (54.9)	38 (23.5)	6 (3.7)	2.13 (.740)
13.I feel aches and soreness in the back or eye discomforts due to excessive smartphone use.	23 (14.2)	52 (32.1)	71 (43.8)	16 (9.9)	2.49 (.858)
14.The idea of using smartphone comes as the first thought on mind when waking up each morning.	13 (8.0)	37 (22.8)	79 (48.8)	33 (20.4)	2.81 (.850)
15.To use smartphone has exercised certain negative effects on my schoolwork or job performance.	25 (15.4)	68 (42.0)	60 (37.0)	9 (5.6)	2.33 (.802)
16.I feel missing something after stopping smartphone for a certain period of time.	19 (11.7)	70 (43.2)	60 (37.0)	13 (8.0)	2.41 (.801)
17.My interaction with family members is decreased on account of smartphone use.	36 (22.2)	73 (45.1)	40 (24.7)	13 (8.0)	2.19 (.872)

Smartphone Addiction Scale	Strongly disagree n (%)	Somewhat disagree n (%)	Somewhat agree n (%)	Strongly agree n (%)	Mean (SD)
18.My recreational activities are reduced due to smartphone use.	17 (10.5)	68 (42.0)	65 (40.1)	12 (7.4)	2.44 (.780)
19.I feel the urge to use my smartphone again right after I stopped using it.	12 (7.4)	59 (36.4)	72 (44.4)	19 (11.7)	2.60 (.791)
20.My life would be joyless hadn't there been smartphone.	23 (14.2)	52 (36.4)	64 (39.5)	23 (14.2)	2.54 (.906)
21.Surfing the smartphone has exercised negative effects on my physical health. For example, viewing smartphone when crossing the street, fumbling with one' smartphone while driving or waiting, and resulted in danger.	27 (16.7)	69 (42.6)	49 (30.2)	17 (10.5)	2.35 (.880)
22. I try to spend less time on smartphone, but the efforts were in vain.	15 (9.3)	83 (51.2)	55 (34.0)	9 (5.6)	2.36 (.728)
23. I make it a habit to use smartphone and the sleep quality and total sleep time decreased.	21 (13.0)	62 (38.3)	60 (37.0)	19 (11.7)	2.48 (.865)
24. I need to spend an increasing amount of time on smartphone to achieve same satisfaction as before.	25 (15.4)	92 (56.8)	33 (20.4)	12 (7.4)	2.20 (.787)
25. I cannot have a meal without smartphone use	43 (26.5)	67 (41.4)	40 (24.7)	12 (7.4)	2.13 (.893)

Smartphone Addiction Scale	Strongly disagree n (%)	Somewhat disagree n (%)	Somewhat agree n (%)	Strongly agree n (%)	Mean (SD)
26. I feel tired on daytime due to late-night use of smartphone.	29 (17.9)	57 (35.2)	67 (41.4)	9 (5.6)	2.35 (.836)

Table 4.3.3 shows the mean and standard deviations of each item under smartphone addiction experienced by UNIMAS undergraduate nursing students. The most highest item was item number 14 which is "The idea of using smartphone comes as the first thought on mind when waking up each morning" (*M*=2.81, *SD*=±.805) and followed by item number 3 which is "I find that I have been hooking on smartphone longer and longer" (*M*=2.78, *SD*=±.762). Meanwhile the lowest item was item number 10 which is "I feel distressed or down once I cease using smartphone for a certain period of time" (*M*=2.10, *SD*=±.719).

4.4 Sleep quality among UNIMAS undergraduate nursing students.

Table 4.4.1:

The sleep quality of the respondents (n = 161).

Variables	n (%)	M (SD)	Median
Total Score SQS		40.38 (9.40)	39.50
≤39.50	81 (50.3)		
39.60≥	80 (49.7)		

Table 4.4.2:

The domains of sleep quality experienced by respondents (n =161).

Variables	M (SD)	Median
Total Score SQS	40.38 (9.41)	39.50
Restoration after Sleep	6.02 (2.36)	6.00
Sleep Satisfaction	4.54 (2.12)	5.00
Daytime symptoms	18.91 (7.93)	18.00
Problem maintain sleep	2.23 (1.33)	2.00
Problem beginning sleep	3.70 (2.11)	4.00
Difficult Waking Up	4.99 (1.79)	5.00

Table 4.4.1 shows the frequency, percentage, median and mean of sleep quality experienced by UNIMAS undergraduate nursing students (N=161) which the median of the study was 39.50 for total score of sleep quality scale, while the mean was 40.38 (*SD*= ±9.40). The higher the total score more than the median indicates the lesser risk of serious sleep problems. 50.3% (n=81) of UNIMAS undergraduate nursing students were considered at high risk of serious sleep problems. Meanwhile, 49.7% (n=80) of UNIMAS undergraduate nursing students were considered at low risk of serious sleep problems.

Table 4.4.2 shows the mean, standard deviation and median of 6 domains of sleep quality experienced by UNIMAS undergraduate nursing students: restoration after sleep, sleep satisfaction, daytime symptoms, problem maintaining and beginning sleep and difficulty waking up. Each domain was calculated by using 4-points Likert scale where 1=strongly disagree, 2-somewhat disagree, 3-somewhat agree, 4-strongly agree. All domains reported a presence of sleep quality experienced by UNIMAS undergraduates nursing students. The most highest domain was daytime symptoms (*M*=18.91, *SD*=±7.93) that consists of 12 items, followed by restoration after sleep (*M*=6.02, *SD*=±2.36) that consists of 4 items and difficulty waking up (*M*=4.99, *SD*=±1.79) that consists of 3 items. The lowest domain was problem maintaining sleep (*M*=2.23, *SD*=±1.33) which consists of 2 items.

Table 4.4.3:

The items of sleep quality experienced by respondents (n =161).

Sleep Quality Scale	**Rarely n (%)**	**Sometimes n (%)**	**Often n (%)**	**Almost always n (%)**	**Mean (SD)**
1.I have difficulty falling asleep	49 (30.2)	85 (52.5)	26 (16.0)	2 (1.2)	.88 (.708)
2.I fall into a deep sleep.	7 (4.3)	48 (29.6)	69 (42.6)	38 (23.5)	1.85 (.828)
3.I wake up while sleeping.	59 (36.4)	75 (46.3)	24 (14.8)	4 (2.5)	.83 (.766)

Sleep Quality Scale	Rarely n (%)	Sometimes n (%)	Often n (%)	Almost always n (%)	Mean (SD)
4.I have difficulty getting back to sleep once I wake up in middle of the night.	65 (40.1)	68 (42.0)	22 (13.6)	7 (4.3)	.82 (.826)
5.I wake up easily because of noise.	34 (21.0)	56 (34.6)	46 (28.4)	26 (16.0)	1.40 (.993)
6.I toss and turn.	22 (13.6)	76 (46.9)	48 (29.6)	16 (9.9)	1.36 (.839)
7.I never go back to sleep after awakening during sleep.	77 (47.5)	69 (42.6)	14 (8.6)	2 (1.2)	.64 (.694)
8.I feel refreshed after sleep.	27 (16.7)	63 (38.9)	60 (37.0)	12 (7.4)	1.35 (.845)
9.I feel unlikely to sleep after sleep.	9 (5.6)	36 (22.2)	77 (47.5)	40 (24.7)	1.91 (.830)
10.Poor sleep gives me headaches.	11 (6.8)	45 (27.8)	52 (32.1)	54 (33.3)	1.92 (.939)
11.Poor sleep makes me irritated.	13 (8.0)	42 (25.9)	55 (34.0)	52 (32.1)	1.90 (.947)
12.I would like to sleep more after waking up.	12 (7.4)	55 (34.0)	57 (35.2)	38 (23.5)	1.75 (.901)
13.My sleep hours are enough.	16 (9.9)	46 (28.4)	77 (47.5)	23 (14.2)	1.66 (.843)
14.Poor sleep makes me lose my appetite.	63 (38.9)	66 (40.7)	22 (13.6)	11 (6.8)	.88 (.887)

Sleep Quality Scale	Rarely n (%)	Sometimes n (%)	Often n (%)	Almost always n (%)	Mean (SD)
15.Poor sleep makes me hard to think.	16 (9.9)	56 (34.6)	50 (30.9)	40 (24.7)	1.70 (.952)
16.I feel vigorous after sleep.	17 (10.5)	32 (19.8)	86 (53.1)	27 (16.7)	1.76 (.855)
17.Poor sleep makes me lose interest in work or others.	21 (13.0)	58 (35.8)	49 (30.2)	34 (21.0)	1.59 (.962)
18.My fatigue is relieved after sleep.	45 (27.8)	69 (42.6)	43 (26.5)	5 (3.1)	1.05 (.818)
19.Poor sleep causes me to make mistakes at work.	21 (13.0)	78 (48.1)	40 (24.7)	23 (14.2)	1.40 (.888)
20.I am satisfied with my sleep.	21 (13.0)	56 (34.6)	64 (39.5)	21 (13.0)	1.52 (.879)
21.Poor sleep makes me forget things more easily.	11 (6.8)	70 (43.2)	54 (33.3)	27 (16.7)	1.60 (.845)
22.Poor sleep makes it hard to concentrate at work.	9 (5.6)	55 (34.0)	57 (35.2)	41 (25.3)	1.80 (.884)
23.Sleepiness interferes with my daily life.	14 (8.6)	64 (39.5)	50 (30.9)	34 (21.0)	1.64 (.910)
24.Poor sleep makes me lose desire in all things.	28 (17.3)	72 (44.4)	41 (25.3)	21 (13.0)	1.34 (.913)
25.I have difficulty getting out of bed.	28 (17.3)	68 (42.0)	41 (25.3)	25 (15.4)	1.39 (.947)

Sleep Quality Scale	Rarely n (%)	Sometimes n (%)	Often n (%)	Almost always n (%)	Mean (SD)
26.Poor sleep makes me easily tires at work.	6 (3.7)	63 (38.9)	56 (34.6)	37 (22.8)	1.77 (.845)
27.I have a clear head after sleep.	30 (18.5)	66 (40.7)	53 (32.7)	13 (8.0)	1.30 (.864)
28.Poor sleep makes my life painful.	34 (21.0)	60 (37.0)	44 (27.2)	24(14.8)	1.36 (.976)

Table 4.4.3 shows the mean and standard deviations of each item under sleep quality experienced by UNIMAS undergraduate nursing students. The most highest item was item number 10 which is "Poor sleep gives me headaches" (*M*=1.92 *SD*=±.939) and followed by item number 9 which is "I feel unlikely to sleep after sleep" (*M*=1.91, *SD*=±.830). Meanwhile the lowest item was item number 7 which is "I never go back to sleep after awakening during sleep." (*M*=.64, *SD*=±.694).

4.5 Inferential Statistics

4.5.1 Relationship Smartphone Addiction and Sleep Quality among UNIMAS undergraduate nursing students.

Table 4.5:

Spearman Correlation of Smartphone Addiction and Sleep Quality among UNIMAS undergraduate nursing students.

Spearman Correlation test		Total Score SPAI
Total Score SQS	Correlation Coefficient	.391
	Sig. (2-tailed)	.000
	N	161

In the Spearman Correlation test, there was a relationship between smartphone addiction and sleep quality. There was a significant weak positive correlation between smartphone addiction and sleep quality [r= .391, n=161, p= .000] (Table 4.5).

4.6 Summary

The results analysis used to describe the prevalence of smartphone addiction, sleep quality and relationship between smartphone addiction and sleep quality among undergraduate nursing students in UNIMAS in detail in this chapter. For smartphone addiction, more than half of respondents reported that they have a total score less and equal to 62. Meanwhile, for sleep quality more than half reported that they have a total score less and equal to 39.50. The relationship between smartphone addiction and sleep quality among UNIMAS nursing students were determined using the Spearman Correlation test. Smartphone addiction correlated significantly with sleep quality which consists of weak positive correlation.

CHAPTER 5: DISCUSSION

5.0 Introduction

Chapter 5 provides a discussion of the result of the study. This chapter consists of four sections. Prevalence of smartphone addiction and sleep quality experience among UNIMAS undergraduate nursing students and also relationship between smartphone addiction and sleep quality among UNIMAS undergraduate nursing students are discussed in this chapter. The relationship between smartphone addiction and sleep quality among UNIMAS undergraduate nursing students, implication, limitation of study and summary are covered in this chapter. Whereas the last section of this study in section 5.7 is the conclusion.

5.1 Prevalence of Smartphone Addiction among UNIMAS undergraduate nursing students.

Sma8rtphone is a portable computer device that combines the functions of mobile telephone and computer into one unit. However, smartphones are different from older design feature phones due to advanced hardware capabilities and operating systems which make it easy to access to the internet, multimedia functionality like music, video, cameras and other entertainment. Recently, smartphone developers have found to integrate satellite messaging connectivity and satellite emergency services into devices for use in remote regions where there is no reliable cellular network (Siddiqui, 2023). All of these interesting

features and advanced hardware, lead to increased time spending on smartphones which promote people to get addicted to smartphones. Besides, after the world went through a chaos due to COVID-19, smartphones became more prominent as it connected people around the world even though lock down had been launched.

In this study, 47.8% (n=77) of UNIMAS undergraduate nursing students were considered at high risk of smartphone addiction. Whereas the smartphone addiction mean score was 61.42 ±12.22, which is very close to the cutoff point (62) for high risk of smartphone addiction level. This finding is similar to the study done in two universities located in Turkey (42.4%) were addicted to smartphones (Uzunçakmak et al., 2022). Besides, several studies also found that nearly half of nursing students are addicted to smartphones. These happen due to students using electronic devices especially smartphones for education purposes for example to do assignments, make research, organize the learning documents and much more. This finding is also similar to a study that was conducted in two public universities in the Northeast of Brazil which reported the prevalence of smartphone addiction in nursing students of these two universities was 47.7% (Graças Alves Lobo et al., 2022). Moreover, a study that was conducted in Cairo University reported approximately 95.8% of nursing students had smartphone addiction (Mohamed et al., 2020). These values showed a significant and concerning percentage of students that suffered smartphone addiction in a meantime. This result may be due to various forms of social media that nursing students used for purposes of communication, obtaining information, chatting with friends and family and sharing their status. According to Chen et al. (2019), another study suggested that persons who are experiencing psychological

problems are prone to spend more on their smartphone to get the negative feeling to disappear.

However, a meta-analysis research study reported contrary to this study finding that about 22% of nursing students experienced a prevalence of smartphone addiction and it is considered that almost a quarter of the research population meet the criteria of nomophobia (Osorio-Molina et al., 2021). Nomophobia refers to a mental state when people fear being separated from their smartphone (Bhattacharya et al., 2019). According to Osorio-Molina et al. (2021), the consequence of smartphone addiction may cause reduced communication skills that are really fundamental as nurses to interact with patients and other healthcare providers in order to provide the continuity and great quality of care towards patients. Besides, a study conducted in Universiti Malaysia Sabah also discovered 25% of nursing students were prone to smartphone addiction (Ramodran et al., 2020). Still, these values are concerning due to consequences that smartphones bring to students' lifestyle, mental and physical health and emotion. This results due to the majority of them having high smartphone usage averaging 4.3 hours daily and male student nurses were more highly addicted towards smartphones compared to female students whereas nursing students are usually dominated by female students.

Moreover, this study found that the highest domain was compulsive behavior (M=61.43, SD=12.22). A similar finding from a study by Graças Alves Lobo et al. (2022), reported that domain compulsive behavior (62.4%) was the highest domain in smartphone

addiction. This is because respondents admitted that they willingly use smartphones even when they are tired. Furthermore, a similar finding by Ganganahalli et al. (2014) discovered nearly 90% of respondents felt discomfort and detached after the lack of smartphone use for hours which related to the domain of compulsive behavior. However, a present study discovered a contrary finding that daytime sleepiness was an element of smartphone addiction (Uzunçakmak et al., 2022). This is similar to the functional impairment domain for example cannot stay focused and awake during daytime, unable to maximally function during daylight and much more due to smartphone addiction.

5.2 Sleep Quality among UNIMAS undergraduate nursing students.

Sleep quality is different from sleep satisfaction. Sleep satisfaction refers to a more subjective judgment of how people feel about the sleep they are getting. Meanwhile, sleep quality refers to measurement of how well people are sleeping. However, in this sleep quality also included some domains which are restoration after sleep, daytime symptoms, difficulty waking up, difficulty maintaining and beginning sleep also covered the sleep satisfaction.

In this study, 50.3% (n=81) of UNIMAS undergraduate nursing students were considered at high risk of serious sleep problems. Whereas this study discovered that the sleep quality mean score was 40.38±9.40, which is more than the cutoff point (39.50) for high risk of serious sleep problems. This finding is similar to the study that was done among

nursing students in one of the higher education institutions in Malaysia with 51.4% participants having poor sleep quality (Aung et al., 2016). Based on findings, it revealed that the percentage of poor sleep quality among respondents was higher than the good sleep quality. These happen due to extreme academic stipulation among university or college students especially nursing students whereas they need to focus on assignments and at the same time dedicate their time for clinical practicum in hospital which lead them to have less amount of sleep. Another study finding from Uludag University Faculty of Health Sciences Department of Nursing (56.1%) of the students have PSQI average of 5 and lower which indicates the poor sleep quality (Yilmaz et al., 2017). Besides smartphone addiction, other contributing factors also include smoking habits, total sleep hours, resting status in the morning and average caffeine consumption per day.

However, a study by Schlard et al. (2017) found a contrary finding from this study which is that about 74% of students have symptoms of an insomnia disorder and more than half of them fulfilled all the basic characteristics of insomnia disorder. These values really raise community and world concern. This happens similar with recent studies that university students are more likely and prone to develop sleep disorders compared to the general population. Besides, a study by Samat et al. (2020) that was conducted in one of the educational institutions in Malaysia found that more than half (88.9%) of the sample population have poor sleep quality. And a positive correlation between smartphone addiction and sleep quality, which is the higher score for smartphone addiction associated with lower sleep quality. This indicates that smartphones are one of the strong contributors towards sleep quality. Moreover, a study by Dhamija et al. (2021) found that more than

half of the boys (51%) and girls (53%) of the sample population have poor sleep quality. Dhamija et al. (2021) compared the respondents addicted to smartphones with respondents not addicted to smartphones which discovered that respondents addicted to smartphones had significantly more sleep disturbance due to spending more time on smartphone during daytime and nighttime.

Moreover, this study found that the highest domain was daytime symptoms (*M*=18.91, *SD*=±7.93). Similar findings reported by Gupta et al. (2015), highly significant correlation was found between duration spent on smartphone and difficulty in waking up and daytime symptoms. For example, daytime symptoms are waking up tired, reducing study habits, several times missed classes, etc. However, a contrary finding reported by Uzunçakmak et al. (2022) that most of the respondents from the sample population had normal daytime sleepiness even though more than half of the respondents had poor sleep quality.

5.3 Relationship between smartphone addiction and sleep quality among UNIMAS undergraduate nursing students.

In this globalization era, smartphones have been an essential thing to human life. However, humans did not realize that excessive usage of smartphones directly and indirectly bring significant impacts on humans, especially on mental health, physical, physiological and quality of life. Human body depends on circadian rhythms to know the

period to start sleep and the period to feel awake (Suni et al., 2023). The circadian rhythm is a 24-hour biological cycle that imitates the rise and fall of the sun. These biological cycles react chiefly towards light and darkness to decide the period of sleep. During night, the body usually reacts to the darkness by releasing melatonin which is a hormone that acts as signs for sleep. However, human brains are very sensitive to light, especially blue light that emitted from smartphones and other smart gadgets which may delay melatonin production (Newsom, 2023). Hence, this may cause difficulty to fall asleep and may lead to insomnia and can negatively affect daily life.

The main objective of this study was to investigate the relationship between smartphone addiction and sleep quality among UNIMAS undergraduate nursing students. This study found that there was a significant weak positive correlation between smartphone addiction and sleep quality [r= .391, n=161, p= .000]. This finding is similar to a study conducted in Saudi Arabia which the findings indicate that higher smartphone addiction leads to poorer sleep quality and may affect the health of users negatively (Alzhrani et al., 2023). Demirci et al. (2015), reported that females had higher smartphone addiction scores compared to male students among university students. Furthermore, research in West Bengal described that low smartphone users have a slightly better sleep quality than high smartphone users (Ghosh et al., 2021). There are several contributing factors like depression, anxiety, stress, competition, family and future concern, excessive workload and assignments.

However, smartphone addiction is a strong contributing factor that affects sleep quality. Besides, according to Uzunçakmak et al. (2022), a similar study conducted in two universities of Turkey reported that almost half of nursing students presented smartphone addiction and more than half of them had poor sleep quality. Excessive smartphone usage among nursing students may bring lots of negative impact on physical and psychological. Whereas this causes high probability to affect the learning process and performance in the clinical area. At the same time, it also interferes with communication skills between nurses and patients, and between nurses and other healthcare providers which have a high probability to interrupt the quality of care delivered and the professionalism of nurses. All of these due to excessive use of smartphones lead to poor sleep quality. Thus directly or indirectly affects daily life. Due to this significant concern, lots of research is necessary regarding smartphone addiction and sleep quality among nursing students to disclose the impacts of smartphone addiction on sleep quality and outstanding precautions and ways to prevent this issue from getting worse.

5.4 Summary

The discussion used to describe in detail the prevalence of smartphone addiction, sleep quality and relationship between smartphone addiction and sleep quality among UNIMAS undergraduate nursing students. that almost half of nursing students were considered at high risk of smartphone addiction in this chapter. Whereas more than half of this nursing students population had a high risk of serious sleep problems or poor sleep

quality. These findings suggest that smartphone addiction has a negative impact on sleep quality among UNIMAS undergraduate nursing students. The study discovered that there was a significant weak positive correlation between smartphone addiction and sleep quality [r= .391, n=161, p= .000]. This finding is similar to previous and recent studies that intentionally describe the relationship between sleep quality and smartphone addiction. Due to significant smartphone addiction prevalence and poor sleep quality, lots of research and prevention steps are required to reduce these concerning numbers.

5.5 Implications

The findings of this study indicate that higher smartphone addiction leads to poorer sleep quality which may negatively affect the health of the users. A lot of studies reported similar findings. Kumar et al. (2019) discovered that smartphone addiction was associated with poor sleep quality among medical students. These findings of study, intentionally to highlight the significant numbers and concerning issues that are caused by smartphones on sleep quality and provide a disclosure insight of correlation between smartphone addiction and sleep quality. Being a student, especially nursing students, may be putting students under lots of pressure in the learning process, chasing for assignments and assessments, problematic with social relationships. All of these may cause nursing students to neglect the quality of sleep.

Hence, this poor sleep quality will significantly affect the clinical performance, academic results, physical and psychological and focus in the learning session. Besides, this indicates the importance of intervention and prompt action to reduce the smartphone addiction among nursing students to improve the quality of sleep and prevent the worst case of negative impact of smartphone addiction. For example, counseling sessions, workshops and programs to raise awareness and provide preventive measures to avoid smartphone addiction among undergraduates nursing students in Malaysia. In addition, mental health experts and psychiatrists may help to provide the significant sessions like

cognitive behavior therapy which may help the undergraduate nursing students to reduce the smartphone usage and improve the quality of sleep.

5.6 Limitation of the study

There are various limitations in this study. Firstly, data will be collected through a self-administered questionnaire. As a result, determining the respondent's seriousness and honesty is challenging. Second, the respondents will not be able to inquire whether any questions are unclear or confusing. This could cause respondents to give incorrect answers, affecting the study's findings. Finally, because this study will only be done among UNIMAS undergraduates nursing students, the results do not represent all nursing students in Malaysia. Other nursing students of different institutions could have different outcomes.

5.7 Conclusion

Smartphone become one of worrying issues nowadays due to excessive use and dependency on smartphone which lead to smartphone addiction. Smartphone addiction can cause lots of negative impact instead of providing numerous advantages especially on sleep quality of individual. Almost half (47.8%) of the UNIMAS undergraduate nursing students reported high risk of smartphone addiction, the percentage was similar with recent studies. The highest item in Smartphone Addiction Inventory was the item “The idea of using a smartphone comes as the first thought on mind when waking up each morning”. And more than half of the sample population reported having a high risk of serious problems or poor sleep quality. The highest item in the Sleep Quality Scale was the item “Poor sleep gives me headaches”. Furthermore, the findings of this research can be applied to future research

in Malaysia. These findings provide disclosure for preventive measures and actions. This is because the majority of young nurses and nursing students are unaware of the impact of smartphone addiction on sleep quality which may negatively affect physical, psychological and quality of life, particularly among students due to use of smartphone for learning process, seeking for information and entertainment.

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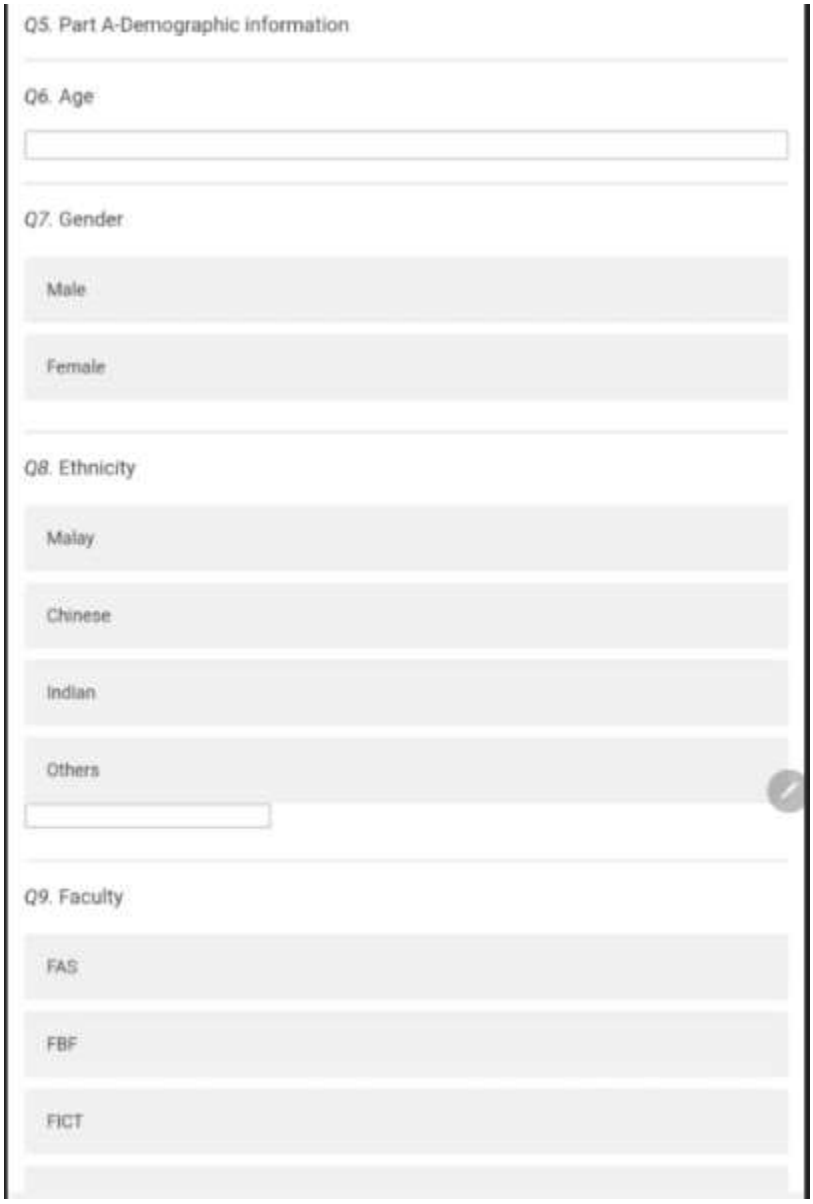
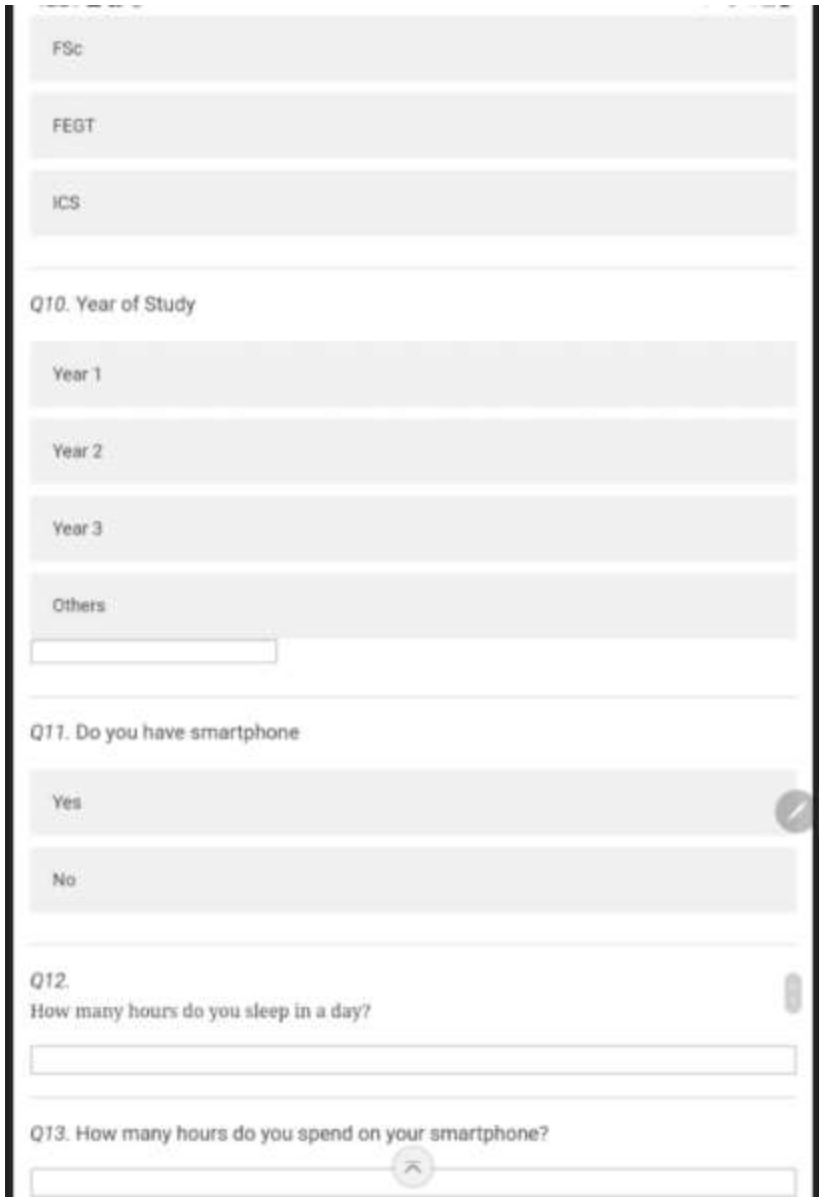
APPENDIX A: Data Collection Instrument

Demographic Information




FSc
FEGT
ICS
Q10. Year of Study
Year 1
Year 2
Year 3
Others
Q11. Do you have smartphone
Yes
No
Q12.
How many hours do you sleep in a day?
Q13. How many hours do you spend on your smartphone?

Smartphone Addiction Inventory (SPAI)

Q14. **Section A: How frequently do you use smartphone?**
Instructions: Please read each statement and choose the number which indicates how much the statement applies to you. There are no right or wrong answers.

1- Strongly Disagree **3 - Somewhat Agree**
2- Somewhat Disagree **4 - Strongly Agree**

1. I was told more than once that I spent too much time on smartphone.

- Strongly Disagree
- Somewhat Disagree
- Somewhat agree
- Strongly agree

2. I feel uneasy once I stop smartphone for a certain period of time.

3. I find that I have been hooking on smartphone longer and longer.

4.I feel restless and irritable when the smartphone is unavailable.

5. I feel very vigorous upon smartphone use regardless of the fatigues experienced.

6. I use smartphone for a longer period of time and spend more money than I had intended.

7. Although using smartphone has brought negative effects on my interpersonal relationships, the amount of time spent on internet remains unreduced.

8. I have slept less than four hours due to using smartphone more than once.

9.I have increased substantial amount of time using smartphone per week in recent 3 months.

10. I feel distressed or down once I cease using smartphone for a certain period of time.

11. I fail to control the impulse to use smartphone.

12. I find myself indulged on the smartphone at the cost of hanging out with friends.

13. I feel aches and soreness in the back or eye discomforts due to excessive smartphone use.

14. The idea of using smartphone comes as the first thought on mind when waking up each morning.

15. To use smartphone has exercised certain negative effects on my schoolwork or job performance.

16.I feel missing something after stopping smartphone for a certain period of time.

17. My interaction with family members is decreased on account of smartphone use.

18. My recreational activities are reduced due to smartphone use.

19. I feel the urge to use my smartphone again right after I stopped using it.

Sleep Quality Scale (SQS)

Q15. **Section B: Sleep Quality Scale**
The survey is to know the quality of sleep you had for the last one month. Read the questions and check the closest answer.

0 Rarely : None - 1-3 times a month
1 Sometimes : 1-2 times a week
2 Often : 3-5 times a week
3 Almost always : 6-7 times a week

1. I have difficulty falling asleep.

- ○ Rarely
- ○ Sometimes
- ○ Often
- ○ Almost always

2. I fall into a deep sleep.
3. I wake up while sleeping.
4. I have difficulty getting back to sleep once I wake up in middle of the night.
5. I wake up easily because of noise.
6. I toss and turn.
7. I never go back to sleep after awakening during sleep.
8. I feel refreshed after sleep.
9. I feel unlikely to sleep after sleep.
10. Poor sleep gives me headaches.

11. Poor sleep makes me irritated.

12. I would like to sleep more after waking up.

13. My sleep hours are enough.

14. Poor sleep makes me lose my appetite.

15. Poor sleep makes me hard to think.

16. I feel vigorous after sleep.

17. Poor sleep makes me lose interest in work or others.

18. My fatigue is relieved after sleep.

19. Poor sleep causes me to make mistakes at work.

20. I am satisfied with my sleep.

21. Poor sleep makes me forget things more easily.

22. Poor sleep makes it hard to concentrate at work.

23. Sleepiness interferes with my daily life.

24. Poor sleep makes me lose desire in all things.

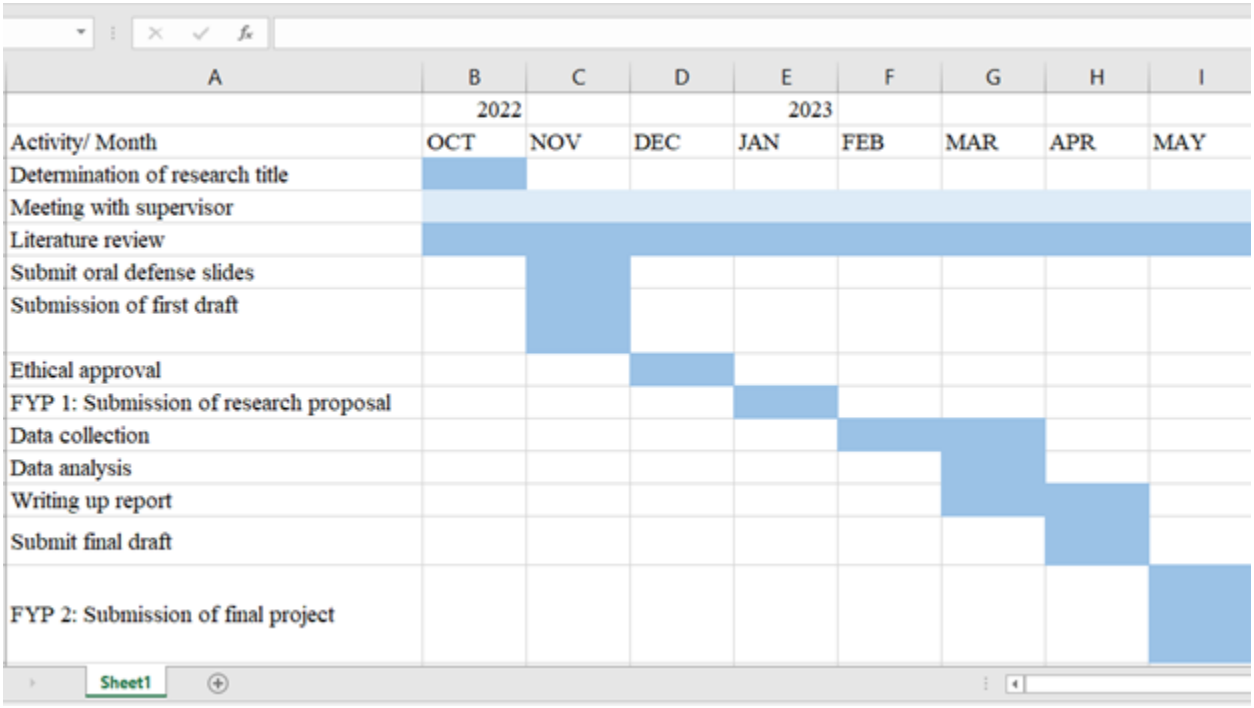
25. I have difficulty getting out of bed.

26. Poor sleep makes me easily tires at work.

27. I have a clear head after sleep.

28. Poor sleep makes my life painful.

APPENDIX B: Gantt Chart



	B	C	D	E	F	G	H	I
	2022			2023				
Activity/ Month	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY
Determination of research title								
Meeting with supervisor								
Literature review								
Submit oral defense slides								
Submission of first draft								
Ethical approval								
FYP 1: Submission of research proposal								
Data collection								
Data analysis								
Writing up report								
Submit final draft								
FYP 2: Submission of final project								

APPENDIX C: Budget Proposal

Items	Price/item	Quantity	Total
Internet data plan	RM 40/month	6 months	RM 240
Printing	0.10/page	200	RM 20
Binding FYP report	10	5	RM50
SPSS	RM 5/item	1	RM 5
Grand Total			RM 315