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A STUDY OF SLEEP QUALITY AND STRESS ON ACADEMIC PERFORMANCE
AMONG UNDERGRADUATE STUDENTS IN MALAYSIA

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A RESEARCH PROJECT

SUBMITTED IN

PARTIAL FULFILMENT OF THE REQUIREMENTS FOR
THE BACHELOR OF SOCIAL SCIENCE (HONS) PSYCHOLOGY

FACULTY OF ARTS AND SOCIAL SCIENCE

UNIVERSITI TUNKU ABDUL RAHMAN

MAR. 2021

SLEEP QUALITY AND STRESS AMONG UNDERGRADUATE STUDENTS

A Study of Sleep Quality and Stress on Academic Performance
Among Undergraduate Students in Malaysia

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This research project is submitted in partial fulfilment of the requirements for the Bachelor of Social Science (Hons) Psychology, Faculty of Arts and Social Science, Universiti Tunku Abdul Rahman. Submitted on March 2021.

SLEEP QUALITY AND STRESS AMONG UNDERGRADUATE STUDENTS

Acknowledgements

A special big thanks to the UTAR Scientific and Ethical Research Committee for approving this research. Not to mention Ms. Natasha Amira Binti Hushairi, the only supervisor of this thesis, without your patient guidance, enthusiastic encouragement, and helpful critiques, we might have faced countless obstacles and challenges throughout the journey of this research work. We are truly appreciated the time and efforts you generously sacrificed in helping us. Besides, our sincere thanks also go to the first examiner, Dr. Chuang Huei Gau. Thanks for providing his valuable and insightful comments for this thesis.

In addition, we would like to express vast gratitude for each participant who has responded to our survey in this research. Thanks for having trust in us, and we conscientiously grateful for the information provided by you all. Other than the respondents, we wish to extend our appreciation to the research group members who have contributed immensely in perfecting this thesis. It would be impossible to complete this research without the assistance and cooperation of each of you. Thanks for those endless stimulating discussions, sleepless nights, and all the fun we had together.

Nonetheless, we wish to recognize our parents for their warm and sweet encouragement as well as their understanding. It is also whole-heartedly appreciate the assistance and clarifications provided by our classmates in this thesis. Just as importantly, we wish to acknowledge the emotional support and happy distractions handed over by our friends in resting our minds outside of this research. To every one of you, we thank you. This thesis has been completed by having all of your efforts and contributions.

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SLEEP QUALITY AND STRESS AMONG UNDERGRADUATE STUDENTS

Approval Form

This research paper attached hereto, entitled “A Study of Sleep Quality and Stress on Academic Performance among Undergraduate Students in Malaysia” prepared and submitted by “Eyven Phang Yee Man, Low Heng Xiang and Ng Jia Sheng” in partial fulfilment of the requirements for the Bachelor of Social Science (Hons) Psychology is hereby accepted.



Date: 29.03.2021

Supervisor

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Abstract

Previous studies examined whether sleep quality or stress is associated with low academic performance. Nonetheless, limited past studies discussed whether which variables contribute more towards their academic performance. Besides, there were inconsistent results on gender difference in the relationship between sleep quality and stress towards academic performance. Hence, the present study aimed to examine the relationship between sleep quality and stress on academic performance among undergraduate students in Malaysia. Furthermore, the present study also conducted to investigate whether gender played a significant role in the relationship between sleep quality and stress towards academic performance. In this quantitative and correlational research design, a sample of 384 undergraduate students in Malaysia (18–32 years; $M=22.03$; $SD=1.634$; Male=28.10%; Female=71.90%) were recruited through the convenience sampling method. The primary data was collected through an online survey method via Qualtrics. The key measures included Sleep Quality Scale and Perceived Stress Scale. The results indicated a significant, negative relationship with sleep quality, but not stress towards academic performance. Moreover, results indicate that there was a negative, significant relationship between both sleep quality and stress towards academic performance in females. The results revealed that sleep quality, but not stress significantly predicted undergraduate students' academic performance. While sleep quality and stress affected females more in academic performance. The current study closed the research gap and contributed to this field's research. Besides, the current study could serve as a wake-up call for university, society and undergraduate students on the factors that are more likely to influence academic performance.


Keywords: sleep quality, stress level, academic performance

Declaration

We declare that the material contained in this paper is the end result of our own work and that due acknowledgement had been given in the bibliography and references to ALL sources be they printed, electronic or personal.

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List of Abbreviation

Abbreviation	Explanation
IBM SPSS	International Business Machines Corporation; Statistical Package for the Social Sciences
PSS	Perceived Stress Scale
SQS	Sleep Quality Scale
GPA	Grade Point Average
CGPA	Cumulative Grade Point Average
REM	Rapid Eye Moment
SWS	Slow Wave Sleep
BPS	Biopsychosocial Models of Stress
PPMC	Pearson Product Moment Correlation
MLR	Multiple Linear Regression
SS	Sum of Square
df	Degrees of Freedom
MS	Mean Square
F	Fisher's F Ratio
ANOVA	Analysis of Variance
n	Number of Cases (generally in a subsample)
N	Total Number of Cases

Chapter 1

Introduction

1.1 Background of Study

Sleep refers to a part that cannot be separated from human health and life is essential for a person's learning, practice, physical wellness as well as mental health (Dewald et al., 2010). According to Rose and Ramanan (2018), sleep is critical for proper cognitive functioning. Lately, many discovered findings indicate the significance of sleep in consolidating a person's memory, in which sleep appears to be stabilizing and enhancing an extensive amount of various memory contents (Diekelmann & Born, 2010). According to Ahrberg et al. (2012), they found that cognitive competencies play a great significant role in tertiary levels of education. Cognitive ability is often believed as the most demanding phase and challenging learning stage in most of the individual's lives. In other words, it could be interpreted as adequate sleep plays a crucial role in undergraduates' university life.

The terminology of "sleep quality" is broadly adopted by scholars, clinicians, and the community. However, this term is lacking a definitional concord. In Ohayon et al. (2017) study, the result showed there are no consistent guidelines on what constitutes a regular or optimal, healthy sleep and better sleeping quality. As stated by Landry, Best, and Liu-Ambrose (2015), sleep quality can be assessed subjectively through a combination of self-reported measures, such as measuring the difficulty in initiating sleep, sleep continuity problems, and the depth of sleep (Zavec et al., 2020). Besides, Landry et al. (2015) indicated that it could also be measured objectively by assessing the individuals' sleep quantity, sleep quality, and sleep architecture through polysomnography (PSG). Recently, in Galea et al. (2020) study, the researchers have proposed sensors that are wearable could be utilized to analyze both sleep and activity outside of the clinical setting.

According to Araújo et al. (2013), they found sleep quality is vulnerable to human health. The researchers mentioned college students display bad sleeping quality. They stated that undergraduates' sleeping pattern was irregular, in which the university students inconsistently changed their sleeping start time and end time. Plus, their sleep time and awakening time was found earlier on weekdays and later on weekends. Besides, the study revealed undergraduates tend to sleep less on weekdays than at weekends, and they tend to have sleep deprivation problems while attending classes or during weekdays. Based on Schneider et al. (2011) study, they indicated sleeping irregularities could influence young people's health negatively. Additionally, they further claimed that sleep irregularities would affect the young adults' memory, concentration ability, ability to resolve problems, and also their academic performance (Schneider et al., 2011). Okano et al. (2019) study declared better sleep quality, longer sleep length, and greater sleep consistency was associated with better grades.

Asides from that, stress is experienced by everyone in the world regardless of academic background, profession, age, religion, or age (Yelkpiri, 2011). Stress is an inescapable topic as it is one of the important parts in life, as life itself is stress related (Ganesan et al., 2018; Kumar & Bhukar, 2012). In general, stress is divided into two different categories, which is eustress and distress. Eustress is defined as the positive form of stress that will drive us to keep going and become better (Tipton, 2020), while distress is defined as the negative form of stress that will suppress our learning and it should be avoided for us to live in fullest potential (Ganesan et al., 2018).

On top of that, stressors can be placed into two main categories, which is chronic stress and acute stress (Lumen Learning, n.d.; Life Line Screening, n.d.). Where chronic stress is the stress that persevere over a period of time (long-term stress), and acute stress is the stress that is experienced everyday (short-term stress) (Lumen Learning, n.d.; Life Line

Screening, n.d.). The accumulation of acute stress could become chronic stress in the future. Stressors could come in different forms and distinct shapes. There are three common forms of stressors that have been identified, which include daily hassles, chronic strains and life events (Adam et al., 2015; Irby-Shasanmi & Redmond, 2014; Khan & Shamama-Tus-Sabah, 2020). Daily hassles is described as minor irritation in daily life (Adam et al., 2015), such as traffic jams (Irby-Shasanmi & Redmond, 2014). The example of chronic stress would be getting a disability injury and living in an unsafe community (Irby-Shasanmi & Redmond, 2014). Life events included losing a job and being banged into car accidents (Irby-Shasanmi & Redmond, 2014). Past study found that these three stressors are intercorrelated to each other, which one type of stressor could provoke another type of stressor, and will lead to severe consequences either in physical health (Berkowsky, 2014) or emotion (Irby-Shasanmi & Redmond, 2014).

According to a few pieces of literature, the researchers stated the stress itself could further lead to more serious long-term impacts. For instance, a literature review of 13 articles done by Ribeiro et al. (2017) indicated that those individuals who undertake tertiary levels of education, their self-reported degrees of stress are correlated with lower quality of life and well-being. Besides, Moylan et al. (2013) stated that ongoing stress would cause the growth of more severe mental health problems, for instance, anxiety and depression. Studies found statistics showing that the undergraduates will have chances as high as 35% to encounter anxiety problems (Ozen et al., 2010) and up to 30% for depression (Ibrahim et al., 2013). All these previous works of literature explained the critical consequences of how stress could further bring so many negative long-term impacts on an individual. Furthermore, in Ahmed et al. (2019) study claimed that the prevalence of stress issues occurs, especially when undergraduates are less empowered with the capability to deal with the stressors. Therefore,

the stress issue is a crucial problem that should not be undermined in undergraduates' university life.

On top of that, Olufemi et al. (2018) research stated that academic performance will be one of the main factors concerned by employers while recruiting employees, especially when they plan to hire fresh graduates. The researchers believe undergraduates have to place more efforts in their academics to accomplish better grades and to equip themselves for career opportunities in future prospects, meanwhile fulfilling the employer's requirement. In Olufemi et al. (2018) research, they recognized the life of students will become uncertain and full of distress if they achieved poorly in their academics during university time. As a result, academic performance plays an important role in undergraduates. According to Shahzadi and Ahmad (2011), student's academic performance has been one of the areas of interest and many researchers have a growing interest in investigating the factors that are associated with university students' academic performance.

Previous literature has found numerous factors, such as academic-related factors and non-academic related factors (Abdulghani et al., 2014) could affect undergraduates' academic achievements. Academic related factors refer to students' learning style and skills (Abdulghani et al., 2014; Olufemi et al., 2018), prioritization of the needs of learning (Abdulghani et al., 2014; Shahzadi & Ahmad, 2011), view on class attendance (Shahzadi & Ahmad, 2011), learning infrastructure and teachers' quality (Olufemi et al., 2018), while non-academic related factors include time management (Abdulghani et al., 2014; Shahzadi & Ahmad, 2011), internal motivation, sleep quality, and stress (Abdulghani et al., 2014), parental background (Olufemi et al., 2018), family support (Abdulghani et al., 2014), peer influence (Olufemi et al., 2018), homesickness and language barrier (Abdulghani et al., 2014).

1.2 Problem Statement

Most undergraduate students are unaware that their sleep habits may be associated with their academic performance (Azad et al., 2015; Elagra et al., 2016; Gilbert & Weaver, 2010). Students may know that poor sleep quality will affect their health, but they do not really understand what the consequences of poor sleep quality are and how it will cause them resulting in low academic performance. Based on Raley et al. (2016) research, undergraduates did not prioritize their sleep and were more inclined to sacrifice their sleeping time for other commitments such as academic and social activities and this had led them to have irregular sleeping routines, bad sleeping habits and further cause the students to have poor academic achievements. Segaren (2018) article wrote most of the students were still being night owls although they understand it was not good for them but they still insisted to burn midnight oil, and slept at odd timing. Through the current research, undergraduates could learn to be aware of their sleeping habits and understand how sleep quality is associated with their academic performance.

Furthermore, a past study stated health care providers can heighten the undergraduates' awareness by conducting intervention programs to educate the university students about the knowledge of sleep, benefits of practicing good sleep hygiene and sleeping problems (Nurismadiana & Lee, 2018). However, encouraging undergraduates to practice good sleep hygiene might be challenging since the results of the previous studies are inconsistent. Some of the past research stated bad sleep quality would affect undergraduates' academic performance, whereas some of the research indicated that there is no relationship between both variables. For instance, in the recent study done by Siraj et al. (2014), they found that those participants who sleep fewer than 6 hours during the weekend significantly score lower CGPA compared to the respondents with sleep around six to eight hours and more than eight hours. Additionally, several studies agreed on the associations between

sleeping quality and academic achievements (Ahrberg et al., 2012; Elagra et al., 2016; El Hangouche et al., 2018). However, contradicting results from Nihayah et al. (2011) study showed that sleeping hours would not influence undergraduates' academic performance in terms of their CGPA. Other few discoveries also declared that there is an insignificant relationship between both variables (Cabalo Jr et al., 2017; Jalali et al., 2020). Therefore, the mixed data might not be convincing enough to encourage undergraduate students to practice good sleep hygiene in their life for them to achieve better academic achievement. Hence, the current research wishes to find out an answer for the associations between the sleep quality and academic performance.

Nowadays, students at any level would be facing various kinds of stress depending on their academic and environmental factors (Yelkperci, 2011), and it even became their routine of life (Kumar & Bhukar, 2012). Past studies showed that the stress level of undergraduate students is negatively associated with academic performances (Abdulghani et al., 2014; Elias et al., 2011; Gustems-Carnicer et al., 2019; Melaku et al., 2015; Sohail, 2013; Sommer & Dumont, 2011; Talib & Zia-ur-Rehman, 2012). Not many studies that discussed the relationship between stress and academic performance mentioned the mediator role of stress intervention programs in helping the students in reducing their stress (Melaku et al., 2015; Sohail, 2013). It is vital for universities to understand the significant effect of stress towards student's academic performance (Gustems-Carnicer et al., 2019) and come out with intervention plans such as workshops, conferences (Yelkperci, 2011), counselling program (Talib & Zia-ur-Rehman, 2012) and university curriculum (Gustems-Carnicer et al., 2019) to assist students in managing their stress. Through that, undergraduate students will be able to learn how to lessen their stress level and this will lead to enhancement of their academic performance (Elias et al., 2011).

In the past, many researchers have studied whether sleep quality is associated with poor academic performance or whether the students' stress is associated with the students' low academics. However, there are limited studies on whether which variables contribute more towards students' low academic performance. Throughout our research, we found Ahrberg et al. (2012) research is very similar to the current study. Unfortunately, the literature is unable to determine the causal relations between all these three variables. The researchers were only able to highlight the significant interaction between those variables (Ahrberg et al., 2012). However, from a study conducted by Taylor et al. (2013), they manage to find the relationship between sleeping quality, stress, and academic achievements. The results of the research revealed sleeping variables as a significant predictor of academic performance in university students. However, they stated it has a minimal effect if compared with the past studies that did not manipulate other variables. Nonetheless, for the stress factor, they found Perceived Stress Scale (PSS) loses its significance effect after consisting of all of the probable predictors. After analysis, PSS was found its confidence level had been reduced in the past finds where additional predictors were not typically included in (Taylor et al., 2013). Due to limited past literature discussed, this research aims to find out which variables contribute more towards students' low academic performance.

Furthermore, a study from Fatima et al. (2016) revealed a significant gender difference in sleep quality and proof by the result. However, there are inconsistent findings on perceived stress level gender differences among gender differences. Some studies indicated that females are perceived more stressed than male (Thawabieh & Qaisy, 2012; Kumar & Bhukar, 2013), while the other study indicated that male are perceived more stressed than females (Pariat et al., 2014). This may be due to both male and female perceived stress in different ways and have different ways to cope with their stress

(Anbumalar et al., 2017). Therefore, it is essential to study the relationship of sleep quality and stress on academic achievements by gender among tertiary levels' students in Malaysia.

1.3 Research Objective

To investigate the relationship between sleep quality and stress on academic performance among undergraduate students.

1.4 Research Questions

- i. Is there a relationship between sleep quality with academic performance among undergraduate students in Malaysia?
- ii. Is there a relationship between stress with academic performance among undergraduate students in Malaysia?
- iii. Is there a relationship between sleep quality by gender with academic performance among undergraduate students in Malaysia?
- iv. Is there a relationship between stress by gender with academic performance among undergraduate students in Malaysia?
- v. Is there a relationship between sleep quality and stress, with academic performance among undergraduate students in Malaysia?

1.5 Hypothesis

- i. H1: There is a significant relationship between sleep quality with academic performance among undergraduate students in Malaysia.
- ii. H2: There is a significant relationship between stress with academic performance among undergraduate students in Malaysia.
- iii. H3: There is a difference in sleep quality by gender with academic performance among undergraduate students in Malaysia.
- iv. H4: There is a difference in stress by gender with academic performance among undergraduate students in Malaysia.

- v. H5: There is a significant relationship between sleep quality and stress with academic performance among undergraduate students in Malaysia.

1.6 Definition of Terms

1.6.1 Conceptual Definition

Sleep Quality. Sleep quality can be conceptual defined as the subjective perceptions on level of satisfaction of one's sleep experience, which included the components of refreshment upon awakening, sleep quantity, sleep maintenance and sleep initiation. Besides, sleep quality might have varied meanings for different people as poor sleep quality might be due to different determinants (Kline, 2013).

Stress. Stress is conceptually defined as either a bodily or mentally tension that is caused by physical, emotional, or mental factors (Medline Plus, 2018), and it will be affecting our health (National Institute of Mental Health, n.d.). Additionally, stress is normally grouped into two different sources, which come from internal and external (Shiel, 2018).

Academic Performance. In this review, academic performance is conceptually defined as the level of academic achievement of a student. This variable is also being used to keep track of their progress on short term and long-term educational goals (IGI Global, n.d.).

1.6.2 Operational Definition

Sleep Quality. Sleep quality in this study is defined as the evaluation in six main domains in sleep quality, which included difficulty waking, problems initiating and maintaining sleep, daytime symptoms, sleep satisfaction and restoration after sleep, which were measured by Sleep Quality Scale (SQS).

Stress. Stress in this study is defined as the perception of self-reported stress of an individual in the past month, measured by Perceived Stress Scale (PSS). It is used to measure the respondents' thoughts and feelings about the incidents that happened last month to measure their current stress level.

Academic Performance. In this study, academic performance is defined by using the Cumulative Grade Point Average (CGPA). It is calculated by averaging the Grade Point Average (GPA) for all completed semesters. The scale is between 1.0 and 4.0, which higher CGPA indicates greater academic performance.

1.7 Significant of Study

Firstly, we have conducted a study to investigate the associations of sleeping quality and stress on academic achievements among undergraduates. The objective of this study is finding out which factors have a higher tendency to cause students to affect their academic performance. The outcome of the study is it will help the undergraduate students to increase their awareness about the possible factor that will affect their academic performance. Therefore, undergraduate students will have the attempt to maintain a good sleep quality and learn to manage their stress because it will affect not only their academic performance, and also their health.

Moreover, this study may increase the awareness of university teachers that sleep quality and stress is a significant factor that will affect academic performance among undergraduate students. Hence, sleep quality and stress among undergraduate students should be part of the preventive and remedial work in university. University teachers should include an evaluation of sleep quality and stress in their initial assessments of undergraduate students to facilitate diagnosis and treatment planning. Preventively, this study will be a proof that university teachers should implement sleep educational programs to promote good sleep hygiene for better sleeping quality and stress management coping skills for undergraduate students to achieve academic success.

Lastly, there are insufficient past research studies on the relationship of sleep quality and stress among undergraduate students in Malaysia context. Through the current study, it is able to provide valuable data analysis and result on the relationship of sleep quality and stress

among undergraduate students for future researchers in Malaysia. Therefore, it may allow the society to facilitate effective intervention programs for undergraduate students in order to increase their academic success, yet contribute to the development of Malaysia.

Chapter 2

Literature Review

In chapter two, the researchers will discuss the previous literature that studied mainly on the three variables. To be more specific, the researchers will first discuss sleep quality, next stress, then only the associations between sleeping quality, stress, and academic achievements. After that, the researchers will explain about the conceptual framework and theoretical framework. In the literature review part, the researchers chose to study research that ranged within ten years, and some of the studies were most up to date. The purpose of using recent studies is to enhance current research to be useful for other researchers in the future.

2.1 Sleep Quality

Based on Kline (2013) research, sleep quality typically means the subjective perception of a person's sleep. The researcher indicated sleep quality as an individual's satisfaction on his or her sleeping experience with other integrating sleep aspects, which is the sleeping amounts, maintenance of sleep, sleep initiation, and refreshment on waking. Oppositely, Ohayon et al. (2017) study found a contrasting result, in which there are no consistent guidelines on what constitutes a regular or optimal, healthy sleep, and better sleeping quality. However, it managed to find evidence showing the continuous sleeping variables, such as sleep latency, sleep efficiency, awakenings after falling asleep, and the number of waking up more than five minutes were suitable indicators of good sleeping quality. Besides, it declared little or no consensus about sleep architecture or napping associated variables as part of good sleeping quality.

From a study conducted by Lai and Say (2013), it reported 1118 of undergraduates in the Universiti Tunku Abdul Rahman (UTAR) were having sleep deprivation problems, as the findings revealed UTAR students slept only around 7.31 hours per night. Besides, the results

showed 32.9% of the undergraduates were categorized under bad quality sleepers, and 30.6% of the students suffered from odd daytime sleepiness. Araújo et al. (2013) study further affirmed that undergraduates display bad sleeping quality. A total of 701 students participated in the research, and 54% of them claimed they had bad sleeping quality in the previous month. Also, the study reported only 18.6% of the students managed to sleep more, which is more than seven hours in the previous month. Plus, the significant evidence indicated that, on average, the participants slept only around 6.3 hours each day, and 99% of the students were categorized under the worst range in the sleep efficiency part, and no one fell in the best categories. According to Maheshwari and Shaukat (2019), it stated sufficient sleep and good sleep efficiency is crucial for learning and memory. The results showed most students who had bad sleeping quality scored lower GPA for their exam. In addition, most of the students mentioned they had 16 to 30 minutes of sleep latency, slept for less than five to seven hours and had a 75% to 84% of sleep efficiency. Therefore, Maheshwari and Shaukat (2019) study claimed it is significant for undergraduates to be well-rested so they could achieve better academic performance.

Araújo et al. (2013) study reported an interesting finding, which is that the participants do not have sleep latency issues. In other words, the participants did not face a lot of troubles in initiating sleep and had little hardship in falling asleep within half an hour in the past month. The results showed that only nine percent of the participants, 63 out of 701 of them required a longer time, which is longer than 30 minutes in falling asleep. Besides, it found only 12.7% of the participants encountered difficulty in getting asleep within half an hour for about three times or more occurrence per week. Schlarb et al. (2017) also found that around two-thirds of the undergraduate participants reported having trouble falling asleep and maintaining sleep and encountered despairs due to sleeping problems. Among all of the samples, 51.9% of them informed that they had early awakenings. Moreover, the study found

it was less common for over half of the undergraduates to fulfill all criteria for nightmares, insomnia disorder, and irregular sleep and waking types. However, Lai and Say (2013) research stated poor sleep could be interpreted in terms of the late sleeping time onset, shorter period of total sleeping duration, and longer sleep latency. The researchers were able to prove that poor sleepers will have longer sleep latency and shorter periods of overall sleeping time than people with good sleeping quality.

Asides from the findings mentioned in Araújo et al. (2013) study above, the other results indicated 41.7% of the participants claimed that they encountered no nightmares. However, significant evidence showed the students had terrible dreams at least one time per week in the previous month. Whereas for the difficulty to stay awake, the participants categorized themselves evenly in overall, and only 13.4% of them reported they experienced three or more times in a week. However, the researchers noticed the students faced mild or considerably large amounts of problems in staying enthusiastic during their daily activities. In Schneider et al. (2011) study, it described that undergraduates' sleeping pattern was irregular, in which the university students inconsistently changed their sleeping start time and end time. Plus, their sleep time and awakening time was found earlier on weekdays and later on weekends. Besides, the research also revealed undergraduates tend to sleep less on weekdays than at weekends, and they tend to have sleep deprivation problems while attending classes or during weekdays. Furthermore, a past report conducted by Azad et al. (2015) revealed that undergraduates appear to have insufficient self-consciousness and general knowledge of sleep. The study concluded most of the sleep awareness research conducted in Asia suggested that medical undergraduates typically had misconceptions, and they had little sleep knowledge.

Other than that, Fatima et al. (2016) study revealed a significant gender difference in sleep quality. The results showed females participants reported having a higher prevalence of

bad sleeping quality than the males. In contrast, Lai and Say (2013) study provided results indicating nonsignificant differences in terms of the sleep quality between both males and females participants. The findings revealed the percentage of male participants (87%) who are good sleepers was nearly the same as the female participants (86%). However, the findings of Giri et al. (2013) research were indifferent with Fatima et al. (2016) study and Lai and Say (2013) research. Giri et al. (2013) claimed that females had a better sleeping quality than males. Similarly, Okano et al. (2019) study found males have higher chances to experience bad sleeping quality compared with females.

2.2 Stress

Based on the study by Anuradha et al. (2017) to investigate the relations between stress and stressors among undergraduate students specifically medical students, it was found out that academic stressors are the main contributor towards the increasing stress levels among the students. The example of academic stressors included enormity of the academic courses, absence of recreational activities and the feeling of fear towards poor academic performance. Similarly, the findings of a research conducted by Othman et al. (2013) on 248 students from a public institute in Malaysia revealed that students perceived their stress was often associated with academic requirements. Besides, two significant psychosocial stressors of undergraduate students consist of problems related to family and loneliness. The environmental stressor which highly predicted the stress level among the students is living away from home. However, competition among peers, relationship with partners, high expectations from parents, travel journey between university and house, financial issues, food quality, adjustment with people living in the same room or neighbours and living environment were not significant predictors of stress.

Moreover, Radeef et al. (2014) conducted a study to determine the relationship between the root of stressors and emotional disruption among undergraduate students. A

sample of 194 undergraduate students were recruited in this study. The results showed that the components that are associated with the feeling of incapacity, difficulty level of class assignments and absence of inspiration to learn were categorized as the root of stressors.

Additionally, in the study conducted by Talib and Zia-ur-Rehman (2012), three primary sources of stress were identified, which were problems associated with sleep, course subject load and social activities. However, there was no significant difference between the stress level perceived by males and females. This aligns with another past study from Khan and Shamama-Tus-Sabah (2020). The study reported that there is not much difference in perceived stress for students in both genders. Nevertheless, in the recent study conducted by Khan and Shamama-Tus-Sabah (2020) mentioned that female students tend to experience more stress compared to male.

2.3 Sleep Quality and Academic Performance

Rose and Romanan (2018) have conducted a cross-sectional design study to measure the consequences of sleep deprivation on undergraduates' academic performance and the effect of sleep deprivation on their cognitive functioning. A total of 150 healthy college students were recruited, and the findings showed 95.3% of them sleep less than seven to eight hours. The study indicated students who sleep less and those who have sleep deprivation problems were found to have a lower GPA. Hence, Rose and Romanan (2018) further claimed that appropriate sleeping time is essential for students to achieve better results and function better in terms of their cognitive aspects. However, Nihayah et al. (2011) found a different finding, in which sleeping duration was not associated with academic achievements. Similarly, the findings in a recent research conducted by Jalali et al. (2020) provided additional evidence to support Nihayah et al. (2011) results, in which the study found sleeping quality was not significantly associated with the academic achievements among 102 of medical undergraduates from different domains.

Besides, in Frenda and Fenn (2016) study, it mentioned that sleep deprivation would suppress general attention ability and the ability to use mnemonic methods, and it would affect the neural activation in parietal cortices and frontal lobes, areas essential for working memory. Frenda and Fenn (2016) research stated these issues that caused by poor sleep quality may lead to low academic performance among undergraduate students. Diekelmann and Born (2020) further affirmed Frenda and Fenn (2016) study by stating that sleep has been referred to as a condition that enhances the consolidation of newly obtained information in memory. Moreover, cross-sectional research conducted among the fourth year of medical undergraduates in Universiti Kebangsaan Malaysia (UKM) by Siraj et al. (2014) indicated that sleep deprivation would cause sleepiness on day time and reduced attention level in which later affected undergraduates' academic achievements. A total of 234 students were recruited for the research. The results found most of the undergraduates were sleep-deprived and had inconsistent sleeping time on weekdays and weekends. After conducting statistical analysis, the findings revealed that adequate sleep is needed to achieve better academic performance as sleep plays a significant role in learning procedure and the consolidation of memory.

Furthermore, Elagra et al. (2016) research had studied the effect of 1160 dental students' sleeping patterns on their academic achievements. Those responded participants were being categorized into two sub-groups based on their academics levels, in which one group comprises students who are not in a clinical year and another group consists of students who are in the clinical year. The findings indicate that sleep quality was found negatively correlated with academic performance in both groups. Besides, the results showed clinical groups had a higher Pearson negative correlation coefficient compared with non-clinical groups. However, the researchers only selected female undergraduates as respondents for their study. They suggested future researchers could recruit both genders in the research and

make comparisons in terms of their sleep quality towards their academic performance. Elagra et al. (2016) revealed that bad sleep quality might influence the undergraduate's attention level, increase their anxiety level, impair their memory and decision-making ability, which all these could further affect the undergraduate's academic achievements. Therefore, this study provides evidence showing poor sleep quality would lead to low academic performance and affect undergraduate's health (Elagra et al., 2016). Similarly, recent findings conducted on 457 of medical undergraduates by El Hangouche et al. (2018) research also claimed that bad sleeping quality is having a significant relationship with low academic performance.

In Mirghani et al. (2015) study, they investigated the relations of sleep quality and academic achievements within medical students. A total of 165 students responded to the survey forms, and the researchers found a significant difference in the sleep quality between the excellent group and the average grade group. After conducting statistical analysis, Mirghani et al. (2015) claimed that good sleeping quality is having a strong relationship with high academic achievements and it found what caused the poor academic results was the lack of concentration and inability to function during the day. Okano et al. (2019) study explored how sleep influences the 88 undergraduate students' academic achievements through objective measurements and tracking their sleep ecologically with the usage of a wearable activity tracker, Fitbit. The results indicated that good sleeping quality, longer sleeping time, and better sleep consistency were strongly correlated with good academic performance. Besides, a study done among 557 psychology undergraduates by Gilbert and Weaver (2011) indicated that the Global Sleep Quality (GSQ) is significantly associated with grade point average (GPA). Moreover, the correlational analysis showed that the Global Sleep Quality (GSQ) is significantly associated with the academic performance of females. However, the study found GSQ was not having a significant association with the male's academic achievements. With all these results, the researchers concluded that the findings were

consistent with the hypothesis in which poor sleeping quality is associated with the undergraduate's lower academic achievements.

Moreover, a meta-analytic review done by Dewald et al. (2010) was to probe the associations of sleepiness, sleeping quality, amounts of sleep, and academic achievements. In the research, the target participants are healthy children and adolescents, which is not similar to our study. However, they were able to find that sleepiness has the biggest effect, then only followed by sleep quality and sleep duration. From the study, they concluded these three factors were having a significant relationship with academic performance but only at a moderate level. The other findings were they found females need more sleep and encounter more daytime sleepiness than males. The study used objective measurement and insomnia questionnaires to measure sleep quality, whereas academic performance was measured by using the students' grade point average, standardized tests, or survey forms. Interestingly, subjective sleep quality measurement showed a stronger association with academic achievements than objective assessment.

2.4 Stress and Academic Performance

Elias et al. (2011) study was conducted with the aim of finding out the associations of level of stress and academic performance among local university students. The study had recruited a sample of 376 undergraduate students through cluster sampling methods. From the study, it was found that generally, undergraduates faced moderate stress, while medical undergraduates encountered the most stress level within others and the first year undergraduates tend to experience lower levels of stress. It can be concluded that academic performance was the major source of stress for the students. A weak and significant relationship found between these two variables. The academic performance was measured by their results of the semester, which is Grade Point Average (GPA), while stress was being evaluated by College Undergraduate Stress Scale (CUSS). This result was aligned with the

study conducted by Talib and Zia-ur-Rehman (2012) which aim to investigate the effect of the variable (perceived stress) towards academic performance. In this study, a total of 199 university graduates and undergraduates were involved and a significant negative correlation was found between perceived stress and academic performance. The scales that included in the questionnaire consisted of Perceived Stress Scale (PSS), stress factor survey and GPA.

Additionally, a cross-sectional study that recruited a total of 329 samples of medical students by Melaku et al. (2015), was aimed to measure the stress level of medical undergraduates students with substance use and academic performance. In the results, this study found that stress levels negatively correlated with academic performances, while academics was the major stressor among the students. Besides, a similar study that was conducted by Sohail (2013) showed similar results, where a moderate, significant and negative relationship between academic achievement and stress levels. A sample of 120 medical students responded to the survey questionnaire and 12 students were being interviewed. Both data collections were obtained by a non-probability sampling method.

Moreover, another research done by Gustems-Carnicer et al. (2019) was to investigate the relations of stress levels, coping strategies, and academic performance among undergraduate students specifically students in teacher education courses. A sample of 334 undergraduate students involved in the study. The result showed that students' academic performance became worse with the present of stress. However, the relationship became weaker as the age of the participants increased. The study also found that 51.2% of the sample experienced a remarkable level of stress. Students tend to use avoidance coping strategies such as cognitive avoidance and problem solving methods to cope with stress. Three types of scale were used in the study, which consists of Perceived Stress Scale (PSS), the Coping Responses Inventory-Adult form (CRI-A) and academic achievement was measured by GPA.

Nevertheless, there were some past studies that disagreed on the negative correlation between stress and academic performance. A recent study by Khan and Shamama-Tus-Sabah (2020) examined the association between perceived stress levels with academic achievement and positive mental health. A total sample size of 261 undergraduate students were recruited in this study through purposive sampling method. The result found that perceived stress level is positively associated with academic achievement. Another study by Siraj et al. (2020) in Malaysia supported the finding of Khan and Shamama-Tus-Sabah (2020). The cross sectional research was conducted to examine the relations of stress level and academic accomplishments among medical undergraduates specifically year four students. A sample of 179 undergraduate students in Universiti Kebangsaan Malaysia responded to the study, the study found out that students who experienced severe and high stress tend to obtain greater results. It was an interesting finding as the result of recent studies contradicted with past studies.

2.5 Relationship between Sleep Quality, Stress and Academic Performance

A study conducted by Ahrberg et al. (2012) reviewed the relations of sleeping quality, stress and academic success. The researchers recruited 943 students to complete a web-based questionnaire, 632 of them took an actual exam and required them to complete a questionnaire at three different timing which is during the semester, during the exam preparation period and eight weeks after the participants finished their exam. At last, 144 of the undergraduates completed for all three-time points. From the study, the result showed that academic success was related with the level of stress and sleeping quality during the exam preparation period. However, the study did not report any significant relations of stress and sleeping quality during the semester and after the exam with academic accomplishments. Furthermore, the result cannot determine the causal relations of sleeping quality, stress and academic success.

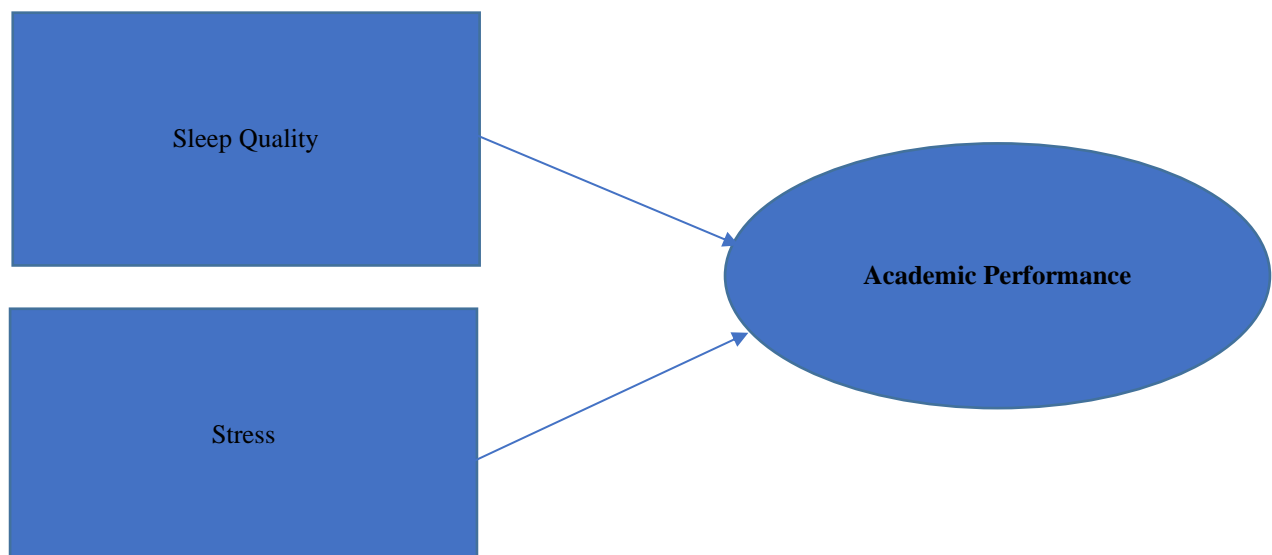
Moreover, Taylor et al. (2013) research had studied how sleep plays a role in predicting undergraduates academic achievements. This study had also further discussed the relations of stress and academic achievements. A total of 867 participants that achieved condition from psychology classes were recruited through the research respondent tool from the Department of Psychology. Sleep diary and Perceived Stress Scale (PSS) were used in this study to evaluate sleep quality and stress. The result of the study showed that sleep quality and stress are significant predictors of academic performance.

2.6 Conceptual Framework

A diagram of conceptual framework that illustrates the predictor (Sleep quality and Stress) on the outcome (Academic performance), shown in Figure 2.1. Sleep quality and Stress serve as the independent variables that contribute to the Academic performance which is the dependent variable in this study.

Figure 2.1

Conceptual Framework of the Current Research



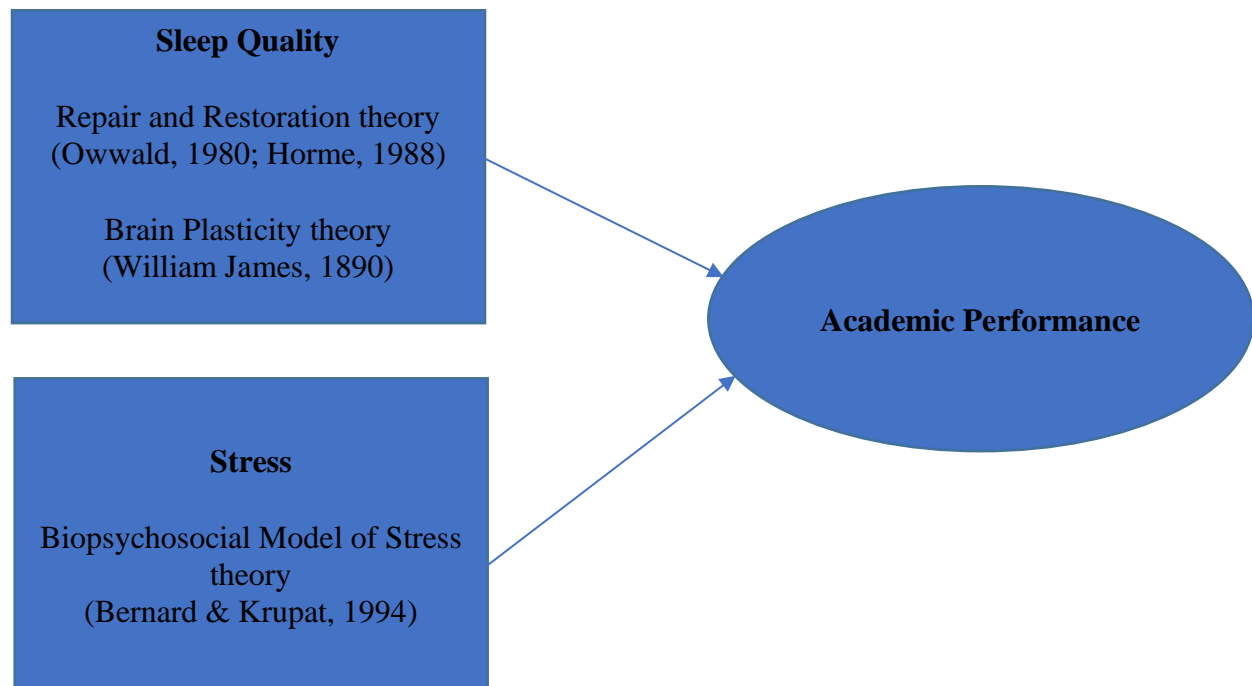
2.7 Theoretical Framework

Repair and restoration theory suggests that the function of sleep is to repair and restore the brain and body (Dokie, n.d.). Two theorists have made major theoretical contributions to this general field. Oswald (1980) first contributed to this theory and Horne (1988) extends Oswald's theory (Dokie, n.d.). Oswald suggests that different types of sleep are required to repair and restore different biological functions. The repair and restoration will happen during Rapid Eye Movement (REM) sleep pattern. Rapid Eye Movement (REM) sleep is necessary for brain development, repair and recognition function. Slow Wave Sleep (SWS) is also necessary for the growth and repair of the body (Dokie, n.d.). It is important for protein synthesis as growth hormone is released during Slow Wave Sleep (SWS) (Dokie, n.d.). Moreover, Horne suggests that sleep is divided into core sleep and optional sleep. Rapid Eye Movement (REM) and Slow Wave Sleep (SWS) is included in core sleep (Dokie, n.d.). He suggests that the repair and restoration of the brain happens during core sleep while the body happens during optional sleep, and can also happen at other times (Dokie, n.d.). By contrast, the differences between Oswald and Horne is Oswald suggests that repair and restoration of brain and body are happening during core sleep which is Rapid Eye Movement (REM) and Slow Wave Sleep (SWS), while Horne suggests that the repair and restoration of the body happen during optional sleep.

William James (1890) has generated Brain plasticity theory which suggests that sleep is correlated to changes in the organization and structure of the brain. According to Ergoflex (2016), this theory means the capability of the brain to adapt and change throughout an individual's life. Brain plasticity suggests that sleep is a process of consolidating new memories from the information that has been acquired. The brain still functions during sleep as it is reviewing and sorting out the activities and information acquired during day time and transforming into long-term memory (Ergoflex, 2016). Hence, the lack of sleep will have a

negative effect on the ability to encoding information. For example, this theory explains the reason why infants need to sleep more longer times because they are constantly learning about the world, yet require more deep sleep for the brain to process all of the information and transform it into long-term memory.

Biopsychosocial models of stress (BPS) theory were contributed by Bernald and Krupat (1994), they suggest that stress consists of three elements which is internal part, external part and the interaction between internal part and external part. Cordon (1997) mentioned that the internal component of Biopsychosocial models of stress (BPS) involves a series of neurological and physiological responses to stress, while the external component involves environmental activities that are accompanied by stress recognition and it can evoke responses to stress. Moreover, the third component of Biopsychosocial models of stress (BPS) which is the relationship between internal and external components can be referred to as the relationship between individual and environmental factors, involving the individual's cognitive processes. The way an individual perceives an event plays an important role in evaluating the extent of the stress response, and also the kind of coping mechanisms that a person may use to cope with the stress (Cordon, 1997).

Figure 2.2*Theoretical Framework of the Current Research*

Chapter 3

Methodology

3.1 Research Design

The current study utilizes quantitative research design with correlational research design to study the relationship of sleep quality and stress on academic performance among undergraduate students in Malaysia. This research design allows researchers to use the correlation statistic to measure the degree or relationship between two or more variables or sets of score (Cresswell, 2012). Sleep quality and stress serve as the independent variables that contribute to academic performance which are the dependent variables in this study. A non-probability sampling method which is a convenience sampling method was conducted in this study to collect data from a conveniently available pool of respondents which is undergraduate students in Malaysia. The main objective of the convenience sampling method is to collect data from participants who are easily accessible to researchers (Etikan et al., 2016). It is an affordable and convenient method to collect data (Etikan et al., 2016).

3.2 Research Sample

A total number of 384 respondents were recruited in this study referring to the online sample size calculator. The sample size calculator uses the total amount of population of undergraduates in Malaysia which is obtained from the Macro Higher Education Institution (2019), confidence level of 95%, and confidence interval of 5 to determine the precise sample of this research. The total sample population of undergraduates' students in Malaysia in the year of 2019 is 1,275,052.

3.3 Research Instruments

There were two instruments being used in this study, which were Sleep Quality Scale (SQS) and Perceived Stress Scale (PSS).

3.3.1 Sleep Quality Scale (SQS)

Sleep Quality Scale was developed by Hyeryeon et al. (2006) with the purpose of measuring the overall sleep quality of an individual for one last month. Six main domains of sleep quality will be evaluated in this scale which include sleep satisfaction, difficulty waking, problems initiating and maintaining sleep, restoration after sleep and daytime symptoms. SQS is a self-reported scale that consists of 28 items that are rated on a four point Likert scale ranging from 0 (*never or rarely*) to 3 (*almost always*). Items related to satisfaction with sleep and restoration after sleep will be reversed-coded prior before calculating the total scores, which are obtained by summing up every item. The range of the total scores are from 0 to 84, with higher scores indicating more severe sleep problems. Past study reported the Cronbach α of .92, a test-retest reliability correlation coefficient of .81 and a strong correlation was found with the result of Pittsburgh Sleep Quality Index (PSQI) (Buysse et al., 1989) which is a validated measure that is widely used in measuring sleep quality (Hyeryeon et al., 2006).

3.3.2 Perceived Stress Scale (PSS)

Perceived Stress Scale was developed by Cohen (1983) with the aim of measuring the stress level of an individual generally for the past one month. PSS is a self-reported scale that comprises 10 items that are rated on a five-Likert scale ranging from 0 (*never*) to 4 (*very often*). The total scores are obtained by reversing the score for item 4, 5, 7 and 8 prior before summing up all the items. The total score ranges between 0 and 40 with higher score (27 to 40) reflecting higher perceived stress. High Cronbach α of .84 (males and females sample), .85 (college student samples) and .86 (smoking-cessation sample) was reported in the study itself. A high test-retest reliability correlation coefficient of .85 was found in the college student samples, it showed the scale has good reliability (Cohen, 1983). Meanwhile,

in recent study, a Cronbach α of $>.70$ was reported in 12 studies, and a test-retest reliability of $>.70$ was found in four studies that are included in the psychometric test (Lee, 2012).

3.4 Research Procedure

At first, the researchers applied for ethical clearance to conduct research from the UTAR Scientific and Ethical Research Committee. After a few days, the researchers successfully received the approval letter with the reference number of U/SERC/04/2021. The application aimed to request authorization from the university to conduct research on its premises. In the research proposal, the researchers yielded a topic of the associations between sleep quality, stress, and academic achievements among undergraduate students in Malaysia. However, to further probe the topic, the researchers have developed several research questions and research objectives. In addition, this research has incorporated the variables of sleep quality, stress, and academic performance.

After generating a proposal for the research, the researchers quickly designed a research poster with a survey link and distributed it online. The researchers chosen to distribute the survey online was due to easy accessibility, lower costs faced, and higher convenience. However, before starting circulating the research poster, the researchers created the online questionnaire through Qualtrics. Next, to be more efficient, the researchers aimed to distribute the survey and hit the target sample size within four weeks. To achieve this goal, the researchers had direct messaging the survey form to a person or a group on WhatsApp, Facebook, Instagram, or WeChat, starting from 23 January 2021. Surprisingly, the response rate was very optimum.

Moreover, the respondents were required to tick the box to indicate agreement as an implied consent in the survey form. Other than the participants' informed consent, the questionnaire consisted of the participants' demographic information, Sleep Quality Scale (SQS), Perceived Stress Scale (PSS), and also their Cumulative Grade Point Average

(CGPA). After the researchers completed the data collection, the researchers filtered the responses and excluded those responses from participants who are not currently undertaking undergraduate programs in Malaysia. Later, the researchers utilized the instruments mentioned above to measure all the variables and further analyzed the data and findings.

3.5 Pilot Study

A pilot study is a trial test in checking the feasibility of the actual research (In, 2017). According to In (2017), pilot study serves as a tool to enhance the planning and the modification of the actual research. Another benefit of conducting a trial study is it can surpass the actual study to check on its validity. Besides, the pilot test allows the researchers to revise the steps and procedures of the real research. After doing the pilot test, the researchers can better understand the participants' recruitment criteria. Later, the researchers could familiarize themselves with analyzing the instruments used in the actual research (In, 2017). Besides, the researchers can briefly know the time spent of participants while filling up the questionnaire. Moreover, the researchers could evaluate whether they will face any financial problems during the actual research (Thabane et al., 2010). Additionally, through the pilot study, the researchers could learn and minimize the possible errors, smoothen the actual research process and handle well on the resources and management in the real research.

Therefore, the current researchers have conducted a pilot test to analyze the feasibility of the actual study. In the pilot test, in order to ensure the online survey form is accurate and error-free, the researchers read through the online survey at least once before starting to circulate it. While collecting the data, the researchers slowly got ideas on the recruitment criteria for the actual study. For the respondents of the pilot test, the researchers had recruited 30 undergraduates from universities in Malaysia. On average, each of the participants spent around 5 minutes to complete the online survey form. Next, the researcher conducted the data

analysis according to table 1 after collecting the responses from 30 participants. By practicing the data analysis steps, it allows the researchers to be extra familiarized with the procedure. Throughout the pilot study, all the researchers had clearly understood how to conduct the actual research.

As for the result, the researchers have tested the reliableness and validity of the Sleep Quality Scale (SQS) and Perceived Stress Scale (PSS) during the pilot test. For the reliability of the SQS, it has an internal coefficient value of .805, which indicated a notably great level of reliability. Similarly, Perceived Stress Scale (PSS) has an appropriate level of reliability, in which it has an internal consistency value of .779. Therefore, to conclude, both scales are reliable to be used in the recent samples. Next, for validity, both inventories have the same values of .320. That value indicated that both instruments showed a good construct validity. Hence, it means both scales, testing the theory they are gauging on, indeed (Ginty, 2013) in the current sample size.

3.6 Data Analysis Plan

Three different statistical tests were used to test out the hypotheses in this study as illustrated in Table 3.1. Pearson Product Moment Correlation (PPMC) is used for testing hypothesis one and two as PPMC is widely used to measure the strength of the relationship between two variables. On the other hand, PPMC also used to test the relationship between sleep quality with academic performance by gender (hypothesis three) and the relationship between stress with academic performance by gender (hypothesis four) by splitting the data by gender before conducting the analysis. Last but not least, Multiple Linear Regression (MLR) was conducted to test out hypothesis five, which is to analyse the relationship between two dependent variables (sleep quality and stress) and one independent variable (academic performance). All statistical tests conducted using International Business Machines Corporation; Statistical Package for the Social Sciences (IBM SPSS).

Table 3.1*Statistical Test Used for Hypothesis Testing*

Hypotheses	Statistical Test
H1: There is a significant relationship between sleep quality with academic performance among undergraduate students in Malaysia	Pearson Product Moment Correlation
H2: There is a significant relationship between stress with academic performance among undergraduate students in Malaysia.	Pearson Product Moment Correlation
H3: There is a difference in sleep quality with academic performance by gender among undergraduate students in Malaysia.	Pearson Product Moment Correlation
H4: There is a difference in stress with academic performance by gender among undergraduate students in Malaysia.	Pearson Product Moment Correlation
H5: There is a significant relationship between sleep quality and stress with academic performance among undergraduate students in Malaysia.	Multiple Linear Regression

Chapter 4

Result

Chapter 4 includes data analysis of 384 respondents of the current study on the five hypotheses proposed. Data screening and outlier checking was conducted before proceeding with the analysis. Demographic information of the participants was included, Pearson Product Moment Correlation (PPMC) was used to test hypothesis one, two, three and four, Multiple Linear Regression (MLR) was used to test hypothesis five.

4.1 Missing Data and Outlier Check

The total number of 400 participants were recruited in this study through a random sampling method through Qualtrics. Among them, six participants (1.5%) were removed due to incomplete response, 10 participants (2.5%) were removed as they didn't meet the requirement of the current study, which is Malaysian undergraduate (six of them are from foundation and four of them are from A-level). Boxplots was conducted to identify outliers of the current study, and no responses were excluded as all the responses fall into the range of boxplots, refer Appendix C and Appendix D.

4.2 Descriptive Statistics

Table 4.1

Demographic Profile of the Respondents

Variables	Frequency	Percent (%)
Age (years)		
Mean	22.03	–
Standard deviation	1.634	–
Minimum	18	–
Maximum	32	–
18 – 21	116	30.20
22 – 25	259	67.50
26 – 29	5	1.30

≥ 30	4	1.00
Gender		
Male	108	28.10
Female	276	71.90
Ethnicity		
Chinese	356	92.70
Malay	13	3.40
Indian	5	1.30
Others	10	2.60
CGPA		
2.0000 – 2.9999	69	18.00
3.0000 – 3.6699	204	52.90
3.6700 – 4.0000	111	29.10

Note. $N = 384$.

Table 4.1 showed the participants' demographic profile of current study. After data screening and removing, a total of 384 participants were included in the data analyses of the current study. Among them, 28.1% ($n=108$) were male and 71.9% ($n=276$) were female. The participants' age ranged from 18 to 32 years old where 67.50% ($n=259$) of them were aged 22 to 25 years old, and majority of them were Chinese (92.7%; $n=356$). Most of the participants scored good (52.90%; CGPA: 3.0000 – 3.6699) in their academic performance, followed by excellent (29.10%; CGPA: 3.6700 – 4.0000) and satisfactory (18.00%; CGPA: 2.0000 – 2.9999).

4.3 Pearson Product Moment Correlation

Table 4.2

Pearson Correlation for Sleep Quality and Academic Performance

H1: There is a significant relationship between sleep quality with academic performance among undergraduate students in Malaysia.

Variable	1	2
1. Sleep Quality	-	
2. Academic Performance	-.166**	-

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

Table 4.2 showed that Sleep Quality and Academic Performance were found to have a significant, negligible and negative correlation, $r(382) = -.166, p < .001$. This result supported hypothesis 1 of current study.

Table 4.3

Pearson Correlation for Stress and Academic Performance

H2: There is a significant relationship between stress with academic performance among undergraduate students in Malaysia

Variable	1	2
1. Stress	-	
2. Academic Performance	-.096	-

Note. $p = .060$.

Based on Table 3, Stress and Academic Performance were found to have a not significant, negligible and negative correlation, $r(382) = -.096, p = .060$. Null hypothesis 2 was accepted while alternate hypothesis 2 was rejected.

Table 4.4

Pearson Correlation for Sleep Quality and Academic Performance by Gender

H3: There is a difference in sleep quality with academic performance by gender among undergraduate students in Malaysia

Variable	1	2
1. Sleep Quality	-	.024
2. Academic Performance	-.225**	-

Note. **. Correlation is significant at the 0.01 level (2-tailed), $p = .804$ for male. The results for the male sample ($n=108$) are shown above the diagonal. The results for the female sample ($n=276$) are shown below the diagonal.

Table 4.4 showed that among males, the Sleep Quality and Academic Performance were positively correlated, with a not significance and negligible correlation, $r(382) = .024$, $p = .804$; while for females, both variables were negatively correlated, with a significant and weak correlation, $r(382) = -.225$, $p < .001$. Hypothesis 3 of the current study is partially supported.

Table 4.5

Pearson Correlation for Stress and Academic Performance by Gender

H4: There is a difference in stress with academic performance by gender among undergraduate students in Malaysia

Variable	1	2
1. Stress	-	-.095
2. Academic Performance	-.128*	-

Note. *. Correlation is significant at the 0.05 level (2-tailed), $p = .329$ for male. The results for the male sample ($n=108$) are shown above the diagonal. The results for the female sample ($n=276$) are shown below the diagonal.

Lastly, Table 4.5 showed that among males, Stress and Academic Performance were found to have a not significant, negligible and negative correlation, $r(382) = -.095$, $p = .329$; while for females, Stress and Academic Performance were found to have a significant, negligible and negative correlation, $r(382) = -.128$, $p < .05$. This results partially supported hypothesis 4 of the current study.

4.4 Multiple Regression Analysis

Table 4.6

Summary of ANOVA

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Regression	1.715	2	.857	5.503	.004 ^b
Residual	59.362	381	.156		
Total	61.077	383			

Note. a. Dependent Variable: Academic Performance, b. Predictors: (Constant), Stress, Sleep Quality; ANOVA = analysis of variance; *SS* = sum of squares; *df* = degrees of freedom; *MS* = mean square; *F* = fisher's *F* ratio.

Table 4.7

Regression Analysis Summary for Stress and Sleep Quality Predicting Academic Performance

H5: There is a significant relationship between sleep quality and stress with academic performance among undergraduate students in Malaysia

Source	Unstandardized coefficients		Standardized coefficients		
	<i>B</i>	Std. error	β	<i>t</i>	<i>p</i>
(Constant)	3.598	.090		40.118	.000
Stress	-.002	.004	-.027	-.483	.629
Sleep Quality	-.005	.002	-.154	-2.717	.007

Note. Adjusted $R^2 = .023$.

Multiple regression analysis was used to test if stress and sleep quality significantly predicted undergraduates' academic performance. The model was statistically significant, $F(2, 381) = 5.503, p < .004$ and accounted for 2.3% of the variance. It was found that sleep quality, but not stress, significantly predicted undergraduates' academic performance ($\beta = -.154, p < .007$). This result partially supported the fifth hypothesis of the current study.

4.5 Conclusion

In the nutshell, for this current study, hypothesis one was accepted, hypothesis three, four and five were partially accepted, however there was no support for hypothesis two.

Further discussion will be included in the following chapter.

Chapter 5

Discussion and Conclusion

This chapter will be discussed on the answer to current study's research questions of (1) determining the relationship between sleep quality and academic performance among undergraduate students in Malaysia, (2) determining the relationship between stress and academic performance among undergraduate students in Malaysia, (3) determining the effect of gender in the relationship between sleep quality with academic performance and stress with academic performance among undergraduate students in Malaysia, (4) determining whether sleep quality or stress will significantly correlated with academic performance among undergraduate students in Malaysia. Past studies were included in the justification of the current study's discussion. Moreover, both theoretical and practical implications of the current study, recommendations for future study were also included in this chapter.

5.1 Discussion

For the first hypothesis, the research supported it in which sleep quality was significantly correlated with academic achievements negatively. This finding means that the undergraduates who scored higher on the Sleep Quality Scale (SQS) encountered more severe sleeping problems and caused bad sleeping quality. Consequently, those sleeping problems caused the undergraduates to achieve lower academic scores. This research findings were in line with previous works (Ahrberg et al., 2012; Elagra et al., 2016; El Hangouche et al., 2018).

For instance, Seun-Fadipe and Mosaku (2017) showed that undergraduates who sleep poorly tend to score lower significantly than those who sleep better. The study stated that sleep quality could independently predict academic achievements. Moreover, Elias et al. (2011) study claimed that sufficient sleep is demanding to underpin the brain plasticity procedures in consolidating the memories. Besides, according to Rasch and Born (2013)

research, it revealed that the memory consolidation process would activate during sleep, and good sleep quality could escalate the quality of the reorganization process and later integrate it into long-term memory. Nonetheless, Scott et al. (2019) study affirmed Elias et al. (2011) and Rasch and Born (2013) research, indicating that sleeping quality acts as a critical element in the memory restoration process and not to mention academic achievements. Thus, the researchers agreed that inadequate sleep would affect the learning journey and the information memorizing process.

Besides, research from Alqudah et al. (2019) identified undergraduates who see themselves as poor sleepers prone to experience insomnia issues. Unsurprisingly, the other findings reported undergraduates who scored a CGPA lower than 2.5 were more susceptible to encounter more insomnia problems than students who scored 3.0 or greater than that. Upon the results, Alqudah et al. (2019) exploration concluded that sleep quality significantly correlated with academic achievements. Additionally, an interview session conducted by Datta et al. (2018) study also affirmed the results in this research. By referring to the findings, 57% of the undergraduates suffered from sleep disturbances. 66.3% of the interviewees who scored averagely in their last semester examination found to be troubled by their sleeping disturbance. Besides from that, Datta et al. (2018) research revealed 72.4% of the students who reported sleepiness during the day experienced more struggles significantly during the test than that 51.7% of students who claimed to be non-sleepy.

What is more, the current research rejected the second hypothesis. This shows that there was no significant relationship between stress and academic performance. Surprisingly, this finding was not aligned with some of the past literature (Elias et al., 2011; Oketch-Oboto & Okunya, 2018; Lin et al., 2020). However, Farhan and Khan (2015) result aligned with the present research. The study acknowledged that the stress was not significantly correlated with academic performance.

Based on Farhan and Khan (2015) findings, it explained that the undergraduates would experience a lot of academic workload and confusion at the beginning. However, they will slowly be familiarized with the course when more and more works coming in. As time passes by, the undergraduates will get used to it and have comparable lesser stress than the beginning. Later, they will have reduced perceived stress when they went through the middle semester and moved ahead to the end of the semester. After that, they would only need to worry about their final assessments since they have completed all of their assignments (Farhan & Khan, 2015). Thus, the researchers explained that students perceived stress very differently during different weeks. Nonetheless, the last statement above is aligned with Pitt (2017) research. However, the opinions were dissimilar to Farhan and Khan (2015) research. The study described that the students faced higher stress when they moved to the middle and the end of the semester. Besides, the researchers claimed that these two periods were more stressful where assignment submission deadlines and final assessments were just close. Provided the researchers recruited respondents from different tertiary institutions. Therefore, the inconsistency of the timing they enrolled for their current semester might cause them to feel different stress levels. Hence, this might explain the fact why students faced different stress levels and resulting insignificant results for this hypothesis.

Other than that, Ganesan et al. (2018) research reported that coping techniques were significantly related to stress inversely. In other words, students who feel lesser stress tend to acquire better-coping techniques to handle their stress. In addition, according to Solomon (2013) study, stress negatively corresponded with resilience. On top of that, the researchers identified high resiliency linked with high academic achievements. Therefore, the current researchers make a possible interpretation by linking all these three variables together. The prediction was that most of the respondents might opt for adaptive coping techniques while handling their stress. With more practices of adaptive coping methods, they might get to build

a higher resilience since they were able to adapt to the stressful environment. Hence, they might not feel that stress is a massive issue for them. Consequently, the adaptive coping methods and high resiliency might just further lead the respondents to feel that their stress is not a burden for them. Thus, they would observe stress as having a nonsignificant connection with their academic performance.

Next, regarding the third hypothesis, the research supported it in which there was a significant relationship between sleep quality by gender with their academic achievements. Although the findings of the current research were the opposite of Lai and Say (2013) study, there was still literature that came across similar finds with this research (Toscano-Hermoso et al., 2020; Salmani et al., 2020).

In the work of Toscano-Hermoso et al. (2020), the researchers indicated that women presented a higher risk in reporting their poor sleep quality than men significantly. Other than that, Salmani et al. (2020) study also confirmed that women facing poor sleep quality, such as having sleeping disorders, and this affecting their academic performances significantly. Conversely, an interesting study from Leak (2020) revealed that gender was not significantly affecting the numbers of waking, sleep latency, and sleep duration. However, they found women faced more sleeping disturbances on weekends. They predicted that women might not gain as much as the men benefit from the recovery sleep during the weekends. In other words, the researchers suggested that men slept more during weekends and to recover from there. Thus, this might explain why sleep would not significantly influence men undergraduates on academic performance.

Nevertheless, the current research supported the fourth hypothesis, in which there was a significant relationship between stress by gender with their academic performance. The findings were in agreement with Mehfooz and Haider (2017). Next, based on Verma et al. (2011) study, it revealed that males and females respond to stress distinctly in terms of a

biological and psychological perspective. However, the neurobiologists claimed that the biological relationship was still under the exploration stage. Besides, Bamuhair et al. (2015) research reported that females utilized coping strategies more significantly than men. Through the findings, women applied positive coping techniques and negative coping methods as well. Next, a past study by Monteiro et al. (2014) revealed female undergraduates were more likely to engage in wishful thinking and disemploy problem-focused strategies more than male undergraduates. Likewise, Anbumalar et al. (2017) study identified that different gender adopts various kinds of stress coping techniques differently and significantly. For females, they were more inclined to utilize spiritual practice to handle their stress. Whereas males, they were more prone to adopt active stress coping techniques more in dealing with their stress. Plus, the results revealed that perceived stress was significantly associated with coping methods. Thus, the current researchers suggested the female participants might use ineffective ways to get through the stress. Hence, this condition might lead them to perceive stress as significant in influencing their academic performance.

Last but not least, the current research rejected the fifth hypothesis. Based on the results, it only revealed that sleep quality was significantly related to academic performance. Unfortunately, the researchers were unable to discover the significant associations between stress and also academic achievements. According to Ahrberg et al. (2012) study, it explored similar variables as the current research. However, it could not detect the causal associations among sleeping quality, stress, and academic achievements. Contrastingly, Taylor et al. (2013) paper reported the same findings as to the current research. Taylor et al. (2013) disclosed that sleeping quality significantly tied with academic achievements with minimal effect only. However, they found Perceived Stress Scale (PSS) loses its significant effect after comprising all the possible predictors. Besides, a study ran by Scott et al. (2019) explained that the undergraduates might have significantly faced stress. The stress level

might bring a negative effect on their sleep quality and further affect their academic performance. Thus, the researchers believed the indirect influence of stress on the undergraduates' sleeping quality caused them to feel sleep quality significantly influencing their academic achievements rather than the stress.

5.2 Implications of the Study

5.2.1 Theoretical Implication

The findings of this current study could serve as a reference for undergraduate students in Malaysia to have a better understanding on what is the variable that might affect their academic performance. The current study presented that it was not stress, but sleep quality has a significant and negative correlation with their academic performance. This contributed to the research gap as there were limited past studies examining sleep quality and stress, which variables significantly contribute towards academic performance.

Past studies showed inconsistent results for the association between sleep quality and academic performance, the researchers argued on the correlation between these two variables and caused confusions for the community. Thus, the current study aims to figure out the answer for the correlations between these two variables. The results of the current study filled in the research gap mentioned above, which indicated the negative correlation among these two variables. Other contributions of the current study, which is towards the relationship among sleep quality and stress by gender towards academic performance. The results also indicated that gender differences did play a significant role in the relationship of these variables.

5.2.2 Practical Implication

The current study revealed that it was sleep quality, but not stress significantly correlated with undergraduate students' academic performance. A past study by Voinescu and Szentagotai-Tatar (2015) showed that sleep hygiene played a significant role in

maintaining satisfactory sleep, and the awareness of sleep hygiene was significantly worse among young adults. Therefore, a sleep hygiene awareness campaign could be organized by university from time to time to highlight the importance of sleep hygiene towards satisfactory sleep and academic performance. Meanwhile, it is also suggested to organize sleep hygiene workshops to further explain how to practice sleep hygiene to have better sleep quality, thus increasing their academic performance.

Moreover, the current study also created self-awareness and self-reflections among the undergraduate students in Malaysia while they are filling in the survey. By realizing their current sleep quality, it might raise their awareness and thus lead to behaviour change to have a better sleep quality, as all behaviour change starts with an awareness and the intention to change.

5.3 Limitations

There may be some possible limitations in this study. One of the limitations include the difference in open book test and closed book test. Due to the Covid-19 pandemic, the government of Malaysia had issued the Movement Control Order (MCO) that takes effect from 18th March 2020 in order to increase the social distance and delay the spread of the Coronavirus. The Education Ministry had implemented online learning as all of the education institutions remained closed during Covid-19 pandemic. All of the universities implement final assessment and online examination which is open book test as the substitute of physical examination which is closed book test. According to Goothy et al. (2019), the results show that the stress levels were significantly higher in closed book tests compared to open book tests. It can be concluded as students will perceive lower stress levels in open book tests and more higher stress levels in closed book tests. Therefore, it might influence the accuracy of the current research's results compared to past research.

Moreover, the next limitation of current study is measurement which is the self-reported questionnaires. It means all of the participants need to answer the questionnaire solely by themselves. When answering the questionnaires, participants may also have difficulties to recall their actual perceptions and behaviours. Regarding the limitations of self-reported questionnaires, it could be argued that the significance of CGPA is entirely dependent on the honesty of the undergraduate student (Elagra et al., 2016). However, the possibility of undergraduate students to be dishonest may be impossible since they are voluntary and anonymous to engage in this study.

Another possible limitation is the target participants of current research is the CGPA might also get influenced by the participants that come from different Universities. According to the Public Services Commission of Malaysia (n.d), the calculations of CGPA for each university in Malaysia may differ from one another. Furthermore, undergraduate students from different universities might have a big difference in sleep quality and stress level. For example, some studies have shown that medical students perceived more stress and low sleep quality compared to other university students (Sohail, 2013; Abdulghani et al., 2014; Azad et al., 2015; Melaku et al., 2015; Mirghani et al., 2015; Anuradha et al., 2017; El Hangouche et al., 2018; Maheshwari & Shaukat, 2019; Jalali et al., 2020; Siraj et al., 2020). Therefore, it might influence the accuracy of the result of the current study since the participants come from different universities in Malaysia.

On the other hand, the possible limitation of this study is the number of females in the sample was higher than the male. The big difference in gender ratio might influence the result as the current study has discussed the gender difference between sleep quality and stress with academic performance.

5.4 Recommendations

There are some suggestions to improve in the future study. First of all, the researchers may conduct the research when the undergraduate students are conducting a physical exam which is closed book tests. Researchers are able to figure out the difference between closed book tests and open book tests and compare it with the present study. Therefore, it might increase the accuracy of the results.

Moreover, the researchers could improve the accuracy of self-reports through survey design by asking the participants to estimate their behaviour in a specific period. For example, the researchers could ask the participants to estimate their stress level and sleep quality during the exam preparation period when answering the questionnaire. Furthermore, the researchers can start the data collection during the exam preparation week of undergraduate students in order to gain more accurate data.

Moreover, the next recommendation suggested to improve in the future study is the researchers could consider conducting the study on some specific universities. It may further increase the accuracy of the data collection of the sleep quality, stress and academic performance among the undergraduate students among the same university. This is because there is a high possibility that most of the undergraduate students that are from the same university might have more similar sleep quality and stress. Therefore, it can avoid the bias of the difference in difficulty of the degree courses and be able to obtain reliable and accurate results.

The researchers could pay attention to the gender ratio of the participants when conducting research that is studying gender differences. The imbalanced ratio of gender might impact the accuracy of the result. In future study, researchers could collect a more balanced gender ratio when studying research of gender differences in order to obtain more accurate results.

5.5 Conclusion

The current study aims to investigate the relationship between sleep quality and stress on academic performance followed by gender differences among undergraduate students in Malaysia. The findings revealed that sleep quality was significantly correlated with academic performance negatively. Moreover, there was no significant relationship between stress and academic performance. Furthermore, there was a significant relationship between sleep quality and stress by gender with their academic performance. Lastly, the current study cannot determine the causal relationships among sleep quality, stress and academic performance. Hence, the current study contributed findings to serve as a reference for undergraduate students to understand the possible factors which could affect their academic performance. Therefore, undergraduate students can adopt effective intervention in order to increase their academic performance.

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Appendix A

Perceived Stress Scale (PSS)

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate by circling how often you felt or thought a certain way.

Name: _____ Date: _____

Age: _____ Gender (Circle): **M** **F** Other: _____

0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often

1.	In the last month, how often have you been upset because of something that happened unexpectedly?	0	1	2	3	4
2.	In the last month, how often have you felt that you were unable to control the important things in your life?	0	1	2	3	4
3.	In the last month, how often have you felt nervous and “stressed”?	0	1	2	3	4
4.	In the last month, how often have you felt confident about your ability to handle your personal problems?	0	1	2	3	4
5.	In the last month, how often have you felt that things were going your way?	0	1	2	3	4
6.	In the last month, how often have you found that you could not cope with all the things that you had to do?	0	1	2	3	4
7.	In the last month, how often have you been able to control irritations in your life?	0	1	2	3	4
8.	In the last month, how often have you felt that you were on top of things?	0	1	2	3	4
9.	In the last month, how often have you been angered because of things that were outside of your control?	0	1	2	3	4

10.	In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	0	1	2	3	4
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Appendix B

Sleep Quality Scale (SQS)

The following survey is to know the quality of sleep you had for the last one month. Read the questions and check the closest answer.

Examples

Rarely : None or 1 -3 times a month

Sometimes : 1 -2 times a week

Often : 3 -5 times a week

Almost always : 6 -7 times a week

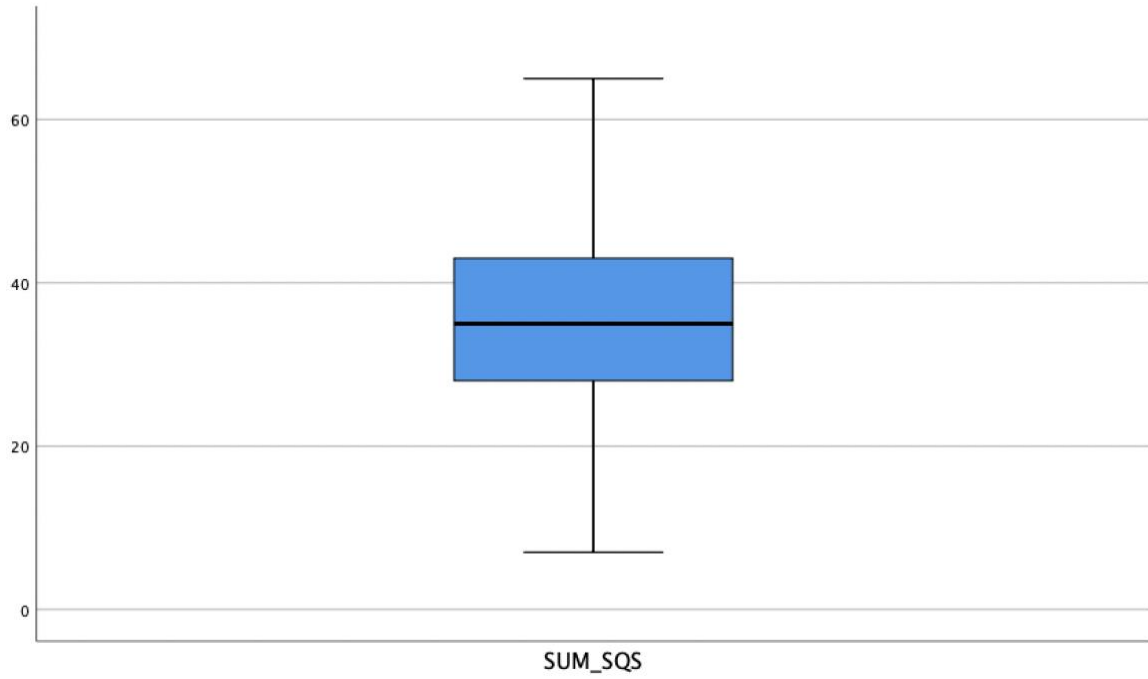
		Rarely	Sometimes	Often	Almost always
1	I have difficult falling asleep.				
2	I fall into a deep sleep.				
3	I wake up while sleeping.				
4	I have difficulty getting back to sleep once I wake up in middle of the night.				
5	I wake up easily because of noise.				
6	I toss and turn.				
7	I never go 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 hard for me 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 tired at work.				
27	I have clear head after sleep.				
28	Poor sleep makes my life painted.				

Appendix C

Boxplots for Sleep Quality Scale (SQS)

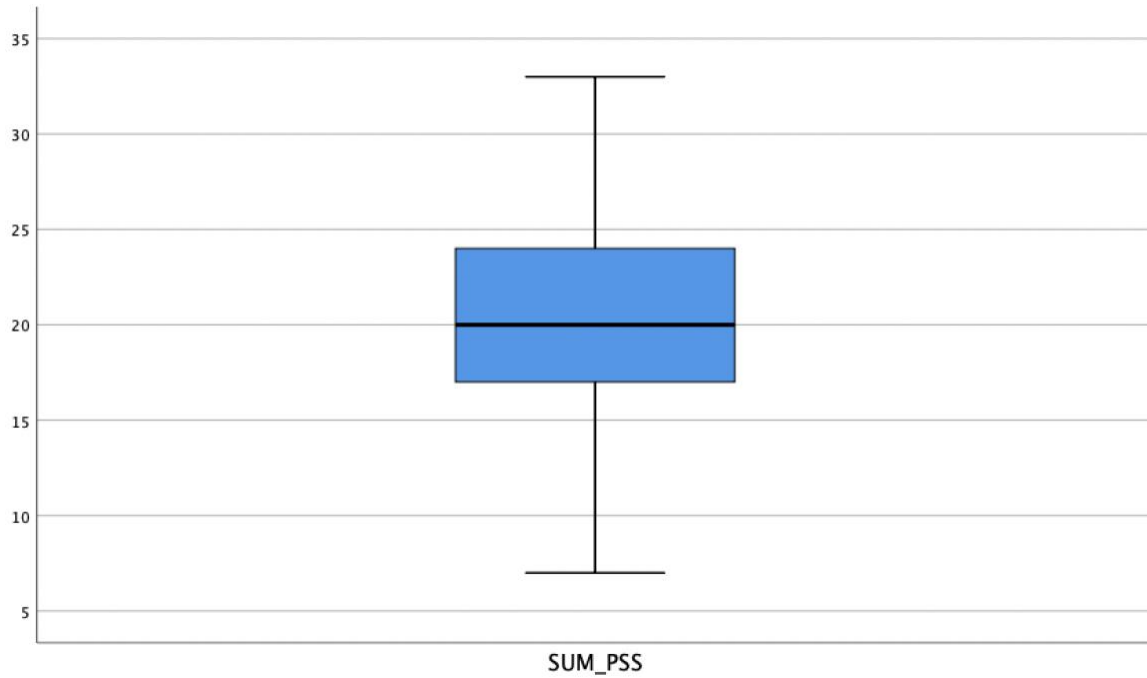
SUM_SQS



Appendix D

Boxplots for Perceived Stress Skills (PSS)

SUM_PSS



Appendix E

Turnitin Originality Report

Sleep quality, stress and academic performance among
undergraduate students in Malaysia

ORIGINALITY REPORT

11 %	6 %	4 %	9 %
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

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