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## The Impact of Psychological Factors on Sleep Quality among Public University Students in Klang Valley, Malaysia

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### Abstract

A good night's sleep is essential for human mental and physical health, and chronic sleep deprivation has been related to impaired neurobehavioral function. This study aims to determine the relationship between internet addiction, loneliness, and cognitive workload on sleep quality among public university students in Klang Valley. A total of 400 respondents involved from three public universities in Klang valley. A self-administered questionnaire was used as a tool for data collection. The result revealed that most of the respondents had moderate level of internet addiction, loneliness, and cognitive workload. Meanwhile, the result also showed that majority of the respondents scored low level severity of sleep quality. In addition, cognitive workload, loneliness and internet addiction were positively correlated with sleep quality issues. Multiple regression analysis showed that loneliness and cognitive workload were significant predictors of sleep quality issues among the students with cognitive workload as the strongest predictor. This study concluded that undergraduate students' cognitive workload, loneliness and internet addiction were important in influencing the undergraduate students' sleep quality issues. By understanding the impact of these psychological factors on sleep quality particularly among the undergraduate students, it helped to minimize the possibility of undergraduate students' sleep quality issues in order to promote and maintain a healthy lifestyle for them. Thus, the impact and implications of this study will be discussed.

**Keywords:** Sleep Quality, Cognitive Workload, Loneliness, Internet Addiction, Public University Students

### Introduction

Sleep is a state of consciousness that has a significant effect on one's health, well-being, and quality of life (Irwin, 2015). Sleep is vital for memory consolidation, learning and is clearly essential for the efficient accumulation of both declarative and procedural information and skills (Kootesh et al., 2016). To support optimum health, according to the National Sleep Foundation's sleep time period guidelines, it is suggested that healthy young adults (18-25

years old) sleep 7 to 9 hours a night (Hirshkowitz et al., 2015). Meanwhile, from the university students' context, with the hectic student lifestyle where they have to meet their course schedule between classes, exams, work, extracurricular and social activities most likely fail to get a good sleep of 7 to 9 hours a night. Since time is limited, students must effectively manage their time to avoid falling behind (Kaur & Singh, 2016). Majority of university students say that they cannot get enough sleep because they are required to complete assignments or prepare for quizzes, exams, or assessments until late at night (Nurismadiana, 2018). Sleep may not be the main priority for university students in the light of their academic requirements, as they decrease their sleeping time to free up more time for studying and workload (Ahrberg, 2012).

A good sleep quality are well-known predictors of physical and mental health, as well as cognition (Irwin, 2015). Research worldwide has discovered that students who have low sleep quality perform poorly on exams and are more depressed than their peers (Vanderlind, 2014). Poor sleep quality can affect university students' academic performance because sleep is essential for cognitive processes and for the physical and mental health well-being. Physical illnesses such as hypertension, heart disease, neurological diseases, digestive conditions, and cancer, as well as mental disorders such as depression and anxiety, are all linked to poor sleep quality (Bonvanie, 2016). Due to the potential risks of low sleep quality, the extent to which the factors affect sleep quality of university students should be paid a close attention to. Hence, the present study will shed light on the internet addiction, loneliness and cognitive workload which should be prioritized for intervention to prevent and defend against low sleep quality as sleep is a fundamental part of human beings and it has a high impact on education of university students in particular.

According to Kuss et al (2014), internet addiction is described as a preoccupation with using the internet, inability to regulate the urge to use the internet, and continued use of the internet despite varying degrees of functional disability. Whilst, loneliness develops when an individual's essential need is not met by the community or environment, resulting in social isolation or thoughts of disconnection (Cacioppo et al., 2015). Meanwhile, cognitive workload refers to the proportion of cognitive resources used per unit of time to attain a task's necessary performance (Wickens et al., 2015). Simply it means the cost of completing a task (Hart, 2006). Identifying which of these indicators is a risk factor for low sleep quality could give a basis for understanding sleep quality of university students.

There is research indicating that many sleep disorders have risk factors and symptoms amongst university students (Azad et al., 2015). Though suicidal ideation has long been related to mood, anxiety, and substance abuse disorders (Poorolajal et al., 2016), new links have been discovered with insomnia and other forms of sleep disturbance (Michaels et al., 2017). Internet addiction variable was identified as one of the important factors of sleep quality issues, which predicted sleep quality issues directly (Sami, 2018). Apart from that, there are few findings of association between cognitive workload and sleep quality issues (Jansen et al., 2019; Goel et al., 2014; Laethem et al., 2018).

Moreover, limited studies had been done regarding the internet addiction, loneliness, cognitive workload and sleep quality issues among university students. Most of the previous studies only focused on the prevalence of sleep quality which will be affected by either

internet addiction (Sami, 2018), loneliness (Shochat et al., 2013) or cognitive workload (Jansen et al., 2019; Geol et al., 2014; Laethem et al., 2018). There was no research study considered combining these three variables that had relationships to one another and it is very important to study these factors since nurturing physically and mentally well students is crucial for public health promotion.

In continuation, it is critical to comprehend the factors that influence sleep quality among university students of Klang Valley, especially the unique predictor. Internet addiction, loneliness and cognitive workload are all factors that are intertwined (Kroese et al., 2016; Yang et al., 2020; Dewi et al., 2021). It is also vital to intervene and prevent poor sleep quality among university students in order to ensure that university students complete their academic studies and graduate. In light of the above concerns, this study aims to look at internet addiction, loneliness, cognitive workload and sleep quality among students of Public University in Klang Valley with specific research questions as follows:

1. What are the levels of internet addiction, loneliness, cognitive workload and sleep quality?
2. What are the relationships between internet addiction, loneliness and cognitive workload on sleep quality?
3. What are the unique factors that predicts sleep quality?

## **Psychological Issues Related to Sleep Quality among University Students**

### ***Internet Addiction***

People's quality of life has increased as telecommunications have developed, but behavioural addictions such as Internet and social media addiction have now become prevalent (Rajesh & Rangaiah, 2020). The internet is a valuable resource for everyone, but particularly for adolescents who enjoy receiving and sharing personal, social, and educational information (Dong et al., 2020). Problematic internet use is becoming a big public health concern in many countries as people spend more time online (Jorgenson, et al., 2016). While there is no specific definition of Internet addiction (Monacis et al., 2018), it is generally described as Internet usage that is excessive, obsessive-compulsive, uncontrollable, and tolerance-inducing, and is linked to any online activity that causes tension in social relationships and impairments and malfunctions in normal everyday life (Kalaitzaki & Birtchnell, 2014).

People's communications, schooling, commerce, and other facets of their lives have all benefited from easy access to Internet technologies, however, addiction to Internet technology is on the rise all over the world (Rajesh & Rangaiah, 2020). University students relied on the Internet to find literature and relevant information because it was both cost-effective and widely available for recreational purposes. The advent of the internet that leads to Internet addiction among university students could be due to their flexible study schedules, free access to the internet in the hostel, and the lack of parental restrictions. According to Ching et al (2017), university students who spent excessive and unnecessary time on the Internet were more likely to become addicted to it. Based on various results of past research, it can be concluded that the internet addiction was negatively and significantly associated with individual health. Universities should provide their students with more robust learning, networking, and entertainment channels in order to boost self-efficacy and self-esteem while also reducing negative Internet addiction.

***Loneliness***

Humans are sociable creatures by nature. Likewise, Baumeister and Leary (1995) claimed that as humans, we have a fundamental motivation, “a need to belong” that drives our ideas, emotion, and social interaction. “A pervasive urge to develop and sustain at least a minimum number of permanent, positive, and substantial interpersonal relationships” is what this urge to belong implies. As a result, people who have continuous issues forming and maintaining satisfactory relationships with others, and hence have difficulty meeting their belongingness requirements, are more prone to feel deprived, manifesting as disturbances like loneliness, despair, anxiety, and rage (Henderson et al., 2021).

Significant relationships had been revealed between loneliness and sleep quality. In addition to biological factors, the environment and social relationships seem to have an effect on sleep quality (Shochat et al., 2014). Sleep quality issues are more common among people who are socially isolated or otherwise unhappy with their social relationships, so loneliness plays a key part on sleep quality (Henderson et al., 2021). In a study conducted by Smith et al., (2012), there was a notable positive relationship between loneliness and sleep quality related issues. According to this correlation, higher levels of perceived loneliness are related to higher sleep quality issues. Therefore, various studies are needed to determine the deeper relationships between loneliness and sleep quality issues to provide guidance on possible sleep quality interventions.

***Cognitive Workload***

Humans are capable of a wide range of complicated and astounding abilities. Adapting training and work restrictions to the mental needs of the individual can improve skilled performance (Raduntz, 2017). Cognitive workload is a word that relates to the expense of accomplishing a task (Hart, 2006). It is the quantity of cognitive resources consumed per unit time to achieve the task's performance requirements (Wickens et al., 2015). Cognitive workload occurs when the time required to perform a job exceeds the time available, and vice versa. It occurs as a result of humans' limited working memory capacity (Wickens et al., 2015). Cognitive workload has long been recognised as a crucial part of human-machine interaction. The basic ways of measuring cognitive workload can be subjective measurement, performance measurement, and psychophysiological assessment (Raduntz, 2017).

Meanwhile, there has been quite less research on the association between cognitive workload and sleep quality issues. According to the research conducted by Jansen et al., (2020), higher cognitive workload is associated with lower overall sleep quality in young adults. Although both sexes had associations with mental intensity and short sleep, male students had positive associations with poor sleep quality while female students with higher mental intensity, recorded better overall sleep quality. According to Jansen (2020), a higher mental workload is linked to higher overall sleep quality issues whereby heavy workloads induce a homeostatic sleep response by increasing subjective exhaustion and sleepiness and decreasing the time of awakening after sleep, in addition to delaying sleep onset. This is to say that people who have a regular heavy workload have poorer sleep quality than those who have a low or moderate workload (Laethem et al., 2018).

## Method

### Population and sample selection

The targeted population for this current study were public universities in Klang Valley who were aged 19-27. Klang valley public universities undergraduate students from Universiti Putra Malaysia (UPM), Universiti Kebangsaan Malaysia (UKM) and Universiti Malaya (UM) were the samples of the current study. Those students from various races and regardless of their years of study as well as programmes were considered eligible to participate in this study. The sample size in the current study was 400 respondents from the total number of Malaysian undergraduate students in UPM, UKM and UM of 44,467.

### Data Collection

#### Measures

*Sleep Quality.* The Sleep Quality Index (SQI) was used to evaluate sleep quality. The 8-item SQI was developed by (Urponen et al., 1991). The items related to how often they had difficulty falling asleep, waking up during the night, waking up too early in the morning, disturbed night sleep, and insomnia. Response categories are; no, <3 days/week, and 3-7 days/week. Example of items are; "Difficulties falling asleep during the past 3 months" and "Disturbed night sleep during the past 3 months". The reliability was  $\alpha = .80$ .

*Cognitive workload.* The CarMen-Q questionnaire by Valdehita et al (2017) was used to assess the cognitive workload with 29 items that covers items on mental load which involves cognitive, temporal, and performance demands. Example of items are; "I have to make difficult decisions", "I have to work constantly, I cannot take breaks beyond strict regulations". The factor "emotional demands" is formed by 7 items related to the job's emotional and health consequences. 5 items constitute the "performance demands" factor that asks about the performance requirements as the level of responsibility, required accuracy of responses, and error severity. The reliability was  $\alpha = 0.93$ .

*Loneliness.* Hays and DiMatteo (1987) ULS-8, short-form scale, was used to evaluate loneliness of students of Klang valley public universities. The ULS-8 Loneliness Scale contains 8 items with each item has a 4-level frequency score, with answer choices of 1 (never) to 4 (always). Example of items are; "There is no one I can turn to", and "I lack of companionship". The total score ranges from 8 to 32 points, with higher scores suggesting a higher degree of loneliness. The internal reliability of the ULS-8  $\alpha = 0.86$ .

*Internet Addiction.* The Compulsive Internet Use Scale (CIUS) (Meerkerk et al., 2009) was used to evaluate the degree of problematic Internet use behaviors among adults. This CIUS consists of 14 items which were developed to cover the 5 core elements of compulsive internet use, with each question representing a different element of that behavior. Example of items; "Do you find it difficult to stop using the Internet when you are online?", and "Do you continue to use the Internet despite your intention to stop?". The items based on a 5-point Likert scale, with 0 (Never) to 4 (very often). The reliability was 0.94.

### Results and Discussion

From Table 1, results for sleep quality showed that 50.2% had low levels of sleep quality issues indicating a good sleep quality. While 39.8% had moderate levels of sleep quality issues and only about 10.0% of the respondents showed high signs of sleep quality issues. Considering

that the current study was conducted during the pandemic to endemic phase, supporting to this data, a study has been conducted by Wright et al (2020), of sleep before and after stay-at-home orders among 139 students at a Colorado institution who had switched from in-person to online classes. During the stay-at-home phase, the students' nightly sleep duration increased by roughly 30 minutes on weekdays and 24 minutes on weekends. 92 percent of students received the necessary 7 hours or more of sleep each night during this time, compared to 84 percent previous to the stay-at-home period. Thus, this may show that with the current online classes, the students may have more sleeping time meanwhile a good night's sleep will positively influence sleep quality.

Additionally, for cognitive workload level, about 54.8% of the respondents had moderate cognitive workload levels. While, about 33.4% scored high levels of cognitive workload and only 11.8% respondents have low cognitive workload. The result shows consistent results with previous research whereby according to recent research by Widyanti et al (2020), one possible reason for cognitive workload is the consequences of online learning. Students have to be able to operate high-tech equipment like computers and the Internet in order to participate in e-learning. If the student's capacity to operate the equipment is limited, it is possible that it will raise the student's cognitive workload. If the students do not have the technical skills to operate the technology, the learning process of utilizing technology as a learning medium will result in increased pressure. When compared to traditional approaches, the usage of e-learning increases students' discomfort.

Meanwhile for loneliness, about 53.0% of the respondents reported a moderate loneliness level. While, about 27.3% of the respondents had a low loneliness level and only 19.8% tended to show a high level of loneliness. This result can also be supported from previous research by Labrague et al (2021) that shows home confinement, social isolation, and quarantine to manage infection, contribute significantly to a sense of loneliness among students by preventing them from associating with their friends. Furthermore, university and college closures may contribute to the development of loneliness among students, as college routines and activities have been recognized as important coping mechanisms, particularly for young people.

Finally, for internet addiction, majority of the respondents (58.0%) moderately reported being addicted to the internet. Moreover, the results also indicated that 28.2% of the respondents are in the category of high level of internet addiction. Only 13.8% scored a low level of internet addiction. This result was also supported by previous study by Hashemian et al (2014) which showed that, overall, 43.7 percent of 466 students placed in the internet addiction group had moderate addiction and severe Internet addiction. In addition, the online learning method requires most students to spend more time at home. Staying at home, not participating in extracurricular activities, the amount of time spent on the Internet each day, and the way of accessing the Internet were all found to be major contributors in the internet addiction pattern (Kumar & Mondal, 2018). Majority of individuals nowadays use the internet for recreational, intellectual, social, business, or leisure activities. Many people have unknowingly become addicted to the Internet over time, to the point that it is now a commonly recognized condition or issue (Baturay & Toker, 2019).

Table 1

*Level of sleep quality, cognitive workload, loneliness, and internet addiction.*

Level	n	%	Mean	SD	Min	Max
<u>Sleep quality issues</u>			1.596	.665	1	3
Low (1.00 – 1.66)	201	50.2%				
Moderate (1.67 – 2.34)	159	39.8%				
High (2.35 – 3.00)	40	10.0%				
<u>Cognitive workload</u>			2.218	.637	1	4
Low (1.00 – 2.00)	36	11.8%				
Moderate (2.01 – 3.01)	61	54.8%				
High (3.02 – 4.00)	5	33.5%				
<u>Loneliness</u>			1.93	.682	1	4
Low (1.00 – 2.00)	109	27.3%				
Moderate (2.01 – 3.01)	212	53.0%				
High (3.02 – 4.00)	79	19.8%				
<u>Internet addiction</u>			2.145	.632	1	5
Low (1.00 – 2.33)	55	13.8%				
Moderate (2.34 – 3.67)	232	58%				
High (3.68 – 5.00)	113	28.2%				

Meanwhile, on the relationships between the psychological factors on sleeping quality, Table 2 shows that there was a positive significant relationship between cognitive workload with sleep quality issues ( $r = .255, p > 0.01$ ). The finding was supported by previous studies which revealed that cognitive workload was significantly to have positive relation to sleep quality issues (Jansen et al., 2019; Laethem et al., 2018). Academic stress and intensive studying, which demands deep concentration and focus, may be linked to poor sleep quality, including problems falling asleep and staying asleep (Alsaggaf et al., 2016).

Moreover, there was a positive significant correlation between loneliness and sleep quality among the students with  $r = .208, p < .01$ . The result shows that the lower the score on loneliness among public university students in Klang valley, the least the students will deal with any sleep quality issues. The result showed similar findings with previous research which stated that there was a positive correlation between loneliness and sleep quality issues such as a study researched by Harris et al (2013) found that children in the high loneliness group took significantly longer to fall asleep and had significantly more sleep disruptions than those in the low loneliness group. People's relaxation and sleep quality may be disrupted as a result of their increased vigilance to loneliness (Hawkley & Cacioppo, 2010).



Furthermore, there was a positive significant correlation between internet addiction with sleeping quality ( $r = .145, p < 0.01$ ) which indicates that the lower the internet addiction, the lower the tendencies for the students to have sleep quality issues. The finding is in line with previous studies which found that internet addiction was significantly to have positive relation to sleep quality issues (Gamble et al., 2014). According to the theory of bedtime procrastination, internet addiction is a main component of nighttime procrastination, which leads to poor sleep quality (Kroese et al., 2016). College students' sleep time may be shortened as a result of bedtime procrastination, and a study found that short sleep increases the likelihood of sleep quality issues in young adults aged 17–25 years (Wong et al., 2013).

Table 2

*The relationship between psychological factors on sleeping quality issues.*

Variable	Sleeping Quality Issues	
	<i>r</i>	<i>p</i>
Cognitive workload	.255**	.000
Loneliness	.208**	.000
Internet addiction	.145**	.004

Note: \*\*\* Level of significant is at  $p < 0.001$

Multiple regression analysis was used to test if the internet addiction, loneliness or cognitive workload were able to predict sleep quality issues significantly. Based on Table 3, there were significant contributors to sleeping quality,  $F(3, 396) = 11.84, p < .001$ . Specifically, loneliness ( $\beta = .157, p = .012$ ) and cognitive workload ( $\beta = .215, p < .001$ ) significantly contributed to the prediction of sleeping quality issues among respondents with the predictors explained 8 percent of the variance. These results have been supported by previous study by Van et al., (2014) on bidirectional relations between work-related stress, sleep quality and perseverative cognition. People with a persistent high cognitive workload have high sleep quality issues than those with a low or moderate cognitive workload. This explained the student's cognitive workload as the strongest unique predictor among other variables. Students who spend more time studying dedicate less time to sleep, which is one clear reason for the link between cognitive workload and sleep quality issues. The amount of time spent studying, assignments, and reading, as well as the awareness of academic pressure and coping techniques, are often connected with sedentary behavior and excessive screen time, both of which have been linked to poor sleep quality. Especially, nighttime studying on light emitting gadgets, in particular, can improve nighttime alertness (Jansen et al., 2020). To be concluded, cognitive workload tended to increase issues in having a good quality of sleep among the students.

Table 3

*Multiple regression in determining the main indicators Sleep Quality Issues among students.*

Variable	Altruistic Prosocial Behaviour			
	B	SE. B	Beta, $\beta$	p
Cognitive workload	.159	.039	.215	.000
Loneliness	.089	.035	.157	.012
Internet addiction	-.017	.035	-.035	.576
<b>R<sup>2</sup></b>	.082			
<b>Adjusted R<sup>2</sup></b>	.075			
<b>F</b>	11.84			

### Significance of Sleep Quality in Student's Life

The current research is critical in many ways. It adds to our knowledge of university students' sleep quality and, in particular, the factors that influence sleep quality. As according to Gaultney (2010), 27% of all university students seem to be at risk for at least one sleep disorder. In addition, research conducted by Schlarb et al (2015), has shown that at least 7.7% of students suffer from insomnia and 24.3% from nightmares. Student's academic performance is seriously affected by poor sleep quality and disorders. Sleep disorders in university students are often linked to mental health concerns, in addition to academic factors. Students with insomnia are more likely to experience mental health issues such as chronic fatigue, depression, stress, decreased optimism, anxiety, and a poorer quality of life (Tang et al., 2017). In University, students leave their home and usual surroundings into a new social and academic environment and reduced parental supervision. The findings showed that loneliness among students in university has been linked to poor sleep quality (Shankar, 2020). There is also evidence to suggest that internet addiction (Sami, 2018) and cognitive workload (Geol et al., 2014) prevalent among university students.

Furthermore, the results aid in raising community awareness of the importance of recognizing the risk factors that influence sleep quality, which includes authorities, parents, and students. Depressive and anxiety symptoms are widespread among university students who don't get enough sleep, according to a study by (Lemma et al., 2012). It's also worth mentioning that there's a link between cognitive workload and anxiety and depression symptoms, which might affect students' sleep quality (Bao et al., 2017). Professionals may take preventive actions in helping the students from bearing too much cognitive workload and in reducing loneliness. According to a report, Facebook use and internet addiction have been linked to high sleep quality issues (Bowler & Bourke, 2019). It is important to investigate the relationships as students sleep are vital because of its significant effects on the development of important psychophysiological functions, including behavior, emotions, and attention (Kootesh et al., 2016).

Furthermore, the preliminary results of this study may stimulate more sleep quality related studies in the Malaysian context. As sleep undeniably a major part of every human being, poor sleep quality among students is fast becoming a significant problem worldwide, more sleep quality related studies are needed to provide knowledge that will enable us to reduce the negative impact of poor sleep quality especially for the vulnerable group which is

university students since they deal with heavy mental workload, internet usage and loneliness. Students primarily use the Internet for education, information discovery, entertainment, communication, and social networking.

Lastly, the results emphasize the importance of stakeholders in education formulating concrete policies and initiating initiatives to aid in the implementation of these policies and programmes for better sleep quality among university students. Many recognize the importance of this student population but fail to understand the problems which they face. Therefore, promoting and maintaining good sleep quality for university students must be acknowledged. According to Rojo-Wissar et al (2019), it is important to research these relationships in younger samples, such as college students, in order to extend the sleep quality literature, as this offers insight into possible mediators involved in studying sleep quality that could be targeted for intervention.

### **The impact and implications of the psychological factors on sleep quality**

This research has highlighted the significance of cognitive workload, loneliness, and internet addiction in managing and maintaining a good sleep quality among students at selected public universities in Klang valley. This study suggests that, despite the low number of students with sleep quality issues, there is an increase in cognitive workload among students which may affect students' sleep quality. Previous research found that cognitive workload, the amount of time spent on and the intensity of studying, homework, and reading, all of which are important aspects of university life, may lead to sleep quality issues. Considering sleep is a condition in which it is impossible to remain attentive for one's own safety, feeling lonely may make sleeping restfully more difficult. Moreover, internet addiction can result in worse sleep quality, shorter sleep duration, and a longer sleep latency. Thus, it is important for students to control and prevent internet addiction, loneliness, and cognitive workload in order to reduce sleep quality issues.

From the current study, cognitive workload, loneliness and internet addiction can be seen as factors that lead to sleep quality issues among university students. Internet addiction has been linked to a disruption in circadian rhythm, loneliness, and cognitive stress, all of which can affect bedtime and sleep length, resulting in daytime weariness and poor work performance. Poor sleep quality can have a negative influence on students' physical and mental health over time. It has been empirically proven that sleep quality issues have been associated with weight gain and obesity, cardiovascular disease, and type 2 diabetes, among other things. With good sleep quality, students will feel less sleepy, fatigued during the day and can make sure to stay awake during lectures. Students can be more productive, detail-oriented, and able to concentrate better when studying. There are a lot of implications that a person can make in preventing internet addiction and loneliness as well as control cognitive workload.

From the study's findings, it can be suggested that students be able to control internet addiction, loneliness and cognitive workload by developing awareness to increase their knowledge on these matters. Increased internet addiction and loneliness knowledge among college students can help not just students' well-being but also institutions' bottom lines. Senior students can help some of their most vulnerable new students at this time of need by utilizing resources, personnel, policies, and programmatic activities that place student mental

health on par with physical health. Universities can show the effect of internet addiction, loneliness, and cognitive workload through awareness programmes, which also provide students with the tools, language, and knowledge they need to improve positive coping and manage possible problems. Colleges and universities may spread a wide net around all students and guarantee that each community member has a shared vocabulary and knowledge of one of the issues that affects them the most by implementing sustainable awareness and education programmes as part of the academic experience. For example, universities may develop programmes focusing on counseling and support services that assist students in coping with loneliness, developing confidence, time management, and task management.

Apart from that, there is no doubt that there is a limited amount of systematic research in Malaysia on the influence of internet addiction, loneliness, and cognitive workload on undergraduate students' sleep quality. Understanding the influence of these psychological factors on sleep quality can assist to reduce the likelihood of undergraduate students struggling with sleep quality issues, as well as promote and maintain good mental health for them.

Furthermore, the findings give some assistance and a better understanding to local researchers, practitioners, and educators in order to stimulate additional study in the Malaysian setting. More sleep quality studies are needed to give knowledge that will help improve concentration and productivity, especially for the susceptible group of undergraduate students, because good sleep is a vital part of student life. Moreover, the possibility of adding fresh knowledge about the same or other elements linked to this topic for future study purposes might be considered. This research might be utilized as a model for society to offer a more conducive setting for undergraduate students' education.

### Conclusion

The issue of sleep quality is a complicated one. The elements that make up sleep quality, as well as their relative value, differ from person to person, making it a highly subjective matter. Thus, assessing the possible risk factors for sleep quality issues was considered contributable to research on, and it had a high impact on education in particular especially for university students. It therefore can be concluded that an adequate sleep is essential to refresh the students every day and help them in learning and memory processing and on top help in improving their mental and psychological well-being.

### Reference

- Ahrberg, K., Dresler, M., Niedermaier, S., Steiger, A., & Genzel, L. (2012). The interaction between sleep quality and academic performance. *Journal of psychiatric research*, 46(12), 1618-1622.
- Alsaggaf, M. A., Wali, S. O., Merdad, R. A., & Merdad, L. A. (2016). Sleep quantity, quality, and insomnia symptoms of medical students during clinical years: relationship with stress and academic performance. *Saudi medical journal*, 37(2), 173.
- Azad, M. C., Fraser, K., Rumana, N., Abdullah, A. F., Shahana, N., Hanly, P. J., & Turin, T. C. (2015). Sleep disturbances among medical students: a global perspective. *Journal of clinical sleep medicine*, 11(1), 69-74.

- Bao, Y. P., Han, Y., Ma, J., Wang, R. J., Shi, L., Wang, T. Y., ... & Lu, L. (2017). Cooccurrence and bidirectional prediction of sleep disturbances and depression in older adults: meta-analysis and systematic review. *Neuroscience & Biobehavioral Reviews*, 75, 257-273.
- Baturay, M. H., & Toker, S. (2019). Internet addiction among college students: Some causes and effects. *Education and Information Technologies*, 24(5), 2863-2885.
- Baumeister, R. F., & Leary, M. R. (2017). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Interpersonal development*, 57-89.
- Bonvanie, I. J., Oldehinkel, A. J., Rosmalen, J. G., & Janssens, K. A. (2016). Sleep problems and pain: a longitudinal cohort study in emerging adults. *Pain*, 157(4), 957-963.
- Bowler, J., & Bourke, P. (2019). Facebook use and sleep quality: Light interacts with socially induced alertness. *British Journal of Psychology*, 110(3), 519-529.
- Cacioppo, S., Grippo, A. J., London, S., Goossens, L., & Cacioppo, J. T. (2015). Loneliness: Clinical import and interventions. *Perspectives on Psychological Science*, 10(2), 238-249.
- Ching, S. M., Awang, H., Ramachandran, V., Sazlly Lim, S. M., Wan Sulaiman, W. A., Foo, Y. L., ... Hoo, F. (2017). Prevalence and factors associated with Internet addiction among medical students - A cross-sectional study in Malaysia. *Med J Malaysia*, 72(1), 7-11.
- Dewi, D. S., Khairunnafi, F., Dewi, R. S., & Sudiarno, A. (2021). The Effect of Mental Workload, Stress, and Learning Motivation on Student Learning Achievement during Online Courses. In 11th Annual International Conference on Industrial Engineering and Operations Management, IEOM 2021 (pp. 2321-2328).
- Dong, H., Yang, F., Lu, X., & Hao, W. (2020). Internet addiction and related psychological factors among children and adolescents in China during the coronavirus disease 2019 (COVID-19) epidemic. *Frontiers in Psychiatry*, 11, 751.
- Gamble, A. L., D'Rozario, A. L., Bartlett, D. J., Williams, S., Bin, Y. S., Grunstein, R. R., & Marshall, N. S. (2014). Adolescent sleep patterns and night-time technology use: results of the Australian Broadcasting Corporation's Big Sleep Survey. *Plos one*, 9(11), e111700.
- Gaultney, J. F. (2010). The prevalence of sleep disorders in college students: impact on academic performance. *J Am Coll Health*, 59(2):91-97.
- Goel, N., Abe, T., Braun, M. E., & Dinges, D. F. (2014). Cognitive workload and sleep restriction interact to influence sleep homeostatic responses. *Sleep*, 37(11), 1745-1756.
- Harris, R. A., Qualter, P., & Robinson, S. J. (2013). Loneliness trajectories from middle childhood to pre-adolescence: Impact on perceived health and sleep disturbance. *Journal of adolescence*, 36(6), 1295-1304.
- Hart, S. G. (2006). NASA-task load index (NASA-TLX); 20 years later. In Proceedings of the human factors and ergonomics society annual meeting (Vol. 50, No. 9, pp. 904-908). Sage CA: Los Angeles, CA: Sage publications.
- Hashemian, A., Direkvand-Moghadam, A., Delpisheh, A., & Direkvand-Moghadam, A. (2014). Prevalence of internet addiction among university students in Ilam: a cross-sectional study. *International Journal of Epidemiologic Research*, 1(1), 9-15.
- Hawkey, L. C., & Cacioppo, J. T. (2010). Loneliness matters: A theoretical and empirical review of consequences and mechanisms. *Annals of behavioral medicine*, 40(2), 218-227.
- Hays, R. D., & DiMatteo, M. R. (1987). A short-form measure of loneliness. *Journal of Personality Assessment*, 51,69-81.
- Hirshkowitz, M., Whiton, K., Albert, S. M., Alessi, C., Bruni, O., DonCarlos, L., ... & Hillard, P. J. A. (2015). National Sleep Foundation's sleep time duration recommendations: methodology and results summary. *Sleep health*, 1(1), 40-43.

- Irwin, M. R. (2015). Why sleep is important for health: a psychoneuroimmunology perspective. *Annual review of psychology*, 66, 143-172.
- Jansen, E. C., Peterson, K. E., O'Brien, L., Hershner, S., & Boolani, A. (2020). Associations between mental workload and sleep quality in a sample of young adults recruited from a US college town. *Behavioral sleep medicine*, 18(4), 513-522.
- John-Henderson, N. A., Oosterhoff, B., Kothe, K. M., Kampf, T. D., Hall, B., Johnson, L. R., ... & Carter, J. R. (2021). Loneliness and sleep in the American Indian Blackfeet community. *Sleep Health*, 7(4), 429-435.
- Jorgenson, A. G., Hsiao, R. C. J., & Yen, C. F. (2016). Internet addiction and other behavioral addictions. *Child and Adolescent Psychiatric Clinics*, 25(3), 509-520.
- Kalaitzaki, A. E., & Birtchnell, J. (2014). The impact of early parenting bonding on young adults' Internet addiction, through the mediation effects of negative relating to others and sadness. *Addictive Behaviors*, 39(3), 733-736.
- Kaur, G., & Singh, A. (2017). Excessive daytime sleepiness and its pattern among Indian college students. *Sleep medicine*, 29, 23-28.
- Kootesh, B. R., Raisi, M., & Ziapour, A. (2016). Investigation of relationship internet addict with mental health and quality sleep in students. *Acta Medica Mediterranea*, 32(5), 1921-25.
- Kroese, F. M., Evers, C., Adriaanse, M. A., & de Ridder, D. T. (2016). Bedtime procrastination: A self-regulation perspective on sleep insufficiency in the general population. *Journal of health psychology*, 21(5), 853-862.
- Kumar, M., & Mondal, A. (2018). A study on Internet addiction and its relation to psychopathology and self-esteem among college students. *Industrial psychiatry journal*, 27(1), 61.
- Kuss, D. D., Griffiths, M., Karila, L., & Billieux, J. (2014). Internet addiction: A systematic review of epidemiological research for the last decade. *Current pharmaceutical design*, 20(25), 4026-4052.
- Labrague, L. J., De Los Santos, J. A. A., Falguera, C. C. (2021). Social and emotional loneliness among college students during the COVID-19 pandemic: The predictive role of coping behaviors, social support, and personal resilience. *Perspect Psychiatry Care*, 57(4), 1578-1584.
- Laethem, M., Beckers, D. G., Geurts, S. A., Garefelt, J., Hanson, L. L. M., & Leineweber, C. (2018). Perseverative cognition as an explanatory mechanism in the relation between job demands and sleep quality. *International journal of behavioral medicine*, 25(2), 231-242.
- Lemma, S., Gelaye, B., Berhane, Y., Worku, A., & Williams, M. A. (2012). Sleep quality and its psychological correlates among university students in Ethiopia: a cross-sectional study. *BMC psychiatry*, 12(1), 1-7.
- Meerkerk, G. J., Van Den Eijnden, R. J., Vermulst, A. A., & Garretsen, H. F. (2009). The Compulsive Internet Use Scale (CIUS): some psychometric properties. *Cyberpsychology Behavior*. 12(1), 1-6.
- Michaels, M. S., Balthrop, T., Nadorff, M. R., & Joiner, T. E. (2017). Total sleep time as a predictor of suicidal behaviour. *Journal of sleep research*, 26(6), 732-738.
- Monacis, L., Sinatra, M., Griffiths, M. D., & de Palo, V. (2018). Assessment of the Italian version of the Internet Disorder Scale (IDS-15). *International journal of mental health and addiction*, 16(3), 680-691.

- Nurismadiana, I., & Lee, K. (2018). Factors Associated with Sleep Quality among Undergraduate Students at a Malaysian Public University. *International Journal of Public Health and Clinical Sciences*, 5(6), 373-391.
- Poorolajal, J., Haghtalab, T., Farhadi, M., & Darvishi, N. (2016). Substance use disorder and risk of suicidal ideation, suicide attempt and suicide death: a meta-analysis. *Journal of Public Health*, 38(3), e282-e291.
- Raduntz, T. (2017). Dual frequency head maps: A new method for indexing mental workload continuously during execution of cognitive tasks. *Frontiers in physiology*, 8, 1019.
- Rajesh, T., Rangaiah, D.B., (2020). Facebook addiction and personality. *Heliyon* 6 (1), e03184.
- Rodriguez-Lopez, A. M., Rubio-Valdehita, S., & Diaz-Ramiro, E. M. (2021). Influence of the Covid-19 pandemic on mental workload and burnout of fashion retailing workers in Spain. *International Journal of Environmental Research and Public Health*, 18(3), 983.
- Rojo-Wissar, D. M., Davidson, R. D., Beck, C. J., Kobayashi, U. S., VanBlargan, A. C., & Haynes, P. L. (2019). Sleep quality and perceived health in college undergraduates with adverse childhood experiences. *Sleep health*, 5(2), 187-192.
- Sami, H., Danielle, L., Lihi, D., & Elena, S. (2018). The effect of sleep disturbances and internet addiction on suicidal ideation among adolescents in the presence of depressive symptoms. *Psychiatry research*, 267, 327-332.
- Schlarb, A., Bihlmaier, I., Hautzinger, M., Gulewitsch, M. D., & Schwerdtle, B. (2015). Nightmares and associations with sleep quality and self-efficacy among university students. *Journal of Sleep Disorders and Management*, 1.
- Shochat, T., Cohen-Zion, M., & Tzischinsky, O. (2013). Functional consequences of inadequate sleep in adolescents: A systematic review. *Sleep medicine reviews*, 237, 121-133.
- Smith, S. S., Kozak, N., & Sullivan, K. A. (2012). An investigation of the relationship between subjective sleep quality, loneliness and mood in an Australian sample: can daily routine explain the links?. *International journal of social psychiatry*, 58(2), 166-171.
- Tang, J., Liao, Y., Kelly, B. C., Xie, L., Xiang, Y. T., Qi, C., ... & Chen, X. (2017). Gender and regional differences in sleep quality and insomnia: a general population-based study in Hunan Province of China. *Scientific reports*, 7(1), 1-9.
- Urponen, H., Partinen, M., Vuori, I., Hasan, J. (1991). Sleep quality and health: description of the sleep quality index. In: Peter JH, editor. *Sleep and Health Risk*. Berlin: Springer, 555–8
- Valdehita, S. R., Nunez, M, I. L., & Lopez-Higes, R., & Ramiro, E. D. (2017). Development of the CarMen-Q Questionnaire for mental workload assessment. *Psicothema*, 29, 570-576.
- Vanderlind, W. M., Beevers, C. G., Sherman, S. M., Trujillo, L. T., McGeary, J. E., Matthews, M. D., ... & Schnyer, D. M. (2014). Sleep and sadness: exploring the relation among sleep, cognitive control, and depressive symptoms in young adults. *Sleep medicine*, 15(1), 144-149.
- Wickens, C. D., Hollands, J. G., Banbury, S., & Parasuraman, R. (2015). Engineering psychology and human performance. *Psychology Press*.
- Widyanti, A., Hasudungan, S., & Park, J. (2020). E-Learning readiness and perceived learning workload among students in an Indonesian university. *Knowledge Management & E-Learning*, 12(1), 18-29.
- Wong, M. L., Lau, E. Y. Y., Wan, J. H. Y., Cheung, S. F., Hui, C. H., & Mok, D. S. Y. (2013). The interplay between sleep and mood in predicting academic functioning, physical health and psychological health: A longitudinal study. *Journal of psychosomatic research*, 74(4), 271-277.

Wright Jr, K. P., Linton, S. K., Withrow, D., Casiraghi, L., Lanza, S. M., de la Iglesia, H., ... & Depner, C. M. (2020). Sleep in university students prior to and during COVID-19 Stay-at-Home orders. *Current Biology*, 30(14), R797-R798.

Yang, X., Fan, C., Liu, Q., Chu, X., Song, Y., & Zhou, Z. (2020). Parenting styles and children's sleep quality: Examining the mediating roles of mindfulness and loneliness. *Children and Youth Services Review*, 114, 104921.