Association between Quality of Sleep and Academic Performance: Evidence from Undergraduate Students from Sabah, Malaysia

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Abstract
Sleeping patterns have been one of the most essential aspects of one's lives, which also contribute to memorization and learning. However, undergraduate students seem to underestimate the importance of sleep by skipping a night of sleep to spend time on other works. As a result, their academic performance is affected due to poor sleep quality. Thus, this study was conducted to examine the relationship between quality of sleep and academic performance among undergraduate students in Sabah. This study comprised a convenience sample of 407 undergraduate students aged 18-26 as participants. The data were obtained through a questionnaire survey, where participants were required to provide demographic information, cumulative grade point average (CGPA) and select Sleep Quality Scale (SQS). The findings show a positive correlation, r=0.342, p<0.05 shows there is a positive relationship between the quality of sleep and academic performance among undergraduate students in Sabah. Thus, students need to focus on their sleep quality in order to improve their quality of life overall as adequate sleep leads to the physical health and well-being of a student.
Keywords: Quality of Sleep, Academic Performance, Undergraduate Students, Malaysia

Introduction
Initially, in university lifestyle, every student struggles to strive and achieve as many accomplishments as possible that can help them gain good results in their respective courses. Physiologically, poor sleep quality can lead to lower levels of health condition and higher fatigue (Krenek, 2006). While, psychologically it results in emotional instability, less self-assurance, more impulsiveness, and recklessness (Jenkins, 2005). Studying students usually have the misconception that sleeping time can be given up to study to eventually score good results in exams. But, they do not realise that adequate sleep is an important tool that could

make them score well in the exams. Sleep quality is an essential element in a students' daily life as it is vital for memory consolidation which in turn is critical for the successful academic performance of students. Although many sleep-related types of research associates with academic performance, few types of research studies especially on sleep quality and academic performance among specific subjects.

Student performances in academics are much related to many factors such as motivation, creativity, rewards, and sleep quality. Furthermore, many types of research that have been done on sleep is mainly based on sleep duration (Zeek et al., 2015), daytime sleepiness (Rodrigues et al., 2002), sleep habits (Johns et al., 1976), sleep deprivation (Al Ghamdi, 2013) and many more in relation to academic performance. There are only very few studies on sleep quality as a whole and academic performance as sleep quality here includes daytime symptoms, restoration after sleep, problems initiating and maintaining sleep, difficulty waking, and sleep satisfaction. Moreover, there are only little empirical researches in Malaysia that focus on sleep quality and academic performance. Hence, this study to find out the relationship between quality of sleep and academic performance among undergraduate students in Sabah has a rational reason to be conducted.

The salient function of sleep is for the consolidation of memory which lets us recall back what we have studied, which eventually is crucial for successful academic performance among students. Beyond the effects of sleep on memory consolidation, lack of sleep or sleep distributions has been linked to poor attention and cognition. Rasch and Born (2013). Hence, the quality of one's sleep is important for better academic performance especially for university students who strive for success in their academics. In order to score higher CGPA, they need to have better sleep quality. Indeed, this study is supported by the previous research conducted by Maheshwari and Shaukat (2019) as the study proves that there is a relationship between sleep quality and the academic achievement of students. This is because students experience poor sleep quality as they face high academic stress and pressure most of the time. They force themselves to study with stress in order to score well in exams. In addition, adequate sleep is essential to refresh them every day and help in learning and memory processing. Not getting enough sleep can lower the alertness and concentration level.

On the other hand, similar research conducted in Malaysia itself among nursing students at the International Islamic University of Malaysia about the relationship between sleep quality and academic performance showed a positive correlation among the variable. Hence, this research is supported as it has a similar correlation as this study among undergraduate students which is the better the sleep quality of a student, the greater the academic performance in terms of CGPA of the students. Conversely, this study of there is a relationship between sleep quality and academic performance is not supported by a past study which was conducted on 102 Kermanshah University medical science students in Iran. The result of this study indicated that there is no significant difference between the sleep quality of students with high grades and those with low grades. Hence, the research was done by Jalali et al. (2020) shows that the students' quality of sleep and their academic performance is not correlated with is contradictory to this current research. The objective of this study is to investigate the relationship between quality of sleep and academic performance among undergraduate students in Sabah.

Literature Review

Mirghani et al (2015) has conducted a study among Sudanese medical students assessing the relationship between sleep quality and academic performance among the students. Their study revealed that a strong relationship is evident between good sleep quality and high academic performance among Sudanese medical students. On the contrary, although many pieces of research show that sleep quality is largely correlated with academic performance or CGPA of the respective subjects, some researches show contrasting results to it. A study was done on the effect of sleep quality on the academic achievement of 102 Kermanshah University medical science students in Iran (Jalali et al., 2020). Although, the results indicated that there is no significant difference between the sleep quality of students with high grades and those with low grades. Nevertheless, the study suggests that longitudinal studies should be performed instead to control confounding factors hence to conclude with more certainty. Whereas studies that are conducted among no depressed students also present that students who have clinically poor sleep quality are associated with poor academic results (Gilbert and Weaver, 2010). The finding that sleep quality is an important component of academic success is alarming and works as a wakeup call for the college psychologist students who do not receive an adequate quality of sleep. In this study, it is also found that the sleep habits of many students are quite poor, highlighting the need to consider sleep quality as well as quantity.

Similar research was also conducted in 2017 on Nigerian University students. It is found from the study that the academic achievement of students with good sleep quality has a higher score than those who are poor quality sleepers. On the other hand, their level of perceived stress and factors that influence poor sleep quality and poor academic performance was also examined in this study (Seun-Fadipe and Mosaku, 2017). Sometimes, not only sleep quality alone aids in better cognitive functioning which eventually results in better academic performance, while sleep duration and sleep consistency also help students to score better in their exams (Okano et al., 2019). The study found that longer sleep duration, better sleep quality, and greater sleep consistency were associated with better academic performance among the students. Besides, students experience poor sleep quality as they face high academic stress and pressure most of the time. They force themselves to study with stress in order to score well in exams (Maheshwari and Shaukat, 2019). Hence, adequate sleep is essential to refresh them every day and help in learning and memory processing. Sleep disturbances are said to be common among medical students and that impacts their academic performance. At this point, the study proves that sleep quality has an impact on academic performance among medical students in this case. Moreover, some studies have been conducted in Malaysia on sleep quality and academic performance. The finding of the study shows that sleep quality has an impact on academic performance among nursing students in the International Islamic University of Malaysia (Aung et al. 2016) In order to measure the sleep quality of the 105 nursing students, Pittsburgh Sleep Quality Index (PSQI) was used. In a conclusion, although these previous researches studies on sleep quality and academic performance, differ in the terms of the subject that is being studied. Moreover, most of the researchers used Pittsburgh Sleep Quality Index (PSQI) to measure the sleep quality of the participants. Meanwhile, in this research, Sleep Quality Scale (SQS) is used to measure the sleep quality of the undergraduate students in Sabah. Whereas these researches could be a guide for the study of sleep quality and academic performance among undergraduate students in Sabah.

Methodology

The research design is a study using a quantitative approach. This study applies the cross-sectional survey method since the data of this study is collected at one point in time. The total population student from first year to fifth year is around 5000 student. Respondents in this study were randomly selected from different faculties at one of the public university in Sabah using the Krejcie and Morgan (1970) method, which the researcher needs around 357 where the survey was conducted among 407 undergraduate students. The online questionnaire consisted of sections A and B, where section A focused on demographic information such as gender, age, ethnicity, faculty, year of study and cumulative grade point average (CGPA) and section B focused on measuring the quality of sleep experienced by respondents using the Sleep Quality Scale (SQS). Section B consists of 28 items where SQS evaluates six domains of sleep quality: daytime symptoms (e.g., Item 19: poor sleep causes me to make mistakes at work), restoration after sleep (e.g., Item 9: I feel unlikely to sleep after sleep), problems initiating and maintaining sleep (e.g., Item 6: I toss and turn), difficulty waking (e.g., Item 25: I have difficulty getting out of bed), and sleep satisfaction (e.g., Item 20: I am satisfied with my sleep). In this questionnaire, a five-point, Likert-type scale is used to encourage the respondent to convey how strongly they agree with a given statement or disagree with it. The scale is denoted as (1) rarely, (2) sometimes, (3) neutral, (4) often, and (5) almost always. The data were collected using Google Forms. After collecting student data, the IBM Statistical Package for Social Sciences (SPSS) Version 23.0 was used to analyse the data. Pearson Correlation is used to measure the relationship between the two quantitative continuous variables to gain results from the study.

Data Analysis

The data in Table 1 shows that out of 407 respondents, 144 (35.4%) were male while 263 (64.6%) were female. In terms of age groups, the respondents aged 18-19 were 19 (4.7%), 20-21 were 65 (16%), 22-23 were 231 (56.7%) and 24-25 were 92 (22.6%). While in terms of ethnicity, 125 (30.7%) were Malays, 100 (24.6%) were Chinese, 68 (16.7%) were Indians, 84 (20.6%) were Sabahans and lastly 30 (7.4%) were Sarawakians. In terms of faculty, 91 (22.4%) respondents were from the Faculty of Psychology and Education (FPP), 76 (18.7%) from the Faculty of Engineering (FKJ), 65 (15.9%) from the Faculty of Business, Economics and Accounting (FPEP), 57 (14%) from the Faculty of Science and Natural Resources (FSSA), 46 (11.3%) from the Faculty of Social Sciences and Humanities (FSSK), 23 (5.7%) from the Faculty of Food Science and Nutrition (FPSK), 8 (1.9%) from the Faculty of Computing and Informatics (FKI) and 41 (10.1%) from the Faculty of Medicine and Health Sciences (FSMP). In addition, in terms of year of study, 34 (8.4%) were the first-year student, 107 (26.3%) were second-year student, 221 (54.3%) were third-year student, 38 (9.3%) were the forth-year student and 7 (1.7%) were the fifth-year student. Lastly, undergraduate students who scored ranged 2.40-3.44 were 198 (48.6%) respondents while 3.45-3.78 was 209 (51.4%) respondents.

Table 1.
Demographic data of gender, age, ethnic, faculty, year of study and Cumulative Grade Point Average (CGPA)

Items		Frequency (f)	Percentage (%)
Gender	Male	144	35.4
	Female	263	64.6
Age	18-19	19	4.7
	20-21	65	16
	22-23	231	56.7
	24-25	92	22.6
Ethnic	Malay	125	30.7
	Chinese	100	24.6
	Indian	68	16.7
	Sabahan	84	20.6
	Sarawakian	30	7.4
Faculty	FPP	91	22.4
	FKJ	76	18.7
	FPEP	65	15.9
	FSSA	57	14
	FSSK	46	11.3
	FPSK	23	5.7
	FKI	8	1.9
	FSMP	41	10.1
Year of Study	Year 1	34	8.4
	Year 2	107	26.3
	Year 3	221	54.3
	Year 4	38	9.3
	Year 5	7	1.7
Cumulative Grade Point Average (CGPA)	2.40-3.44	198	48.6
	3.45-3.78	209	51.4

Table 2 showed the correlation between the quality of sleep and academic performance. The study revealed a positive correlation, r = 0.342, p< 0.05 which means that there is a positive relationship between the quality of sleep and academic performance among undergraduate students from Sabah. All in all, the findings indicate that good sleep quality will have a positive impact on the students' academic performance.

Table 2.
Pearson's Correlation Between Quality of Sleep And Academic Performance Among Undergraduate Students From Sabah

		Quality of Sleep	Academic Performance
Quality of Sleep	Pearson Correlation	1	.342**
	Sig. (2-tailed)		.000
	N	407	407

**p < 0.001

Discussion

As found in this study, r = 0.342, p < 0.05, shows a positive relationship between quality of sleep and undergraduate students' academic performance. From this study, it is found that the greater the sleep quality of a student, the higher their academic performance in terms of CGPA. This finding can be coherent with the finding of past researches as stated by Mirghani et al. (2015). The study conducted among Sudanese medical students revealed that there is a strong relationship is evident between good sleep quality and high academic performance among Sudanese medical students. Hence, this supports the hypothesis of this study that sleep quality and academic performance of undergraduate students have a significant relationship looking at the r-value of Pearson correlation which is .342. On the other hand, similar research conducted in Malaysia itself among nursing students at the International Islamic University of Malaysia about the relationship between sleep quality and academic performance showed a positive correlation among the variable. Hence, this research is supported as it has a similar correlation as this study among undergraduate students which is the better the sleep quality of a student, the greater the academic performance in terms of CGPA of the students. In this study, it is revealed that the better the quality of sleep of a student, the better their academic performance. This can be well explained by the theory of information consolidation. This theory explains that sleep helps us process information and store the things that we have learned in a day into long-term memory. According to Born and Wilhelm (2012), sleep prepares us to face the day fresh. This clearly shows that the brain of a student who has poor sleep quality stores information in their brain in a poor manner. Hence, storing information poorly in their brain will eventually cause them to perform poorly on exams which lead to gaining lower CGPA.

Subsequently, according to the repair and restoration theory of sleep, a night of good sleep is essential for revitalizing and restoring the physiological processes that keep the body and mind healthy and properly functioning (Ezenwanne, 2011). This theory suggests that NREM sleep is important for restoring physiological functions; while REM sleep is essential in restoring mental functions as both psychological and mental functioning is crucial for the brain to function well. Lacking in sleep quality such as waking up while sleeping, light sleeping, and difficulty getting back to sleep once awakened and others will disturb the NREM and REM sleep, hence lowering the cognitive function. This could eventually lead to poorer academic performance which proves the research question. According to Okano et al. (2019), sleep quality is not only a factor that could aid in better cognitive functioning which eventually results in better academic performance. Whereas sleep duration and sleep consistency also help students to score better in their exams (Rathakrishnan et al., 2017). Hence, this study is supported as variables such as sleep consistency and sleeps duration and as well as sleep quality was examined in association with academic performance. The is the prove that student who having quality of sleep they also have stress which will effect their performances in their studies (Rathakrishnan and Chan, 2013) .Although the current study of finding the relationship between sleep quality and academic performance does not include the variable of sleep quantity, it is hoped that in future studies this should also be included in the researches. Moreover, it would be interesting to tie this factor into another study in the future for upcoming researches. Also, a study conducted by Aung et al. (2016) which was conducted in Malaysia shows similar results as this current research. The finding of the study shows that sleep quality has an impact on academic performance among nursing students in the International Islamic University of Malaysia. While in the study, to measure the sleep quality

of the 105 nursing students, Pittsburgh Sleep Quality Index (PSQI) was used. Meanwhile, in this current study on finding the relationship between sleep quality and academic performance among undergraduate students, Sleep Quality Scale (SQS) was used.

Conclusion

As for the limitation of this study is that there are other factors that have not been controlled in this study. For example, a study conducted by Gilbert and Weaver (2010) among no depressed students presents that students who have clinically poor sleep quality are associated with poor academic results. This study of identifying the relationship between sleep quality and academic performance of undergraduate students does not conduct on non-depressed students. Hence, this proves that the quality of sleep has a weak correlation to the academic performance of undergraduate students. This study has explored that the undergraduate students in Sabah having a poor quality of sleep which also has a negative impact on their academic performance. Therefore, students should be educated on the importance of sleep quality and durations as it can lead to short-term and long-term health consequences. Furthermore, a study should be conducted on the relationship between the poor quality of sleep and physical as well as mental wellbeing. This is because it can explore possible causes and appropriate preventive measures and treatments for students who are suffering from a poor-quality sleep.

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