Original Research Article

The relationship between sleep quality and happiness among preclinical students in a medical school

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ABSTRACT

Background: Sleep quality significantly impacts both mental and physical well-being. Sleep disorders are prevalent, especially among medical students, who often overlook the importance of good sleep. This study aimed to examine sleep quality, assess happiness levels, and explore the relationship between sleep quality and happiness among preclinical students.

Materials and Methods: A cross-sectional study was conducted with preclinical students (Year 1 and Year 2 of Bachelor of Medicine and Bachelor of Surgery) from Manipal University College Malaysia. An online questionnaire was distributed, covering demographic data, sleep quality (measured using the Pittsburgh Sleep Quality Index), and happiness (assessed using the Oxford Happiness Questionnaire). Data were analyzed using Microsoft Excel and SPSS, with multiple linear regression used to evaluate the relationship between sleep quality and happiness.

Results: A sample of 305 participants, comprising 66.6% females and 33.4% males, participated in the study. Sleep latency analysis revealed that 25.9% of students fell asleep within 30-45 minutes, while 6.2% took 5-6 hours. Most students (55.4%) rated their sleep as fairly good, and 43.3% slept 6-7 hours per night. A significant majority (81.3%) had high sleep efficiency (>85%). The study found that 66.6% experienced minor sleep disturbances. The happiness score revealed that 53% of participants were moderately happy, with family playing a crucial role in their happiness. In the multiple linear regression analysis, the p-value for subjective sleep quality was 0.005, and for daytime dysfunction, it was less than 0.001. Both subjective sleep quality and daytime dysfunction scores significantly predicted happiness levels.

Conclusion: A significant association was found between subjective sleep quality, daytime dysfunction, and happiness. Preclinical students with better sleep reported higher happiness levels. Interventions to improve sleep quality, such as counselling sessions, may enhance student well-being and academic performance.

1. Introduction

Sleep quality holds an extremely significant role for everyone in their daily life.[1] Sleep is a basic need for a human being to continue daily activities effectively.[2]

The lack of awareness of the importance of sleep is very detrimental to one's health and can lead to long-term side effects and undesirable consequences.[3] Sleep is foundational to supporting robust and healthy physical and mental health, with its effects being particularly pronounced in critical environments like medical school. A review of the literature reveals that poor sleep quality is very common

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among medical students, owing to academic pressures and irregular schedules, and is related to poor cognitive performance and negative emotional well-being.[4] This is important because poor quality sleep is associated with higher stress, depressive symptoms, and cognitive decline, all of which can affect students' ability to do well in school and life.[5]

Recent research reveals concerning rates of sleep problems experienced by (medical) students all over the world, with nearly half of students reporting poor sleep quality.[6] In a study with Mediterranean medical and nursing students, a great number of them reported a suboptimal sleep quality, where factors such as academic pressure, the usage of smartphones and high mental stress were responsible for such a high suboptimal sleep quality.[7] Medical students regularly have disrupted sleep and shorter sleep duration, tightly linked to depressive symptoms, irritability, and poor academic performance.[8] In addition, medical students with inadequate sleep have shown a greater risk for anxiety and depressive symptoms evidence should intervene. The results of a study examining the effects of COVID-19 on Iranian medical students found that those who scored lowest for sleep quality were also reporting the highest levels of depression, indicating that poor sleep could enhance the risk for mental health problems.[9]

The established goal of this study was to evaluate sleep quality and happiness levels and the correlation between sleep and happiness among preclinical students at Manipal University College Malaysia (MUCM). The study hopes to inform future wellness initiatives using these relationships that help students achieve both academic achievement and maintain their mental health.

2. Materials and Methods

2.1. Study design and sampling method

A cross-sectional design was used to study the relationship between sleep quality and happiness among preclinical students at MUCM, Melaka, Malaysia. Participant selection was done using a simple random sampling method from the population to achieve representation and minimize selection bias.

2.2. Ethical approval

Before data collection, ethical approval was obtained from the Research Ethics Committee (Ref: 071/2022) at MUCM to safeguard the rights, safety, dignity, and well-being of the research participants. Consent forms were also provided to participants along with the questionnaire.

2.3. Questionnaire

An online questionnaire was structured which consisted of three sections; section A regarding the demographic data, section B about the sleep quality assessment, and section C that evaluates the happiness of students. The questionnaires were validated (by three lecturers from the faculty) and pre-tested (answered by foundation students) before being sent out to the participants. Pittsburgh Sleep Quality Index (PSQI) and Oxford Happiness Questionnaire (OHQ) were used as references for this research. This content validity was established to ensure the questionnaire items cover all relevant aspects of the constructs being measured.

These PSQI and OHQ questionnaires are standard and widely used to assess the quality of sleep and happiness. PSQI can be used as an efficient tool to measure the quality of sleep by assessing subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, sleeping medication and daytime dysfunction.[10,11] Each of the sleep components yields a score ranging from 0 to 3 with 3 indicating the greatest dysfunction. OHQ contains 29 questions. Each question consists of four choices, depicting the amount of happiness as unhappy, mildly depressed, low level of happiness and high level of happiness.

2.4. Sample size calculation

The sample size can be calculated by using the formula developed by Krejcie and Morgan.[12] The total number of preclinical medical and dental students, N is incorporated into the formula below to find out the required sample size for this research:

$$S = \frac{X^2 \, NP(1-P)}{d2(N-1) + X2 \, P(1-P)}$$

Where: S is the required sample size, X^2 is the chi-square value based on the desired confidence level, P is the estimated proportion of the population, d is the margin of error. This formula accounts for both population size and the variability within the population, allowing for the determination of an adequate sample size that represents the larger group accurately.

2.5. Method of study

Data were analysed using Microsoft Excel and SPSS. Sleep quality components were then used as predictor variables and happiness score was used as a dependent variable to evaluate the association between sleep quality and happiness scores using multiple linear regression. This approach facilitated examining the impact strength and significance of the effect of each sleep quality component on happiness while controlling other variables in the model.

3. Results

3.1. Demographic data

For this research project, a sample size of 305 participants was obtained. Based on the sample size, the percentage of

female participants outweighs the male participants with 66.6% female participants and 33.4% male participants. The largest percentage of participants in this research, 41%, were first-year MBBS students, followed by first-year BDS students, second-year MBBS and second-year BDS students in MUCM. As for nationality, the participants comprised 76.7% Malaysians and 23.3% Non-Malaysians.

3.2. Sleep latency

Sleep latency is the amount of time taken for an individual to fall asleep after turning the lights out.[13] The analysis of this research project presents that 25.9% of participants have a sleep latency score of 0 hours which shows the vast majority of participants can fall asleep between 30 to 45 minutes after lights have been turned out while 6.2% of participants have sleep latency scores of 5 and 6 hours. This indicates a minor percentage of participants require 5 and 6 hours to be able to fall asleep after the lights have been turned out.(Table 1)

3.3. Subjective sleep quality

Subjective sleep quality refers to the overall quality of sleep acquired by participants. Based on data analysis, it indicates that 55.4% of participants have fairly good sleep quality whereas 6.9% of participants have very bad sleep quality. This outcome is a result of students frequently using electronic devices for study purposes, which serves as an easy distraction and makes it more difficult to get a good night's sleep.(Table 2)

3.4. Sleep duration

In terms of sleep duration, 43.3% of participants obtained 6-7 hours of sleep followed by 32.5% obtaining 5-6 hours, 15.7% obtaining less than 5 hours of sleep and lastly 8.5% of participants obtained more than 7 hours of sleep. This is due to the extensive study hours required to revise for classes and tests as a medical student, which results in students getting less sleep each day.(Table 3)

3.5. Habitual sleep efficiency

Habitual sleep efficiency is the ratio between the time a person spends asleep and the total time dedicated to sleep. 81.3% of participants have a habitual sleep efficiency of more than 85%. This result of more than 85% habitual sleep efficiency shows that the majority of preclinical students at MUCM prioritize sleep and realize that a good night's sleep and having slept well are essential for maximizing learning during classes. Results also indicate a minor percentage which is 3% of participants have habitual sleep efficiency of less than 65%. (Table 4)

The formula used to calculate Habitual Sleep Efficiency:

$$\frac{Number\ of\ hours\ slept}{Number\ of\ hours\ spent\ in\ bed} \times 100$$

3.6. Sleep disturbances

Based on the participants of this research project, 9.2% of them have 0 sleep disturbances while 66.6% of participants have 1-9 sleep disturbances. Participants are asked if they have experienced specific issues during the past month, such as waking up in the middle of the night or early morning, having to use the bathroom during the night, feeling too hot or too cold, having bad dreams, and other disruptions. The frequency of these disturbances is rated on a scale from 0 (not during the past month) to 3 (three or more times a week). A higher score in this component indicates more frequent sleep disturbances during the past month (the maximum score for 9 factors of disturbance is 27). Upon further questioning, students who do experience sleep disturbance did mention the cause is due to their hectic schedule which affects their sleep quality. The data shows bad weather and nightmares are the most common factors which are affecting students' sleep among the participants of MUCM. (Table 5)

3.7. Sleeping medication

Sleeping medication was not taken during the past month by 97.4% of participants which indicates that a large percentage of participants do not depend on sleeping medication to acquire good sleep whereas 1% of participants take sleeping medication less than once a week. Medical students are often vulnerable to stress and anxiety which can cause sleeping problems and burnout which leads to the usage of sleeping pills to aid sleep for a minor percentage of medical students.(Table 6)

3.8. Daytime dysfunction

Data obtained for this research indicates that 42% of participants have only a very slight problem whereas 12.1% of participants face a very big problem when it comes to daytime dysfunction. Students are having trouble getting things done during the day due to lack of sleep which directly impacts their performance the next day. (Table 7)

3.9. Happiness score

There are 29 questions for evaluating the happiness score. Based on the happiness score results, 53% of participants are just moderately happy. Following 27% of participants are not particularly happy. 19% of participants are pretty happy. 2% are somewhat happy. Hence, the happiness score of the majority of preclinical students of MUCM is just moderate.

3.10. Factors for happiness

For this section students were allowed to choose multiple options which are social activities, money, friends, food & family. Based on the results, the majority of participants,

Table 1: Percentage of sleep latency among preclinical students at MUCM (n = 305)

Sleep latency		Frequency	Percentage	Valid Percent	Cumulative Percent
Valid	0	79	25.9	25.9	25.9
	1-2	61	20.0	20.0	45.9
	3-4	50	16.4	16.4	62.3
	5-6	56	18.4	18.4	80.7
	4	21	6.9	6.9	87.5
	5	19	6.2	6.2	93.8
	6	19	6.2	6.2	100.0
	Total	305	100.0	100.0	

Table 2: Percentage of subjective sleep quality among preclinical students at MUCM (n = 305)

Subjective sleep quality		Frequency	Percentage	Valid Percent	Cumulative Percent
Valid	Very good	38	12.5	12.5	12.5
	Fairly good	169	55.4	55.4	67.9
	Fairly bad	77	25.2	25.2	93.1
	Very bad	21	6.9	6.9	100.0
	Total	305	100.0	100.0	

Table 3: Percentage of sleep duration among preclinical students at MUCM (n = 305)

Sleep duration		Frequency	Percentage	Valid Percent	Cumulative Percent
Valid	> 7 hours	26	8.5	8.5	8.5
	6-7 hours	132	43.3	43.3	51.8
	5-6 hours	99	32.5	32.5	84.3
	< 5 hours	48	15.7	15.7	100.0
	Total	305	100.0	100.0	

Table 4: Percentage of habitual sleep efficiency among preclinical students at MUCM (n = 305)

Habitual sleep efficiency		Frequency	Percentage	Valid Percent	Cumulative Percent
Valid	> 85%	248	81.3	81.3	81.3
	75-84%	34	11.1	11.1	92.5
	65-74%	14	4.6	4.6	97.0
	< 65%	9	3.0	3.0	100.0
	Total	305	100.0	100.0	

Table 5: Percentage of sleep disturbance among preclinical students at MUCM (n = 305)

Sleep disturbance		Frequency	Percentage	Valid Percent	Cumulative Percent
Valid	0	28	9.2	9.2	9.2
	1-9	203	66.6	66.6	75.7
	10-18	67	22.0	22.0	97.7
	19-27	7	2.3	2.3	100.0
	Total	305	100.0	100.0	

Table 6: Percentage of sleeping medication among preclinical students at MUCM (n = 305)

Sleeping medication	Frequency	Percentage	Valid Percent	Cumulative Percent
Not during the past month	297	97.4	97.4	97.4
Less than once a week	3	1.0	1.0	98.4
Once/ twice a week	2	.7	.7	99.0
3 or more times a week	3	1.0	1.0	100.0
Total	305	100.0	100.0	

Table 7: Percentage of daytime dysfunction among preclinical students at MUCM (n = 305)

Daytime dysfunction	Frequency	Percentage	Valid Percent	Cumulative Percent
No problem et all	54	17.7	17.7	17.7
Only a very slight problem	128	42.0	42.0	59.7
Somewhat of a problem	86	28.2	28.2	87.9
A very big problem	37	12.1	12.1	100.0
Total	305	100.0	100.0	

Table 8: Relationship between happiness (constant) and subscales on sleep quality among preclinical students at MUCM (n = 305)

Model	Unstandardized Coefficients	Standardized Coefficients		t	Sig.
	B	Std. Error	Beta		
Happiness	4.273	.110		38.830	.000
Subjective sleep quality	-.171	.060	-.183	-2.851	.005
Sleep latency	-.029	.025	-.073	-1.159	.247
Sleep duration	.071	.051	.085	1.403	.162
Sleep efficiency	-.050	.061	-.048	-.819	.413
Sleep disturbance	.039	.072	.033	.536	.592
Use of sleep medication	-.105	.112	-.052	-.939	.349
Daytime dysfunction	-.184	.048	-.234	-3.859	.000

80.7% of participants chose the family as an option out of food, friends, money & social activity. The results indicate that preclinical students at MUCM prioritize their families to a greater extent. Hence, family plays a vital role in the happiness of preclinical students of MUCM.

3.11. Multiple linear regression on happiness and subscales on sleep quality

Based on the multiple linear regression, the p-value for subjective sleep quality is 0.005 and the p-value for daytime dysfunction is less than 0.001. Subjective sleep quality score and daytime dysfunction score were significant predictors of happiness levels.

4. Discussion

Their PSQI scores show that the majority of students experience sleep disturbances less than once a week. Even these low-frequency disturbances can have profound impacts on academic and personal well-being. Studies point out that medical students can have many lifestyle factors that can contribute to sleep problems including long stretching studying hours, academic stress, screen time, and sleep disorders such as sleep apnoea, however that academic demands combined with long stretches of studying late at night and pre-sleep anxiety can exacerbate sleep issues further, creating a cycle of anxiety and insufficient sleep leading to poor health and academic results.[14] Medical students remain "submerged in studies" based on their findings of longer study times, studying just before sleep, and associated anxiety about their studies and results.[15] The study among medical students in Pakistan shows that poor quality of sleep is linked with poorer academic performance, cognitive difficulties and poorer memory retention, a crucial skill for medical education.[16] This lifestyle pattern can create a vicious cycle, where anxiety and inadequate sleep hinder academic performance, and poor grades, in turn, increase stress and disrupt sleep even more. In contrast, adequate sleep has a crucial role in enhancing cognitive skills especially memory retention.[16]

Sleep quality affects emotional well-being and happiness, in addition to performance. MUCM preclinical students conveyed moderate happiness scores, which correspond to findings by Jiang et al.[17] that university students are typically not happy. Sleep quality is strongly related to happiness, as measured by sleep quality and daytime functioning, and by how happy and how stable a person is in life. Research shows that students who get enough sleep, have a more positive view of life, are happier, and tend to be less stressed.[18] Also, family support has an important role in students' happiness, controlling students' emotional stability and encouragement which makes students able to succeed academically when the problem time makes them sad or unable to study.[19] Hence, these results highlight the importantrole of sleep quality promotion for medical students to promote academic success as well as mental health. Education and awareness on sleep habits and stress management, as well as screening for sleep disorders, might be helpful interventions that

improve sleep quality and enable students to experience a more balanced and satisfying academic experience.[20]

5. Conclusion

Therefore, our research has concluded that sleep is associated with happiness. A suggestion for medical college management is to provide activity or counselling sessions for preclinical students of MUCM to increase life satisfaction and promote a healthy lifestyle to prevent sleep problems among the students. It will also help to educate preclinical students of MUCM regarding the importance of sleep quality and happiness.

6. Sources of Funding

7. Conflict of Interest

The authors declare none.

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