

## SLEEP QUALITY AND ASSOCIATED FACTORS AMONG THIRD-YEAR MEDICAL STUDENTS AT CAN THO UNIVERSITY OF MEDICINE AND PHARMACY

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### ABSTRACT

**Background:** Sleep is a condition of reduced stimulation that allows the body to recoup and re-energize. Hence, poor sleep will affect the body's capacity to think and focus, raise the risk of health issues, and have a negative impact on learning, causing occupational mistakes and accidents. A busy theoretical study schedule, a clinical practice schedule at the hospital and a tight exam schedule will have certain impacts on the sleep quality of medical students. **Objectives:** Evaluation of quality and some factors related to sleep in third-year full-time medical students at Can Tho University of Medicine and Pharmacy. **Materials and methods:** A cross-sectional descriptive study was conducted on 200 students studying full-time medicine, course 45, Can Tho University of Medicine and Pharmacy (CTUMP). **Results:** Of the 56.5% of students who reported insomnia, mild insomnia accounted for 49%, moderate insomnia for 7.5%, and severe insomnia for none. The rate of reduced sleep quality was 72.7% in the group of students who consumed caffeine and 52.0% in the group who did not; the connection was statistically significant with a p-value of 0.01. The group with high physical activity had the lowest prevalence of insomnia (45.8%), and this association was statistically significant ( $p < 0.05$ ). **Conclusions:** More than half of third-year full-time medical students (56.5%) experience mild to moderate insomnia with a mean PSQI scale score of  $5.95 \pm 3.00$  and mean sleep duration of  $6.26 \pm 1.07$  hours. Sleep quality in third-year medical students at CTUMP was affected by physical activity and caffeine usage.

**Keywords:** PSQI, sleep quality, medical student, Can Tho.

### I. INTRODUCTION

Sleep is easily differentiated from other altered states of consciousness, such as coma and anesthesia, based on EEG recordings [13]. Poor sleep quality can negatively affect memory, concentration, and problem-solving abilities. Interns on a conventional schedule with more than 24 hours of work made 36.0% more major medical mistakes than interns on a normal schedule [8].

According to a research by Hai Phong University of Medicine and Pharmacy on 407 students in 2021, third-year medical students had the lowest average sleep time (6.20 hours) and the greatest percentage of poor sleep quality at 63.1% [2]. We researched the quality of sleep in medical universities in the Mekong Delta, particularly at Can Tho University of Medicine and Pharmacy, with the following purposes: 1). To assess the sleep quality of Can Tho University of Medicine and Pharmacy full-time third-year medical students; 2). To evaluate some associated factors to sleep quality of Can Tho University of Medicine and Pharmacy full-time third-year medical students.

## II. MATERIALS AND METHODS

### 2.1. Study population

Study participants were full-time medical students at CTUMP, course 45.

#### 2.1.1. Standards for selection

Students participating in the research were third-year medical students at CTUMP.

#### 2.1.2. Standard for elimination

Students with a history of neuropsychiatric illnesses; students who have stopped attending school; students who withhold their academic results.

#### 2.1.3. Study site and time

The research was conducted at CTUMP from June 2021 to December 2021.

### 2.2. Methods

#### 2.2.1. Study design

This was an analytical cross-sectional descriptive study.

#### 2.2.2. Study size

The study sample size was determined according to the following formula:

$$n = z_{1-\frac{\alpha}{2}}^2 \times \frac{p(1-p)}{d^2}$$

With

$n$ : is the estimated sample size for the study.

$z_{1-\frac{\alpha}{2}}$ : is the confidence coefficient.

$\alpha$ : is the design significance level (with  $\alpha = 0.05$ ).

$p = 0.631$ .

Based on a study conducted at Hai Phong University of Medicine and Pharmacy,  $p$  was the rate of third-year medical students who have insomnia [2].

$d$ : is the allowable error, with  $d = 0.07$ .

The study was conducted on a total of **200** samples.

#### 2.2.3. Sampling method

Through convenient sampling, all subjects who matched the criteria for the study were invited to participate until there were adequate samples to conduct an extensive search. Questionnaires were introduced and interviewed face to face to the study participants individually.

#### 2.2.4. Study content

Pittsburgh Sleep Quality Index (PSQI) was used for the assessment of the subject's sleep quality, which was grouped into 7 domains (sleep duration, sleep disturbance, sleep latency, daytime dysfunction, sleep efficiency, subjective sleep quality and use of sleep

medication). The domain scores are summed to produce a global score: <5: no insomnia, 5-10, 10-15, 15-21 indicates mild, moderate, severe insomnia respectively.

The strategy was applied to evaluate caffeine consumption: do not use caffeine and use caffeine in the last month, if the objects used caffeine, the frequency of using caffeine in a week would be collected. Physical activity was assessed through the WHO Global Physical Activity Questionnaire (GPAQ). The levels of physical activity were converted to METs for the GPAQ questionnaire. They were then categorized as follows: low, moderate, and high with METs score <600, 600-3000, ≥3000 MET-minutes per week respectively.

The DASS21-S, a subdomain of the DASS-21 (Depression Anxiety Stress Scale), was used as a tool for stress evaluation; it has 7 items with four evaluation levels from 0 to 3 scores, with higher scores showing greater agreement with the item. The scores of 7 items are added together and multiplied by a factor of 2 to determine the result which then categorized as follows: Normal (0-14 scores), mild stress (15-18 scores), moderate stress (19-25 scores), severe stress (26-33 scores), extremely severe stress (34-42 scores).

### 2.2.5. Statistical analysis

The SPSS 26.0 program was used to analyze all data in line with accepted medical statistics methods.

### 2.2.6. Ethics approval

The Medical Ethics Committee of CTUMP on Medical Research gave permission to our research with No. 21.401-HYDCT.

## III. RESULTS

### 3.1. General information

**Table 1.** General information

Variables		Frequency (Percentage %)	Variables	Frequency (Percentage %)		
Age	Mean ± SD, min-max	21.08±0.33, 21-24	GPAQ activity levels	Low	126 (63.0%)	
				Gender	Male	99 (50.5%)
Female	101 (49.5%)	High			24 (12.0%)	
Caffeine usage	Yes	142 (71.0%)		Stress levels	Normal	182 (91.0%)
					No	58 (29.0%)
	Moderate	6 (3.0%)				
	Severe	5 (2.5%)				
	Extremely severe	2 (1.0%)				

### 3.2. Sleep quality characteristics

**Table 2.** Prevalence of insomnia

	Frequency	Percentage
No insomnia	87	43.5%
Mild insomnia	98	49.0%
Moderate insomnia	15	7.5%

56.5% of students reported having insomnia.

**Table 3.** Sleep quality aspects

	Mean	SD		Mean	SD
Sleep duration (hours)	6.26	1.07	Sleep efficiency (%)	54.84	37.68
Sleep disturbance	0.79	0.48	Sleep quality	0.87	0.58
Sleep latency	19.37	13.23	Sleep medications	0.05	0.30
Daytime dysfunction	1.07	0.59	Global PSQI	5.95	3.00

The mean score of the PSQI scale was  $5.95 \pm 3.00$ , while the average sleep duration was  $6.26 \pm 1.07$  hours and the average sleep latency was  $19.37 \pm 13.23$  minutes.

### 3.3. Some associated factors to sleep quality

#### 3.3.1. Gender

**Table 4.** Association between gender and sleep quality

Gender	No insomnia	Insomnia	Total	p
Male	49.5% (50)	50.5% (51)	50.5% (101)	0.084
Female	37.4% (37)	62.6% (62)	49.5% (99)	
Total	43.5% (87)	56.5% (113)	100.0% (200)	

50.5% and 62.6% of male and female students have insomnia. There was no statistically significant association between gender and sleep quality ( $p=0.084$ ).

#### 3.3.2. Habits: caffeine usage and physical activity

**Table 5.** Association between caffeine usage and sleep quality

Caffeine usage	No insomnia	Insomnia	Total	p
No	48.0% (24)	52.0% (26)	25.0% (50)	0.007
Yes	27.3% (41)	72.7% (109)	75.0% (150)	
Total	32.5% (65)	67.5% (135)	100.0% (200)	

52.0% students had insomnia who did not use caffeine, compared to the percentage of insomnia students who used caffeine, which was statistically significant ( $p=0.007$ ).

**Table 6.** Association between physical activity and sleep quality

GPAQ activity levels	No insomnia	Insomnia	Total	p
Low	31.7% (40)	68.3% (86)	63.0% (126)	0.033
Moderate	24.0% (12)	76.0% (38)	25.0% (50)	
High	54.2% (13)	45.8% (11)	12.0% (24)	
Total	32.5% (65)	67.5% (135)	100.0% (200)	

The rate of insomnia in the group of students with high and low physical activity was 45.8% and 68.7%, this result was statistically significant ( $p=0.003$ ).

**3.3.3. Stress****Table 7.** Association between stress and sleep quality

Stress levels	Insomnia	No insomnia	Total	p
Normal	34.1% (62)	65.9% (120)	91.0% (182)	0.338
Mild	20.0% (1)	80.0% (4)	2.5% (5)	
Moderate	0.0% (0)	100.0% (6)	3.0% (6)	
Severe	40.0% (2)	60.0% (3)	2.5% (5)	
Extremely severe	0.0% (0)	100.0% (2)	1.0% (2)	
Total	32.5% (65)	67.5% (135)	100.0% (200)	

The rate of insomnia in the group of students with stress (83.3%) was higher than students without stress (65.9%) and this data was not statistically significant ( $p=0.338$ ).

**IV. DISCUSSION****4.1. Sleep quality characteristics in students**

56.5% of students experienced insomnia, including mild insomnia (49.0%), moderate insomnia (7.5%), and none had severe insomnia. The average PSQI score was  $5.95 \pm 3.00$ , the mean sleep duration and sleep latency was  $6.26 \pm 1.07$  hours and  $19.37 \pm 13.23$  minutes. Our results correspond to those of previous research. Research in 2019 showed that 63.3% of the students had insomnia, the average PSQI score was  $5.38 \pm 2.18$ , and the mean sleep duration was  $6.20 \pm 1.00$  hours with mean latency was  $16.26 \pm 12.55$  minutes [11]. Another research in 2020 found that 44.5% of students had insomnia, third-year students had the greatest prevalence of sleep deprivation (63.1%) and mean sleep duration was 6.20 hours [2]. Getting enough sleep helps the brain recover, positively affects the organ systems and the body's immune process. Long-term insomnia can affect memory, reduce concentration, and increase the risk of diseases. Hence, medical students will have lower GPAs, reduce problem-solving ability, and misdiagnoses leading to unsuitable treatment choices or errors in the prescribing process.

**4.2. Some associated factors to sleep quality****4.2.1. Gender**

This study showed 50.5% and 62.6% of male and female students have insomnia. There was no statistically significant association between gender and sleep quality ( $p=0.084$ ). This rate is not similar to another study in Thailand on 165 students from 2nd to 5th years who completed the questionnaire with a rate of 58.6% male students [11].

**4.2.2. Habits: caffeine usage and physical activity****Caffeine usage**

The rate of insomnia in the groups of students who used and did not use caffeine was 72.7% and 52.0%, respectively. Our research indicated that caffeine usage and sleep quality was associated statistically significant with  $p < 0.01$ , which is similar to Tran Duc

Si's research on the relationship between drinking 1 cup of coffee with reduced sleep quality ( $p < 0.01$ ) [3]. Our result is similar to Ian Clark's research, which found that caffeine prolongs sleep latency, reduces total sleep time, and reduces sleep quality shown on EEG [6]. Our finding is not equivalent to Mirjam L Kerpershoek's survey showing no association between caffeine intake and sleep quality even in the group of students who used caffeine after 18:00 [9]. The difference may be due to racial differences.

### **Physical activity**

Students with high levels of physical activity had better sleep quality than those with low levels of physical activity, the relationship is statistically significant ( $p = 0.007$ ) [4]. This result is similar to Amanah S. R.'s research showed a significant correlation between physical activity and sleep quality in medical students [12]. It is generally agreed that physical activity is good for promoting sleep [5]. This was well illustrated by a research that found that physical activity increased the quality of sleep by 1.7 times [10].

### **4.2.3. Stress**

Students experienced stress had a greater rate of insomnia (83.3%) than students who did not experience stress (65.9%), the correlation was not statistically significant ( $p = 0.338$ ). Our result is not similar to A. Almojali's research in which the rate of insomnia was 86.4% and 64.2%, respectively, with  $p = 0.001$  [14] or with Maha A. Safhi's research recorded on 326 medical students [15]. This difference may be due to study content.

## **V. CONCLUSION**

More than half of third-year full-time medical students (56.5%) experience mild to moderate insomnia with a mean PSQI scale score of  $5.95 \pm 3.00$  and mean sleep duration of  $6.26 \pm 1.07$  hours. Sleep quality in third-year medical students at CTUMP was affected by physical activity and caffeine usage. Students should actively play sports with appropriate intensity and reduce the amount of caffeine intake to improve health and improve sleep quality.

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