



Original Article

Sleep Quality among Undergraduate Occupational Therapy Students in the University of Santo Tomas during the COVID-19 Pandemic: A Descriptive Cross-Sectional Study

Allan James Tan¹, Ma. Carol Mae Gutay-Protacio¹, Bianca Beatrice De Mesa¹, Monique Esmile¹, Zharylle Gayeta¹, Ayessa Dominique Pineda¹, Ray Anthony Torres¹, Kristina Francesca Tuazon¹

¹Department of Occupational Therapy, College of Rehabilitation Sciences University of Santo Tomas, Manila, NCR, Philippines

Correspondence should be addressed to: Allan James Tan¹; attan@ust.edu.ph

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Abstract

Background: Sleep is an essential occupation for students. It affects one's neurocognitive functions and psychomotor performance, playing a significant role in academic performance, health, and well-being. This study aims to describe the sleep quality and sleep patterns among undergraduate occupational therapy (OT) students at the University of Santo Tomas (UST) during the COVID-19 pandemic. **Methods:** This descriptive cross-sectional study utilized a record review based on existing data from the UST OT Department's Student Life Survey 2021 database. A total of 205 students from different year levels and academic cohorts of the academic year 2021-2022 participated in the survey, which included the Pittsburgh Sleep Quality Index (PSQI). The data with valid responses (n=204) was analyzed using the measures of central tendency and dispersion, such as mean and standard deviation. **Results:** Data analysis revealed that 95.59% (n=195) of student respondents had significantly poor sleep quality, while 4.41% (n=9) had good sleep quality. Students in the fifth-year level had the greatest sleep dysfunction as opposed to those in the third-year level who had little sleep dysfunction. Sleep duration and daytime dysfunction received the highest individual scores across all year levels. **Conclusion:** Having poor sleep quality is a common occurrence among undergraduate OT students in UST during the COVID-19 pandemic. Sleep pattern trends suggest the need for school administrators and educators to create measures to mitigate possible negative effects on their student's academic performance, health, and overall quality of life, especially during public health emergencies, calamities, and disasters.

Key Words: *sleep quality, sleep pattern, occupational therapy students, COVID-19 pandemic*

INTRODUCTION

Sleep is an occupation that includes all activities linked with obtaining restorative rest and sleep. Occupations are ordinary, day-to-day activities that people engage in to occupy their time and bring meaning to their life. Sleep as an occupation involves sleep preparation, which pertains to activities related to preparing oneself for a comfortable rest, and sleep participation, which refers to ways of managing one's personal needs for sleep.¹ Overall, sleep is an occupational need that contributes to a person's identity, competence, and their sense of belonging, and is essential to the participation in other occupations.²

Sleep can have a profound impact on an individual's quality of life. Thus, determining the overall sleep quality is vital in evaluating an individual's engagement in this occupation. Sleep quality is primarily measured subjectively depending on the person's overall satisfaction with their sleeping experience. Sleep patterns, including sleep efficiency, latency, duration, and wakefulness, are also gathered when determining sleep quality.³ Several studies have indicated that many variables can influence sleep quality. Physical activity and healthy relationships were reported to positively impact sleep quality, while caffeine and alcohol consumption, stress, smartphone usage, and

irregular sleep-wake pattern impair sleep quality.⁴⁻⁵

Findings show that poor sleep quality affects one's health, well-being, and quality of life. It is commonly associated with impaired cognitive functioning, low academic performance, and poor daytime performance among college students.⁶⁻¹¹ One study that explored the sleep quality of medical students found that students tend to reduce their sleeping time in order to catch up with requirements and cope with the high academic workload, which is reflected in their sleeping patterns.¹² This tendency creates a vicious cycle that affects not only their academic performance but also their overall health and well-being. In addition, the changes brought about by the COVID-19 pandemic have drastically impacted countries across the globe. Multiple public health policies were implemented to reduce the transmission of the virus. These policies include quarantine and stay-at-home procedures that have disrupted employment and education.¹³ This unprecedented circumstance has affected the well-being of many, especially students, as reports have found significant changes in their sleep quality. Events such as home confinement, online learning, prohibited outdoor activities, COVID-19 updates over social media, sudden lifestyle changes, and deprived opportunities for laboratory use at universities are some factors that have influenced the sleep quality of medical students during this period.¹⁴⁻¹⁶ As educational institutions transitioned to an online set-up, a concern for the potential worsening of sleep quality among medical students had been raised by experts, blurring the lines between student life and daily living at home.¹⁷

Occupational therapy (OT) students are also subject to the challenges of student-life balance and the need to cope with the changes in their academic workload. Although studies on sleep quality have been conducted in the past, there is a significant lack of studies focusing on occupational therapy students, as these studies focused on students in general.¹⁷⁻¹⁹ Moreover, most reviewed articles during the pandemic were conducted in foreign countries. Similar studies have yet to be observed and administered in the Philippine context. One study looked into the quality of sleep, perceived

stress levels, and procrastination behavior of OT students at Cebu Doctors' University.²⁰ However, it was conducted before the COVID-19 pandemic. Hence, the sleep quality of Filipino undergraduate OT students during the COVID-19 pandemic remains unexplored.

Information about the sleep quality of Filipino OT students during the COVID-19 pandemic is limited. Hence, this study aims to describe the sleep quality and sleep patterns among undergraduate OT students at the University of Santo Tomas (UST) during the COVID-19 pandemic. The study results can serve as a springboard to create preventive measures and interventions in higher education institutions that will promote good sleep quality and curtail the negative consequences of poor sleep quality among OT students, especially during unprecedented times like public health emergencies, calamities, and disasters.

METHODS

Ethical Considerations. This study was approved by the UST College of Rehabilitation Sciences Ethical Review Committee (SI-2022-016). The researchers also adhered to the ethical principles of the Declaration of Helsinki and the Data Privacy Act of 2012. To safeguard participants' data, the primary research investigator, along with the data privacy officer, oversaw the entire progress of the study.

Study Design. The study utilized a descriptive cross-sectional design by using a record review which is the summarization and analysis of retrospective data recorded on a database. This design only analyzed the sample participants' descriptions of their sleep quality without altering any data or comparing any variables.

Database Description. The record review was based on an existing database containing information extracted from the Student Life Survey 2021. The UST OT Department, which currently owns the database, conducted this survey to understand the different variables influencing the students' performance during the COVID-19 pandemic. The survey form contained different outcome measures, including the Pittsburgh Sleep Quality Index (PSQI), which

aimed to describe the sleep quality of the students during the online set-up.²¹

The database included data from a sample of 205 students of the department during the first term of the academic year 2021-2022. A census approach to sampling was employed to identify the study participants who would represent the following variables: different year levels of the OT program, all ages and genders, curriculum (old and new), and academic load/cohort (regular and irregular load). The online survey was conducted from October to November 2021. Participants were informed about the purpose of collecting the data and were asked for their consent to use their anonymized data for research purposes.

Instruments. While many instruments are available to measure sleep quality, the researchers used the Pittsburgh Sleep Quality Index (PSQI) to gather data regarding the students' sleep quality and sleep patterns. The PSQI is a self-rated instrument that measures one's sleep quality and sleep disturbance during the past month. The sleep quality is derived from the PSQI Global Score. The PSQI Global Score, ranging from 0 to 21, is obtained from the sum of the seven component scores of PSQI. Each component is scored using a 4-point Likert scale (0-3), with "0" denoting no difficulty and "3" implying extreme difficulty. PSQI Global Scores ≥ 5 indicate a significant sleep disturbance, with higher scores showing worse sleep quality, while scores ≤ 4 suggest good sleep quality. A systematic review of six studies tested the tool's reliability over time, and the results showed that the PSQI is reliable even over different administration periods.²² To ensure scale reliability, the researchers computed the tool's internal consistency and yielded an acceptable Cronbach's alpha of 0.631.

Data Gathering Procedures Upon the approval of the UST College of Rehabilitation Sciences Ethics Review Committee, the data privacy officer of the OT Department shared the data with the researchers to ensure that only necessary responses were provided to them. The data were stored in a spreadsheet accessible only to the researchers to ensure data protection. The responses were then screened twice. The first screening was based on the

completeness of the respondents' answers, while the second screening was centered on the PSQI scoring guidelines. Responses indicating a range of values to questions requiring a single numerical value were included by getting the mean value. This screening procedure ensured that only valid answers were extracted and analyzed in the study.

Figure 1 shows the sequential order of steps during the data gathering. The process started with approval from the Ethics Review Committee and ended with data screening.

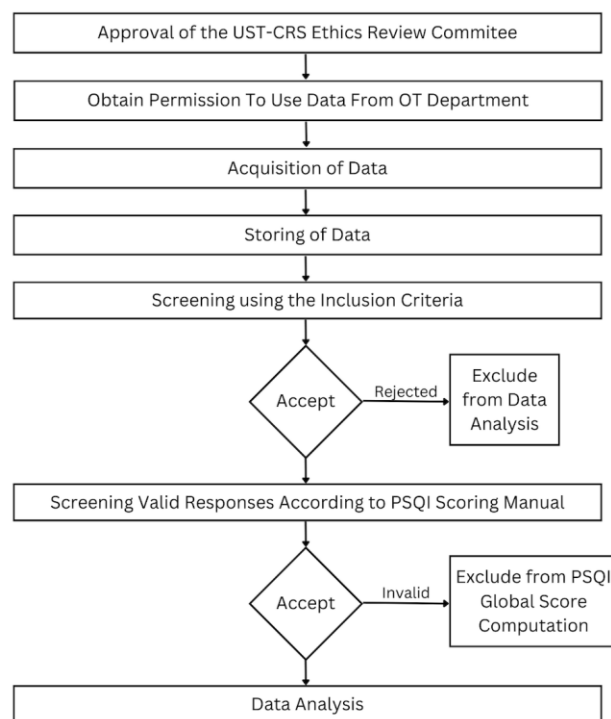


Figure 1. Data gathering procedures

Data Analysis. Extracted data from the Student Life Survey 2021 were analyzed. Calculations to generate the component scores of each student were done following the PSQI scoring manual. Descriptive statistics was the primary statistical test employed since the study aims to describe UST undergraduate OT students' sleep quality and sleep patterns during the pandemic. Descriptive statistics are brief descriptive coefficients that summarize a given data set, representing the entire population or a population sample.²³ It simplified and summarized the data collected from the instrument to determine the participants' sleep quality. Data gathered were interpreted using

measures of central tendency and dispersion. Frequency and percentage were also used to summarize the demographic characteristics of the participants and the distribution of students having poor or good sleep quality based on PSQI's criteria.

RESULTS

General Characteristics of Participants. A total of 205 students answered the survey. However, 204 students were only included in the data analysis as one respondent failed to meet the set scoring guidelines of PSQI. The participants' general characteristics were elaborated, and the PSQI results were categorized by year level.

Table 1 summarizes the demographic characteristics of the participants. The mean age is 20 years old, with a standard deviation of 1.35. 166 (81.37%) participants were female, while 38 (18.63%) were male. 62 (30.39%) out of the total were third-year students comprising most participants. This was followed by fourth-year students at 52 (25.49%), second-year students at 45 (22.06%), fifth-year students at 27 (13.24%), and first-year students at 18 (8.82%). Students with a regular load were 190 (93.14%), while students with an irregular load were 14 (6.86%).

Sleep Quality. The PSQI Global score was computed following the PSQI scoring manual to determine the participants' overall sleep quality. The results of the PSQI are indicated in Table 2.

Table 2 summarizes the frequency of students whose PSQI global scores are greater than or equal to five, indicating significantly poor sleep quality, and four or less, indicating good sleep quality. Out of the 204 participants, 195 (95.59%) students met the criteria of having poor sleep quality, while 9 (4.41%) students fell under the criteria of having good sleep quality. The third-year students received the lowest PSQI Global Score with 9.02 ± 3.21 , indicating having the best sleep quality among all year levels. However, considering the PSQI criteria, it still falls under having poor sleep as it is greater than 5, indicating significant sleep disturbance. On the other side of the spectrum, students from the fifth year received the highest PSQI Global Score among year levels, which suggests having the worst sleep quality. Overall, the total population had an average PSQI Global score of 9.35 ± 3.14 , indicating poor sleep quality.

Sleep Pattern. The sleep pattern of the participants was derived from scores from the seven PSQI components, namely, subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleep medications, and daytime dysfunction. The results of the PSQI components are indicated in Table 3.

Table 3 illustrates the individual scores of each year level regarding the components that make up one's PSQI Global Score. The use of sleep medications was infrequent within the general population of students. The data regarding poor sleep duration, sleep latency, and increase

Table 1. General characteristics of participants

Variables	n (%)	(Mean ± SD)
Age (Mean ± SD)		(20.64 ± 1.35)
Gender		
Male	38 (18.63%)	
Female	166 (81.37%)	
Year Level		
First Year	18 (8.82%)	
Second Year	45 (22.06%)	
Third Year	62 (30.39%)	
Fourth Year	52 (25.49%)	
Fifth Year	27 (13.24%)	
Student Status		
Regular	190 (93.14%)	
Irregular	14 (6.86%)	

Table 2. PSQI global scores for participants

PSQI Global Score	Interpretation	Frequency (%)
< 5	good sleep quality	9 (4.41%)
≥ 5	poor sleep quality	195 (95.59%)
TOTAL		204 (100%)

daytime dysfunction was common across the population, showing a trend that these components are the main drivers contributing to poor sleep quality among the student population.

The PSQI assesses sleep efficiency through habitual sleep efficiency and sleep duration; perceived sleep quality through subjective sleep quality, sleep latency, and use of sleep medications; and daily disturbances through daytime dysfunction and sleep disturbances. Scores of the components range from 0 (good) to 3 (worst). The following results were gathered:

Subjective Sleep Quality. The fifth-year students ranked highest in the subjective sleep quality scores (1.81 ± 0.68), while the first-year students scored the lowest (1.50 ± 0.62). The data dictates that most fifth-year students perceived their sleep quality as poor, while first-year students had the best-perceived sleep quality among all year levels.

Sleep Latency. The fourth-year students ranked highest in the sleep latency scores (1.88 ± 1.11), indicating that they took the longest time to reach any stage of sleep from wakefulness. Meanwhile, first-year students scored the lowest (1.61 ± 1.09), making them the year level that took the shortest time to fall asleep.

Sleep Duration. The first-year students got the highest scores in sleep duration (2.22 ± 0.55), which means they had the least amount of time sleeping. The third-year students had the lowest score (1.82 ± 0.84), indicating they had the longest sleeping time.

Habitual Sleep Efficiency. Regarding habitual sleep efficiency, the first-year students received the highest scores (0.83 ± 1.04). This score means that the amount of sleep they got in relation to the amount of time they spent in bed is the least. In contrast, the fifth-year students scored the lowest in sleep efficiency (0.30 ± 0.61).

Sleep Disturbance. The fifth-year students received the highest scores (1.48 ± 0.75) in the sleep disturbance component. It can be concluded that they experienced the most trouble sleeping due to various reasons, while second-year students experienced the least, as they received the lowest scores (1.17 ± 0.57).

Use of Sleep Medication. Regarding sleep medication, the second-year students received the highest scores (0.39 ± 0.83), suggesting they used sleep medications the most. Meanwhile, first-year students received the lowest scores (0.00 ± 0.00), indicating that none from the freshmen population used sleep medication.

Daytime Dysfunction. The fifth-year students received the highest scores (2.07 ± 0.87) in the daytime dysfunction component. This score indicates they had the most trouble staying awake or maintaining enthusiasm during the daytime. Third-year students received the lowest scores (1.74 ± 0.75), indicating they had the least trouble.

DISCUSSION

This study intends to describe the sleep quality and sleep patterns among UST undergraduate OT students during the COVID-19 pandemic. Based on the study results, poor sleep quality was common among UST OT students during the pandemic, with the fifth-year students expressed to have the worst sleep quality and most disruptive sleep patterns in the domains of subjective sleep quality, sleep disturbance, and daytime dysfunction. In addition, sleep duration problem was also named to be the most problematic sleep component among students. These findings might negatively affect the students' quality of life⁷, academic functioning^{8,10}, and life satisfaction²⁴. Other studies also showed that one's daily occupation is affected by sleep, which consequently influences their overall health and well-being.⁶⁻⁸ Thus, it is vital for teachers, school administrators, and policymakers to consider the sleep quality and sleep patterns among students during public health emergencies and other disasters to protect their well-being and promote their academic success. Likewise, students should be

Table 3. Pittsburgh Sleep Quality Index (PSQI) global and component scores across different year levels

PSQI Components	(Mean ±SD)					
	1st Year (n=18)	2nd Year (n=45)	3rd Year (n=62)	4th Year (n=52)	5th Year (n=27)	Total Population (n=204)
Subjective Sleep Quality	1.50 ± 0.62	1.50 ± 0.72	1.73 ± 0.73	1.63 ± 0.66	1.81 ± 0.68	1.64 ± 0.70
Sleep Latency	1.61 ± 1.09	1.76 ± 1.04	1.74 ± 0.97	1.88 ± 1.11	1.78 ± 1.05	1.78 ± 1.04
Sleep Duration	2.22 ± 0.55	1.85 ± 0.73	1.82 ± 0.84	2.12 ± 0.58	2.04 ± 0.90	1.97 ± 0.75
Habitual Sleep Efficiency	0.83 ± 1.04	0.67 ± 1.00	0.53 ± 0.99	0.52 ± 0.90	0.30 ± 0.61	0.55 ± 0.93
Sleep Disturbance	1.28 ± 0.46	1.17 ± 0.57	1.23 ± 0.58	1.25 ± 0.59	1.48 ± 0.75	1.26 ± 0.60
Use of Sleep Medications	0.00 ± 0.00	0.39 ± 0.83	0.23 ± 0.66	0.35 ± 0.84	0.33 ± 0.78	0.29 ± 0.74
Daytime Dysfunction	2.06 ± 0.73	1.91 ± 0.78	1.74 ± 0.75	1.83 ± 0.83	2.07 ± 0.87	1.87 ± 0.79
PSQI Global Score	9.50 ± 2.46	9.20 ± 2.79	9.02 ± 3.21	9.58 ± 3.44	9.81 ± 3.47	9.35 ± 3.14

Note: n=total number of participants, SD=standard deviation

cognizant of the consequences of sleep quality and sleep patterns on their health, well-being, and school performance.

Sleep Quality of the UST Occupational Therapy Students during the Pandemic.

In this study, 95.12% of the students scored ≥ 5 in the PSQI global score, which indicates a significantly poor sleep quality. Studies that used the same PSQI instrument also mentioned similar findings among the same population. 67.42% students from Pawapuri²⁵, 70.4% students from Saudi Arabia²⁶, and 79.3% students from Columbia²⁷ reported altered sleep quality. These results are alarming and, thus, need to be addressed promptly to avoid repercussions on their overall health and well-being.

It was also observed that there were variations in PSQI global scores across year levels. Third-year students reported having the best sleep quality, while fifth-year students had the worst sleep quality among the rest. Findings from several studies found that common factors influencing sleep quality among students were the consumption of caffeine and alcohol, lifestyle, and stress caused by the pandemic and one's academic workload.^{6,14,19,26}

Regardless of these variations and trends, sleep participation among college students must be assessed, monitored, and targeted by higher education institutions during unprecedented

times, as sleep quality is directly correlated to their mental health and academic performance.²⁸⁻³⁰

Sleep Patterns of the UST Occupational Therapy Students during the Pandemic

Subjective Sleep Quality. The subjective sleep quality among year levels varied from fairly good to fairly bad, with fifth-year students having poor subjective sleep quality while the first and second-year students having better subjective sleep quality. Relating this sleep component to the students' academic performance, existing literature showed that lower scores in subjective sleep quality are linked with poorer occupational and academic performance. It is also associated with students' perception of home confinement and their decreased levels of physical activity, both of which are attributable to the COVID-19 pandemic.^{10,31} A study also reported that as students advance into the latter stages of their undergraduate years, sleep deprivation also increases. This factor further contributes to the deterioration of their perceived sleep quality.³²

Sleep Latency. Results gathered regarding the sleep latency of the participants are consistent with other studies showing a high prevalence of poor sleep latency among medical students during the pandemic.³³⁻³⁴ Results showed that most participants (59.2%) need more than 30 minutes to fall asleep. It surpasses the results gathered by other studies, which revealed that

the percentage of students that need more than 30 minutes to fall asleep ranged from 44.6%³⁴ to 47.7%¹⁰, indicating that the sleep latency of the study population is longer than that of other medical-related students. The implications of having long sleep latency are linked to one's level of tiredness as a long sleep latency limits the total time spent sleeping, which in turn will lead to increased levels of exhaustion.³⁵

Sleep Duration. The decreased sleep duration among the participants is consistent with studies conducted internationally.^{25,32} 80.98% of the participants answered that they only get less than six hours of sleep per day; this is less than the recommended eight hours of sleep that individuals age 18 years old and above must get each night to achieve healthy outcomes³⁶ and increased life satisfaction. Life satisfaction has been found to have a positive correlation with sleep duration due to the ability to dedicate time for valued occupations outside of school, one of which is sleep.^{24,37} Poor sleep duration, which is primarily driven by one's academic workload,³² is found to be associated with an increased risk to experiencing burnout, lower cognitive performance, and poorer physical and mental health.³⁸ Hence, the sleep duration problem among students can affect their health, life satisfaction, and academic achievement.

Habitual Sleep Efficiency. The optimum PSQI score for sleep efficiency is 0.³⁹ Given this, the habitual sleep efficiency of the participants was high since their average scores were less than 1. This result is consistent with the other study wherein medical-related students also had good sleep efficiency during the COVID-19 pandemic.⁴⁰ This factor can facilitate academic success, as sleep efficiency is correlated with better cognitive processing and memory integration.⁴¹

Sleep Disturbance. This study also found minimal variation in sleep disturbance across year levels. A higher sleep disturbance among fifth-year students indicates that they have the most frequent experience of disturbed sleep. A similar study conducted with medical students found that their sleep disturbance can be attributed to fragmented sleep, stress, and the use of technology.³³ This factor may be directly associated with academic performance and

emotional, psychological, and physical health among the college student population.⁴²

Use of Sleep Medication. Sleep medication usage among the participants showed inconsistency with other studies conducted.^{4,43} Sleep medications have positive and negative effects on users, depending on their usage and lifestyle.⁴ Students with high chronic stress, insomnia, anxiety, and academic burnout will most likely benefit from sleep medications.⁴⁴ However, its regular usage may result in side effects such as rebound insomnia, tolerance, and dependency on sleep medications.⁴⁵ With this, minimal sleep medication usage among students can positively influence their general health and well-being.

Daytime Dysfunction. This study found that daytime dysfunction was high among the participants, consistent with existing literature that reported high daytime dysfunction among students.^{2,6,8,10} Similar findings reported that during the prolonged period of quarantine, daytime sleepiness was common among medical students, which was also associated with anxiety, stress, use of stimulants, and below-average grade.^{8,15} The demands of medical programs contributed to students' poor sleep quality and daytime sleepiness, as lack of rest during the pandemic was common.¹⁵ Thus, this factor may impair recreational and occupational domains of life and may cause adverse effects on one's overall quality of life.⁴⁶ Moreover, fifth-year students reported the highest scores of daytime dysfunction, which might impair their clinical performance by making them more vulnerable to committing errors during practice.⁴²

Implications of the Study. Despite the significant impact of sleep on other occupations, the importance of sleep is often overlooked, especially among students, as adolescents frequently forego sleep to meet social and academic responsibilities.⁴⁷ Sleep largely affects one's health, engagement in social and occupational activities, and daily functioning in general. Hence, the importance of sleep must be discussed and imparted among students, as placing more value on sleep will positively affect their satisfaction and quality of life.⁴⁸

In most components of the PSQI, the study produced similar results to existing literature, suggesting that UST OT students may have

similar experiences with other students during the COVID-19 pandemic. This study's findings have implications for sleep-related factors that may affect students' performance in school and daily activities. Studies have found that sacrificing sleep for study may be counterproductive, as less sleep and sleep irregularity can interfere with school performance.⁴⁹

As academic institutions move forward to blended learning in the new normal, educators, school administrators, and policymakers can learn from the trends evident in the data to ensure the creation of evidence-informed programs that serve their student population. The inclusion of robust monitoring mechanisms that link students' academic performance to their sleep quality and preventive measures to safeguard the good sleep quality of college students must be considered. Other studies recommend different strategies to improve college students' sleep quality, such as promoting good sleep hygiene, limiting electronic media before bedtime, doing moderate aerobic exercises, and practicing mindfulness training, among others.^{28,50} These recommendations can be curated based on the students' needs to facilitate academic success, good health, and improved quality of life.

Limitations of the Study. Several limitations have been identified in this research. The number of study participants across year levels was not normalized. Thus, the data should be interpreted with caution. As the study utilized a self-report questionnaire, recall bias is also a risk factor that could affect the results. Further, the study was conducted within a single department of one institution. Hence, the study results may not be extrapolated and generalized to all Filipino OT students. In addition, the study did not explore the contributing factors and associated risk factors of poor sleep quality and disruptive sleep patterns among students.

Future Research. For future studies, it is recommended to expand the study population to make the results generalizable to Filipino OT students. Doing correlational studies exploring the relationship between sleep quality and the different demographic variables, such as

students with regular and irregular loads, is also suggested. As academic institutions adopt a blended learning approach in the new normal, exploring the sleep quality and sleep patterns among students in a hybrid learning set-up will also be relevant.

CONCLUSION

A majority of undergraduate occupational therapy students from different year levels in the University of Santo Tomas reported poor sleep quality during the COVID-19 pandemic, with third and fifth-year students shown to have worse sleep quality than other year levels. Moreover, problems in sleep duration and daytime dysfunction were the most significant and consistent among all year levels. With academic institutions transitioning to blended learning in the new normal, the study results can pave the way for creating programs and preventive measures to promote good sleep quality and sleep patterns among students, especially since sleep quality can influence students learning, health, and quality of life.

Individual Author's Contributions

A.T., M.G.; Analyzed and interpreted the data, supervised the research, co-wrote the paper, reviewed the final manuscript, approved the final manuscript, and concurred to be accountable for all aspects of the manuscript. B.D.M., M.E., Z.G., A.P., R.T., K.T.; Sought related literature, analyzed and interpreted the data, co-wrote the paper, approved the final manuscript, and concurred to be accountable for all aspects of the manuscript.

Disclosure Statement

This study is not affiliated with any funding agency.

Conflicts of interest

The authors of this paper declare no conflict of interest.

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