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EVALUATION OF THE LEVEL OF SLEEP QUALITY AND FUNCTIONALITY OF PHYSIOTHERAPY STUDENTS

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ABSTRACT

Objective: To evaluate the level of sleep quality and functionality in physical therapy students from the perspective of the International Classification of Functioning. Methods: This is a descriptive, quantitative study approved by the CEP/UESPI. A questionnaire developed by the researchers was used to trace the sociodemographic profile, as well as the validated questionnaire "Pittsburgh Sleep Quality Index" to assess the sleep quality of physical therapy students. Regarding the statistical analysis, a confidence interval of 95% was considered and a significance value of $p<0.05$. Results: 55.89% of the students had poor sleep quality, 23.53% had sleep disturbance, and 20.58% had good sleep quality. Analyzing the sleep data, they present the following median: at bedtime 23:00, latency of 20 minutes to fall asleep, they wake up at 06:00 and sleep 6 hours a night. A predominance of females was identified, with 69.12% and 30.88% for males. The age range ranged from 18 to 32 years, with a mean age of 21.64 (SD+- 2.29) years. Regarding functionality, the components of body functions, environmental factors and activity and participation are altered, including b1341 (sleep functions), b1343 (sleep quality), e2250 (temperature), d230 (performing the daily routine). Conclusion: Physical therapy students had poor sleep quality and changes in sleep functionality within the domains of body functions, environmental factors, and activity and participation.

Keywords: ICF, Quality, Sleep, Students, Physical Therapy.

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INTRODUCTION

Sleep is the state of unconsciousness from which a person can be awakened by sensory or other stimulus. It exists in all mammals and has important functions in homeostasis, having effects on the nervous system and other functional systems of the body. Its specific physiological functions are not yet known, but it is assumed that sleep restores the natural balance between neuronal centers and therefore lack of sleep can cause irregularities in behavioral activities and in the process of thought and memory (GUYTON, 2006).

Sleep problems are frequent in the general population, but students in the health area are a vulnerable group to poor sleep quality, they have higher rates of sleep disorders than students in other areas, this is due to greater exposure to stressors such as high workload, emotional stress, hours using social networks, stages and life choices. Good sleep quality is important for learning and greater patient safety (PEROTTA, 2021)

Sleep quality is influenced by several factors: socioeconomic status, segregation, lighting, air pollution, noise, architecture of the place where the individual lives, as well as violence in their neighborhood, and access to socialization places. The environment in which an individual finds himself, whether physical or social, can interfere in important aspects for the quality of sleep, such as the duration and time he goes to sleep, as well as contribute to the development of the most prevalent sleep disorders: insomnia, sleep apnea, and circadian cycle disorders (BILLINGS, 2020)

These various factors not only interfere with sleep quality, but also with sleep functionality and the individual's own functionality, and one way to classify the impact of these factors is using the International Classification of Functionality (ICF). The ICF was approved in May 2001 during the 54th World Health Assembly with the objective of standardizing and universalizing language in health, and is the international standard for the description of a disability, its use is recommended by the World Health Organization (WHO) in conjunction with the International Classification of Diseases (ICD) to provide information on individuals and populations in terms of health status. The ICF has epidemiological and social importance, the psychosocial approach complements the insufficiency that morbidity and mortality data bring in the definition of health status (WHO, 2003. LEONARDI, 2022)

The ICF contains a variety of categories to describe body functions, structures, activity, and participation, all of which are influenced by environmental factors and personal factors. These categories or domains are represented by letters: Letter "b" represents

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physiological functions, letter "s" represents anatomical parts of the body, letter "d" represents execution of actions and participation in activities, and finally letter "e" represents environmental factors that can be facilitators or barriers. The ICF goes beyond clinical practice, it has relevance as a tool: statistical, pedagogical, research, and social policy development (BARRETO; ANDRADE; CASTANEDA; CASTRO, 2021. MADDEN; BUNDY, 2019)

As a standardized tool that explores environmental and personal factors and their interactions with patient functionality, the ICF is a multifactorial, patient-centered assessment that indicates impacts on functional ability and quality of life. Sleep quality is a determining factor for the health of the individual, considering this, this study is important to determine which aspects of students' functionality are being affected by their sleep quality, identifying the compromised functional skills and coding according to the ICF to guide future interventions focused on this group of society (MADDEN; BUNDY, 2019)

Many studies analyze the quality of students' sleep, but few associate it with functionality. Therefore, this research aims to evaluate the level of sleep quality and functionality in Physical Therapy students from the perspective of the International Classification of Functioning.

METHODOLOGY

This is a cross-sectional descriptive and quantitative study approved by the Research Ethics Committee of the State University of Piauí CEP/UESPI under opinion number 6.388.233, according to the norms established in Resolution 466/12 of the National Health Council (CNS).

The sample consisted of 136 students duly enrolled in the bachelor's degree course in physiotherapy at UESPI. Physiotherapy students, of both sexes, who were attending the first to the tenth block of the institution, aged between 18 and 32 years, and who agreed to participate in the research by signing the Informed Consent Form (ICF) were included in the study. Students who withdrew the Informed Consent Form and those who answered the questionnaire incompletely were excluded.

Data were collected through questionnaires applied to physiotherapy students from October 2023 to April 2024, at the State University of Piauí (UESPI) located in Teresina-PI. Initially, they were invited to participate in the research, presenting them with the informed consent form with all the necessary clarifications, through the researchers, before signing it.

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If they agreed, after signing the term, the research was initiated through the application of a questionnaire prepared by the researchers with the objective of outlining the sociodemographic profile: gender, age, color/race and socioeconomic condition), the period in which the participant was enrolled, their main mode of commuting, how they classified their physical and mental health, if you use oral relaxation plate and CPAP during sleep.

Next, the validated questionnaire "Pittsburgh Sleep Quality Index (PSQI)" was applied, which evaluates sleep quality in the last month. In order to provide a brief and clinically useful evaluation of a variety of sleep disorders that may affect sleep quality, it was translated into Brazilian Portuguese with its validated Brazilian version (BUYSSE et al, 1989; BERTOLAZI et al, 2011)

The first four questions are open-ended and the rest are objective questions. The questions are categorized into seven components, graded in scores from zero ("none in the last month" or "no difficulty") to three ("three or more times in the week" or "severe difficulty"). The components evaluated are subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, presence of sleep disorders, use of sleep medications, and presence of daytime sleep dysfunction. The sum of the values attributed to the seven components varies from zero to twenty-one in the total score of the questionnaire, the lower the result, the better the quality of sleep (DE ARAÚJO et al, 2015)

The PSQI questions were analyzed and ICF categories were assigned, and categorical data were presented in absolute and relative values. Quantitative variables were described as mean and standard deviation, according to the distribution of the data analyzed by the Shapiro-Wilk normality test. The collected data were tabulated in spreadsheets prepared in the Microsoft Office Excel 365 software, where a database was built. The analysis was performed using the statistical program JASP 0.18.3.0, for the statistical analysis, a confidence interval of 95% and a significance value of $p<0.05$ were considered, as recommended for studies in human beings.

RESULTS

The study population consisted of 136 university students from a physiotherapy course at a public higher education institution in Teresina-Piauí. In the group studied, a predominance of females was identified, with 69.1% and 30.9% for males. The age range ranged from 18 to 32 years, with a mean age of 21.6 ± 2.3 years.

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Regarding socioeconomic status, 64% of the participants reported having medium socioeconomic status, 36% low socioeconomic status, and none reported having high socioeconomic status. There was a predominance of brown (46.3%), followed by whites (28.7%), blacks (24.3%) and yellow (0.7%), and 94.12% of the participants in this study reported living with someone.

Regarding the period referring to student enrollment, there was a predominance of students enrolled in the 3rd period and in the 10th period with 14.7% each, followed by the 5th (10.3%), 7th (10.3%) and 8th (10.3%) periods. In the other periods, 39.7% of the interviewees are enrolled.

When asked about their main means of transportation used, 54.4% answered that they use the public service, 20.6% own vehicle, 11% app driver and 14% received a ride from relatives or friends. Regarding the practice of physical activity, 38.2% do not perform it, 26.5% perform it 1 to 3 times a week and 35.3% perform it more than 3 times a week.

Regarding the perception of their own physical health, 1.5% classified it as very bad, 8.1% as bad, 33.1% as neither bad nor good, 46.3% as good and 11% as very good. Regarding the perception of their own mental health, 5.9% classified it as very bad, 18.4% as bad, 43.4% as neither bad nor good, 28.6% as good and 3.7% as very good. No participants reported using a relaxation plate and/or CPAP at bedtime.

Regarding the intrinsic characteristics of the participants' sleep, the interviewees presented the following median: bedtime at 11:00 p.m., latency of 20 minutes to fall asleep, they wake up at 6:00 a.m. and sleep 6 hours a night. (Table 1)

Table 1: Sleep schedule and time of students of the physiotherapy course at UESPI – Teresina-PI (2024)

	Time to sleep	Latency	Time to wake up	Sleep time
Valid	136	136	136	136
Median	23:00	00:20	06:00	06:00
Shapiro-Wilk test	0,472	0,794	0,873	0,931
P-value do Shapiro-Wilk	<,001	<,001	<,001	<,001
Minimum	20:30	00:00	03:00	03:00
Maximum	03:00	02:00	11:00	09:00

Source: Authors of the research.

Using the Pittsburgh Sleep Quality Index (PSQI), the results obtained were: 55.9% had poor sleep quality, 23.5% had sleep disturbance, and 20.6% had good sleep quality. When asked about their perception of their own sleep quality, 47% rated their sleep quality as good, 39% as poor, 9.6% as very good, and 4.4% as very poor. (Table 2)

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Table 2: Sleep quality of students in the physical therapy course through the PSQI. UESPI, Teresina-PI, 2024

PSQI Result	Frequency	Percentage
Good sleep quality	28	20,6
Sleep Disorder	32	23,5
Poor sleep quality	76	55,9
Total	136	100

Source: Research authors

The difficulties in sleeping reported by the students were predominantly waking up in the middle of the night or early in the morning (83.8%), not being able to fall asleep in 30 minutes (69.9%), having to get up to go to the bathroom (63.2%), feeling very hot (61.7%) and having bad dreams (58.1%). Some students reported other reasons why they had difficulty sleeping, such as: anxiety, vomiting, college, excess caffeine, spending too much time on the cell phone, noise and eating late. (Table 3)

Table 3: Factors that interfere with the sleep of students in the physical therapy course through the PSQI. UESPI, Teresina-PI, 2024

Difficulty sleeping due to	Frequency	Percentage
Couldn't fall asleep in 30 minutes	95	69,9
Woke up in the middle of the night or early in the morning	114	83,8
Had to get up to go to the bathroom	86	63,2
Couldn't breathe comfortably	36	26,5
Coughed or snored hard	25	18,4
Felt very cold	62	45,6
He felt very hot	84	61,7
Had bad dreams	79	58,1
There was pain	42	30,9
Other reasons	36	26,5

Source: Prepared by the authors

Also as a result of the survey, 16.9% of the students reported having taken some medication to help sleep, 58.1% reported difficulty staying awake while driving, eating or participating in a social activity, and 89.7% had problems maintaining enthusiasm to do things.

By analyzing the PSQI, it was possible to determine the ICF categories addressed in the questions, using three components of the ICF: body functions, environmental factors, and activity and participation. (Table 4)

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Table 4: Characterization of the PSQI questions according to the ICF categories. UESPI, Teresina-PI, 2024

PSQI issue	ICF Categories	Category Description
2. During the last month, how long (in minutes) did it usually take you to sleep at night?	b1341	Sleep onset: Mental functions that produce the transition between wakefulness and sleep
5. During the last month, how often have you had trouble sleeping because you:		
A) Could not fall asleep within 30 minutes	b1341	Sleep onset: Mental functions that produce the transition between wakefulness and sleep
B) Woke up in the middle of the night or early in the morning	b1342	Sleep maintenance: Mental functions that sustain the state of being asleep
D) Could not breathe comfortably	b440	Respiratory functions: Functions related to the inhalation of air into the lungs, the exchange of gases between air and blood, and the expulsion of air
	B460	Sensations associated with cardiovascular and respiratory functions: Sensations such as loss of heartbeat, palpitation, and decreased breathing. It includes: chest tightness, irregular heartbeat sensations, dyspnea, suffocation, nausea, wheezing, and the need to swallow air.
E) Coughed or snored strongly	b450	Additional respiratory functions: Additional breathing-related functions such as coughing, sneezing, and yawning
F) Felt very cold	e2250	Temperature: Degree of heat or cold, such as high and low temperature, normal or extreme temperature
G) Felt very hot	e2250	Temperature: Degree of heat or cold, such as high and low temperature, normal or extreme temperature
I) Had pain	B280	Sensation of pain: Unpleasant sensation that indicates potential or actual injury to some structure of the body
J) Other reasons -Anxiety	B1522	Range of emotions: Mental functions that produce the spectrum of experiences related to the emergence of affect or feelings such as love, hate, anxiety, grief, satisfaction, fear, and anger
-Nauseas, urge to vomit	b5350	Feeling nauseous: Feeling related to the need to vomit
-Noise	e2500	Sound intensity: Level or volume of the auditory phenomenon determined by the amount of energy generated, where high energy levels are perceived as loud sounds and low energy levels as low sounds.
-Faculty	D830	

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PSQI issue	ICF Categories	Category Description
- Excess caffeine, Eating late - Too much time on mobile	D5701 e125	Higher education: Participate in the activities of advanced educational programs at universities, colleges, and vocational schools and learn all aspects of the curriculum necessary for degrees, diplomas, certificates, and other permits, such as earning a bachelor's or master's degree, graduating from medical school, or another vocational school Diet and fitness control: Taking care of oneself by being aware of one's needs, selecting and consuming nutritious foods, and staying in shape Products and technology for communication
6) Over the past month, how would you rate your overall sleep quality? Hands	B1343	Sleep quality: Mental functions that produce natural sleep leading to optimal physical and mental rest and relaxation
7) During the last month, how often have you taken medication (prescription or "on your own") to help you? 8) In the last month, how often have you had difficulty staying awake while driving, eating, or participating in a social activity (party, gathering friends)? 9) During the last month, how troublesome has it been for you to maintain enthusiasm (spirits) to do things (your usual activities)?	e1101 D475 D550 d9205 D230	Medicines: Natural or man-made substance, harvested, processed, or manufactured for medicinal purposes, such as allopathic and natural medication. Driving: Controlling and moving a vehicle or the animal that pulls it, moving under one's own direction or having at one's disposal any form of transport such as a car, bicycle, boat or animal. Eating: Performing the coordinated tasks and actions of eating the food served, bringing it to the mouth and consuming it in a culturally acceptable manner, cutting or breaking the food into pieces, opening bottles and cans, using utensils, activities related to meals, banquets and dinners. Socializing: Participating in informal or casual gatherings with others, such as visiting friends or relatives and informal gatherings in public places Perform the daily routine: Perform and coordinate simple or complex actions to plan, manage and complete the requirements of day-to-day procedures or duties, such as managing time and making plans for various activities throughout the day

Source: Prepared by the authors

DISCUSSION

Analyzing the sleep data, the participants in this study sleep less than recommended by the American Academy of Sleep Medicine, which recommends that adults should sleep 7 or more hours a night regularly to promote health and well-being, sleeping less than recommended is associated with poor performance, increased errors and higher risk of

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accidents. However, not all individuals need this time interval, genetic, behavioral, medical and environmental factors alter the individual's need for sleep time. (WATSON et al, 2015)

When asked about sleep quality, the participants in this research mostly rated their sleep as good or very good, which is in contradiction with the PSQI results that identified poor quality or presence of sleep disorders in approximately 3/4 of the sample. This contradiction has already been found in another study, demonstrating that the disagreement between the subjective perception of sleep quality and reality is due to the normalization of poor sleep patterns to meet the academic requirements of health courses. The subjective perception of sleep quality is an important factor for the assimilation of the content covered in the classroom, a study carried out with adolescents demonstrated that those with a poor perception of sleep quality are more likely to have difficulty assimilating the subject, regardless of sociodemographic variables (BATISTA et al, 2018. MARQUES et al. 2024;)

In the scientific literature, sleep problems are more prevalent among women due to hormonal changes during pregnancy, menopause, and menstrual cycles, as well as roles and responsibilities that are socially assigned to them. The sample of this research was predominantly female and young, therefore, the students interviewed are more susceptible to developing some sleep problem (BARROS et al, 2019)

The population's routine is mainly governed by one practice: commuting, which is the recurrent journey between home and the place of work or study. In the capitals, the greatest distances and consequently the longest time spent commuting are frequent for individuals of low and medium socioeconomic class, which can be evidenced in this research, where 64% of the participants reported having medium socioeconomic status and 36% low socioeconomic status. Due to this, the time available for activities that do not involve work or studies is reduced, impacting several health-related activities, especially sleep (DOKKEDAL-SILVA et al, 2022)

Studies show that commuting by own vehicle and by public transport that lasts more than 30 minutes is associated with increased daily stress, lower vitality and poorer subjective perception of sleep quality. In addition to distance, poor urban planning and traffic jams are factors that prolong the duration of commuting, so students may be exposed to these stressors that harm physical and mental health (CHATTERJEE, et al 2020).

Physical activity is proven to be beneficial for sleep in several ways: it increases the production of hormones that regulate the wake cycle, reduces stress, improves mood, and

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helps regulate body temperature. This is in accordance with this study where most respondents practice physical exercise at least once a week and consider physical health good or very good, being a possible positive factor for sleep quality (ALNAWWAR et al, 2023)

Problems sleeping and impaired mental health are intrinsically associated. Before, it was assumed that altered mental health caused problems sleeping, however, the reverse can also be true, as poor sleep contributes to the recurrence, appearance and maintenance of mental problems. What can be proven by analyzing the subjective perception of mental health, few participants in this research classified mental health as good or very good. (SCOTT et al, 2021))

After analyzing the content and extracting data from instruments applied to obstructive sleep apnea validated for Brazil, a study found that the PSQI addresses the function domain more frequently, but also has environmental factors, activity, and participation addressed. This was observed in this research, the codes referring to sleep functions were more frequently addressed by the questions, among them are b1341 (sleep onset), b1342 (sleep maintenance) and b1343 (sleep quality), as well as codes from the other domains such as e2250 (temperature) and d230 (performing the daily routine) that were the most affected among the students (NASCIMENTO and FERREIRA, 2021)

In the CIF model, the components interact with each other dynamically, that is, changes in one element have the potential to modify one or more of the other elements. The presence of disability does not dictate the limitation of capacity, however, most of the interviewees presented deficiencies in sleep-related functions, characterized by the ICF through subdivisions from b1341 to b1343 that can be visualized due to the large percentage of poor sleep quality (55.9%) and the presence of sleep disorders obtained through the PSQI results. (23,5%) (WHO, 2003).

A study showed that a poor sleeping environment is one of the main causes of sleep interference, as well as the temperature of the place that leads to a worsening of sleep quality. In this survey, 61.7% of students reported having difficulty sleeping due to heat, an environmental factor characterized by the code e2250 (temperature) that is acting as a barrier to good sleep quality. (XIONG et al, 2020)

This study was limited to analyzing sleep quality and functionality, so association and correlation tests were not performed. Due to the large number of variables and a large population, the data collected can be used for research that aims to correlate the variables,

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making this research a possible umbrella study for a greater knowledge of the sleep quality of physiotherapy students

CONCLUSION

There is a predominance of poor quality and presence of sleep disorders in physical therapy students at UESPI. In the aspect of functionality, the students have alterations in the components of physiological functions, environmental factors and activity and participation. The subdivisions of the ICF referring to the functions of sleep, temperature and performing the daily routine stand out.

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