Effects of exposure to screens on sleep quality in higher education students

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ABSTRACT

Introduction: The definition of normal sleep is described as that which provides an individual with a feeling of well-being or physical and mental rest after a night's sleep. The literature has established that one of the high-risk groups predisposed to being affected by sleep disorders are students. According to some authors, sleep deprivation causes depression, agitation, apathy and poor academic performance in students, with the main reason for the decline in academic performance being the reduction in the total number of hours of sleep. Objectives: To evaluate the quality of sleep in higher education students and relate it to exposure to screens. Materials and Methods: The sample was collected by completing online surveys by students. The survey consists of the Pittsburgh Sleep Quality Index (PSQI) and the Epworth Sleepiness Scale (ESE) and another part to characterize the sample and evaluate consumption habits and exposure to screens. Results: Data was collected from 94 students aged between 18 and 33 years. The prevalence of poor sleep quality was 50%. It was found that those who slept less than 7 hours per night had a higher prevalence of poor sleep quality, with a statistical significance of 0.002. Conclusion: This study found that more than half of the students studied slept less than 7 hours and that they had poor sleep quality.

Keywords: Sleep quality, Students.

INTRODUCTION

The definition of normal sleep is described by Koo (2013) as that which provides an individual with a feeling of well-being or physical and mental rest after a night's sleep, with energy recovery allowing them to perform in good physical and mental condition. the next day's tasks. It is also defined as a basic neurophysiological process, essential to life, being fundamental in the physiology, cognitive functioning and physical recovery of the human being and, as such, it is subject to changes either by processes that are specific to it or by repercussions associated with underlying diseases.

There is a high percentage of incidence of disturbed sleep quality in higher education students who require between 8 and 10 hours of sleep per night, currently sleeping much less than

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necessary, constituting a growing concern in our society, as it can have several consequences on their health, development and income, causing, in the future, a negative impact on their role in society. As academic demands such as exam periods, term papers and deadlines increase these stressors, it is not surprising that a deficit in sleep quality is a common occurrence in higher education students.

Poor sleep quality has been associated with increased tension, irritability, depression, more frequent use of alcohol and illicit drugs, accidents and decreased academic performance. Sleep problems are common and little recognized in the age group where these students are, influencing their learning and behavior.

The use of social networks and, consequently, exposure to screens, has been growing in recent years, being linked to lower than normal sleep quality and increased levels of anxiety and depression among adolescents. These platforms are used by young people and young adults on a daily and frequent basis and are associated with a reduction in the duration and quality of sleep and a delay in falling asleep. Its use usually involves interaction with the device itself, which ends up being more harmful to the quality of sleep than other, more passive ways of exposing screen time, such as watching television.

Exposure to screens before bedtime is a concern for sleep hygiene, as lights have a major impact on the human being's circadian cycle, being able to disrupt the quality of sleep. The circadian cycle synchronizes countless physiological and biochemical processes in our body, including the daily sleep rhythm.

Light exposure from screens during dusk and the early part of the night, even at low intensity, reduces melatonin secretion, modifying the circadian rhythm and delaying bedtime, making it difficult to fall asleep (15). Studies show that around 90% of American individuals own and use a technological device in their bedroom an hour before bedtime or even when trying to fall asleep, with this number being more prevalent in young adults.

GOAL

To evaluate the quality of sleep in higher education students and relate it to exposure to screens at bedtime.

METHODOLOGY

The present study is observational, cross-sectional, prospective and the methodology adopted is fundamentally quantitative.

Data collection was carried out through the availability of online surveys in December 2023. 107 responses were collected, of which 13 were excluded due to not meeting the inclusion criteria, age under 18 years and diagnosis of sleep pathology, and invalid responses, sleep efficiency greater than 100%.

The survey, in online format, was made available, and only after reading and agreeing to the informed consent was the participant able to respond to it. A survey consisting of a part of the Pittsburgh Sleep Quality Index (PSQI) and the Sleepiness Scale was used. of *Epworth* (ESE) and another part to characterize the sample and evaluate consumption habits and exposure to screens.

The data obtained were entered, coded, processed and analyzed using the IBM SPSS (Statistical Package for the Social Sciences) version 27 program. A quantitative descriptive analysis was carried out with the calculation of means, standard deviation, minimum and maximum values and absolute data. In order to test the distribution of the sample, the Kolmogorov-Smirnov normality test was applied. The non-parametric Chi-Square test was used for associations between nominal and/or ordinal variables, for a 95% confidence interval and $p \leq 0.05$.
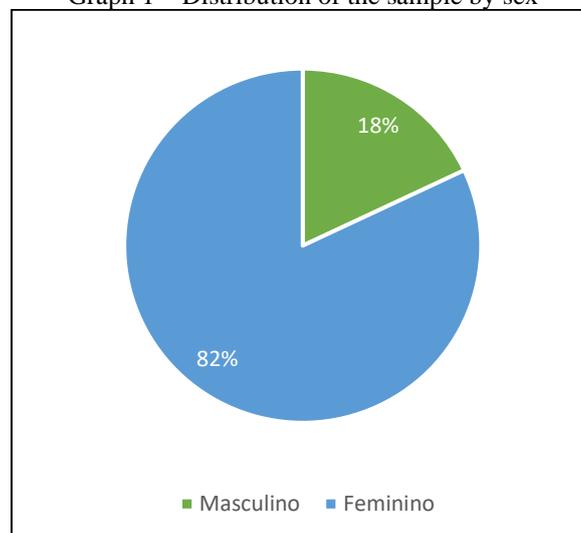
ETHICAL ISSUES

The Study is authorized by an Ethics Committee coded with the number 100/CE-IPCB/2023. The research team declares that they have no conflicts of interest.

RESULTS

SAMPLE CHARACTERIZATION

Graph 1 – Distribution of the sample by sex

The final sample consists of 94 individuals, 77 females (82%) and 17 males (18%) (Graph 1).

In relation to ages, it was found that the average age value was 20.66 ± 2.148 years, ranging from 18 years to 33 years.

Regarding the value of the Body Mass Index (BMI), it was found that its average value was 21.826 ± 2.6277 kg/m^2, which ranged from 16.2 kg/m^2 to 29.3 kg/m^2.

In the Pittsburgh Sleep Quality Index (PSQI) score, an average value of 6.52 ± 3.494 was observed, ranging between 0 and 17.

In the Epworth Sleepiness Scale (ESE) score, a mean value of 7.19 ± 3.850 was observed, with a minimum and maximum value of 0 and 17, respectively.

EVALUATION OF QUESTIONNAIRES

In table 1, you can see the scores obtained from the different components that make up the PSQI.

Table 1 – Sum of the different components that make up the Pittsburgh Sleep Quality Index

Component	Subjective Sleep Quality	Sleep Latency	Sleep Duration	Sleep Efficiency	Sleep Disorders	Use of sleeping medication	Drowsiness and daytime dysfunction
Total	111	184	59	31	98	23	114

Through the above-mentioned table, it is clear that the component with the greatest contribution to the increase in the PSQI score is sleep latency.

Regarding exposure to screens before bed, the entire sample responded that they were exposed to screens (mobile phone, computer, television, etc.) up to 30 minutes before bed. In table 2, we can find the association between sleep duration and PSQI and ESS.

Table 2 – Relationship between sleep duration and the Pittsburgh Sleep Quality Index and the Excessive Sleepiness Scale

		More than 7 hours	Between 7 and 6 o'clock	Between 6 and 5 o'clock	Less than 5 hours	Total	p value
Pittsburgh Sleep Quality Index	Poor Sleep Quality	14	25	7	1	47	0.002
	Good Sleep Quality	30	17	0	0	47	
Excessive Sleepiness Scale	Excessive Daytime Sleepiness	14	14	two	0	30	0.909
	Normal Daytime Sleepiness	30	28	5	1	64	

From the analysis of table 2, it can be seen that there is a higher prevalence of poor sleep quality in those who sleep less than 7 hours, according to the PSQI, with a statistically significant relationship (*p*

value = 0.002). In terms of the relationship between ESS and sleep duration, a relationship between the two variables cannot be confirmed.

In table 3, we can see the relationship between screen exposure habits before bed and PSQI and ESS.

Table 3 – Relationship between screen exposure habits before bed and the Pittsburgh Sleep Quality Index and the Excessive Sleepiness Scale

		Never	Rarely	Sometimes	Often	Ever	Total	*p value*
Pittsburgh Sleep Quality Index	Poor Sleep Quality	1	0	4	15	27	47	0.593
	Good Sleep Quality	0	1	two	17	27	47	
Excessive Sleepiness Scale	Excessive Daytime Sleepiness	1	1	two	6	20	30	0.113
	Normal Daytime Sleepiness	0	0	4	26	34	64	

After analyzing table 3, it was found that those who are exposed to screens more frequently have an equal prevalence of good and poor sleep quality, according to the PSQI. In the ESE, it is possible to verify that those who answered "Never" and "Rarely" have a higher prevalence of excessive daytime sleepiness compared to other individuals.

In table 4, it can be seen that there is a greater percentage of individuals who "Frequently" and "Always" spend more time online than intended. The majority of individuals who responded that they spend more time online than intended "sometimes", "often" and "always" have worse sleep quality according to the PSQI. Those who answered "Never" had a higher prevalence of excessive daytime sleepiness compared to other individuals, despite this, the relationship between these variables was not statistically significant.

Table 4 – Relationship between more time spent online than initially intended and the Pittsburgh Sleep Quality Index and the Excessive Sleepiness Scale

		Never	Rarely	Sometimes	Often	Ever	Total	*p value*
Pittsburgh Sleep Quality Index	Poor Sleep Quality	1	two	13	18	13	47	0.363
	Good Sleep Quality	0	6	15	18	8	47	
Epworth Sleepiness Scale	Excessive Daytime Sleepiness	1	two	5	15	7	30	0.168
	Normal Daytime Sleepiness	0	6	23	21	14	64	

In the analysis of table 5, we can observe the relationship between the feeling that the time spent on screens before bed harms the quality of sleep and the PSQI and ESS. From this cross-reference, it can be deduced that the majority of individuals who responded that the time spent on screens worsened their sleep quality actually had poor sleep quality according to the PSQI. There is no relationship between excessive daytime sleepiness and the feeling that time spent on screens harms the individual's sleep. In this relationship there is no statistical significance as can be seen in table 5.

Table 5 – Relationship between the feeling that the time spent on screens before bed impairs sleep quality and the Pittsburgh Sleep Quality Index and the Excessive Sleepiness Scale.

		Yes	No	Total	*p value*
Pittsburgh Sleep Quality Index	Poor Sleep Quality	22	25	47	0.404
	Good Sleep Quality	18	29	47	
Epworth Sleepiness Scale	Excessive Daytime Sleepiness	17	13	30	0.058
	Normal Daytime Sleepiness	23	41	64	

DISCUSSION

Sleeping well is essential for health and an improvement in quality of life. Sleep is a dynamic process dependent on neurological and hormonal balance, being an essential tool in the memory consolidation mechanism (16). The literature has established that one of the high-risk groups predisposed to being affected by sleep disorders are students. According to some authors, sleep deprivation causes depression, agitation, apathy and poor academic performance in students, with the main reason for the decline in academic performance being the reduction in the total number of hours of sleep (7).

Exposure to light in the late afternoon and early evening, even at low intensity, suppresses the release of the hormone melatonin, which facilitates sleep. According to a study carried out by *Chang*

(2015), the use of electronic devices before bedtime prolongs sleep latency, as it increases the user's state of alertness before bedtime (15), corroborating the results of the present study where it was concluded that The component of the PSQI with the highest score is sleep latency.

The present study demonstrates that 100% of the sample is exposed to some type of screen 30 minutes before falling asleep, a result corroborated by the study carried out by Amaral (2017) which demonstrated that there is daily use of the *Internet* and consequently exposure to screens in 98.6% of young people studied (17).

The current investigation confirmed that 53% of the sample slept less than 7 hours, in which there is a greater prevalence of poor sleep quality. These results are in line with those presented in the scientific community, such as in a study carried out in the United States of America. which states the existence of a prevalence of reduced sleep duration in 72.7% of the population (18). Another study whose objective was to investigate sleep duration in university students with different academic performances, concluded that there was a higher prevalence of low sleep duration in higher education students, being related to low academic performance (18).

In 2012, in South Korea, a study was carried out that concluded that there was a relationship between *internet addiction* and depression and sleep disorders (19). In 2013, a study carried out by *Canan* found, once again, an association between *internet addiction* and changes in sleep (20), confirming the results obtained in the present study, where 90% of the sample said they spent more time online than expected beforehand. of sleeping "sometimes", "often" and "always", with a higher prevalence of worse sleep quality, according to the PSQI, in these individuals.

One of the limitations was the fact that the questionnaire was carried out online and there may be some inaccuracy in the interpretation of the questions and consequently rigorous answers and there may be a poor perception of sleep among individuals. It is essential to reinforce the importance of acquiring good habits and modifying incorrect sleep habits among higher education students, and to teach and raise awareness of the importance and need for maintaining good sleep hygiene.

It is essential to invest in more studies on this topic, evaluating larger samples and distributed similarly between genders. The existence of a sample divided into two groups, one where there is exposure to screens before bedtime and the other where there is no exposure to screens before bedtime would be essential for greater reliability of the results, regarding the relationship between the quality of sleep and exposure to screens.

FINAL CONSIDERATIONS

This study found that more than half of the students studied slept less than 7 hours and that they had poor sleep quality.

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