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Social Jet Lag, sleep quality and daytime sleepiness in university students: A cross-sectional study

Jet Lag Social, qualidade do sono e sonolência diurna em universitários: um estudo transversal

Jet Lag Social, calidad del sueño y somnolencia diurna en estudiantes universitários: un estudio transversal

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Abstract
The objective was to verify the difference in sleep quality and daytime sleepiness between university students with and without JLS. This is a field, descriptive, analytical, cross-sectional study carried out with 105 university students, selected by convenience. The JLS was measured by calculating the discrepancy between the times of sleeping and waking up on usual weekdays and weekends, individuals with an average sleep point >1 hour were classified as having JLS. The Pittsburgh Sleep Quality Index (PSQI) was used to analyze sleep quality and the Epworth Sleepiness Scale for daytime sleepiness. The JAMOVI statistical package was used, the comparison between the midpoints was performed using the paired t test, Comparison between sleep quality and daytime sleepiness scores among university students with and without JLS was performed using the independent t test, adopting an alpha of 0.05 in all analyses. The results indicate that JLS exists in about 1/3 of university students (38;36.2%). The data showed a statistically significant difference between the weekly midpoint and the weekend midpoint ($p<0.001$). Most college students (78; 74.3%) had poor sleep quality and levels of excessive daytime sleepiness (77; 73.3%). Independent t-test shows that college students with JLS have higher scores for poor sleep quality and excessive daytime sleepiness. It is concluded that college students with JLS have worse sleep quality and higher levels of excessive daytime sleepiness.
Keywords: Sleep; Health; Biological rhythms.

Resumo

Objetivou-se verificar a diferença da qualidade do sono e sonolência diurna entre universitários com e sem JLS. Trata-se de um estudo de campo, descritivo, analítico, de corte transversal, realizado com 105 universitários, selecionados por conveniência. O JLS foi mensurado pela calculado pela discrepância dos horários de dormir e acordar em dias habituais da semana e final de semana, indivíduos com ponto médio de sono >1 hora foram classifica dos com JLS. Para análise da qualidade do sono foi utilizado o Índice de Qualidade do Sono de Pittsburgh (PSQI) e para sonolência diurna a escala de sonolência de Epworth. O pacote estatístico JAMOVI foi utilizado, a comparação entre os pontos médios foi realizada através do teste t pareado, comparação entre os escores da qualidade do sono e da sonolência diurna entre os universitários com e sem JLS foi realizada através do teste t independente. Em todas as analises foram adotadas um alfa de 0,05. Os resultados apontam existir o JLS em cerca de 1/3 dos universitários (38;36,2%). Os dados apresentaram uma diferença estatisticamente significativa entre o ponto médio semanal e ponto médio no final de semana (p<0,001). A maioria dos universitários (78; 74,3%) apresentou uma qualidade do sono ruim e níveis de sonolência excessiva diurna (77; 73,3%). Teste t independente aponta que universitários com JLS apresentam maiores escores de qualidade do sono ruim e de sonolência excessiva diurna. Conclui-se que os universitários com JLS apresentam pior qualidade do sono e níveis mais elevados de sonolência excessiva diurna.
Palavras-chave: Sono; Saúde; Ritmos biológicos.

Resumen

El objetivo fue verificar la diferencia en la calidad del sueño y la somnolencia diurna entre universitarios con y sin SLJ. Se trata de un estudio de campo, descriptivo, analítico, transversal, realizado con 105 estudiantes universitarios, seleccionados por conveniencia. El JLS se midió calculando la discrepancia entre las horas de dormir y despertarse en los días laborables habituales y los fines de semana, las personas con un punto de sueño promedio> 1 hora se clasificaron como que tenían JLS. Se utilizó el índice de calidad del sueño de Pittsburgh (PSQI) para analizar la calidad del sueño y la escala de somnolencia de Epworth para la somnolencia diurna. Se utilizó el paquete estadístico JAMOVI, la comparación entre los puntos medios se realizó mediante la prueba t pareada, La comparación entre la calidad del sueño y las puntuaciones de somnolencia diurna entre estudiantes universitarios con y sin SLJ se realizó mediante la prueba t independiente, adoptando un alfa de 0,05 en todos los análisis. Los resultados indican que el SLJ existe en aproximadamente 1/3 de los estudiantes universitarios (38;36,2%). Los datos mostraron una diferencia estadísticamente significativa entre el punto medio semanal y el punto medio del fin de semana (p<0,001). La mayoría de los estudiantes universitarios (78; 74,3%) tenían mala calidad de sueño y niveles de somnolencia diurna excesiva (77; 73,3%). La prueba t independiente muestra que los estudiantes universitarios con SLJ tienen puntajes más altos para la mala calidad del sueño y la somnolencia diurna excesiva. Se concluye que los estudiantes universitarios con SLJ tienen peor calidad de sueño y mayores niveles de somnolencia diurna excesiva.
Palabras clave: Dormir; Salud; Ritmos biológicos.

1. Introduction

Social Jet Lag (JLS) can be conceptualized as a change in the sleep pattern between social and biological time (Jankowsk, 2017). Mota (2017) defines “Social Jet Lag” as the discrepancy between sleep schedules on work or study days and free days such as weekends, where there is a misalignment in the biological and social clock. Misaligning the biological clock may be related to the increased risk for various diseases, as sleeping is essential for the body to carry out restorative functions for the body, this difference in the biological rhythm is associated with depression, bipolar disorder and cognitive disorders (Santos; Moura, 2019).

Malone *et al.* (2016) point out that this misalignment has consequences for the individual's life, including academic life. Irregular sleep and the discrepancy between bedtimes affect sleep quality and is related to a drop in academic performance (Phillips *et al.*, 2017). Araújo *et al.* (2021), show in their study that the academic tasks of university students directly influence their sleep quality, either because they sleep late or even those who have classes in the morning and are forced to wake up early, causing an imbalance in their sleep schedule on class days.

Sleep is essential for life and occurs in every individual, the duration of sleep can vary, the recommendation is 7 to 9 hours of sleep per night, and when there is a change in the course of this process, it can cause consequences and damage to health (Souza; Tomaz, 2017). The poor quality of sleep in university students is significant (Araújo *et al.*, 2021) and that this poor quality of sleep is related to the performance of these academics (Phillips *et al.*, 2017). Current literature demonstrates

that one of the most accepted ways to change this reality is sleep hygiene, whichconsists of relaxing before going to sleep or avoiding the consumption of caffeine, tobacco, alcohol and drugs (Manfredini *et al.,* 2017).

Sleep plays a fundamental role in human life, since it has the function of repairing and conserving energy. However, sleep deprivation leads to impairments in physical and mental well-being, which interferes with the performance of social roles and interpersonal relationships. (Neves; Macedo; Gomes, 2017).

Therefore, the choice of this study took place during the academic process, arising from curiosity regarding the discrepancy in sleep schedules on weekdays and weekends and how this can impact the academic life of university students. The search for a deeper understanding of the Social Jet Lag can contribute to the implementation of more coherent interventions, aiming at improving the individual's health. The study aims to verify the difference in sleep quality and daytime sleepiness between university students with and without JLS.

2. Methodology

This research is characterized as a field, descriptive, analytical cross-sectional study, where the convenience sample was composed of 105 university students from a University Center located in the interior of Ceará. It was adopted as inclusion criteriauniversity students in the health area, of both genders, enrolled and assiduous in the second semester of 2022. University students who used sleep-inducing medication were excluded from the study.

For the characterization of the research participants, a questionnaire structured by the researcher was applied, requesting information about sex, age, work function, family income, skin color, marital status, use of alcohol and cigarettes.

To identify the JLS, a questionnaire was applied asking the time that the individual sleeps and wakes up on a normal weekday and at the weekend. The JLS was calculated as follows: JLS= (midpoint of the time you sleep and wake up on weekends - midpoint of the time you sleep and wake up on a regular day of the week).Example: An individual on usual days of the week sleeps at 00:00 and wakes up at 06:00 the midpoint is 3:00, on weekends he sleeps at 00:00 and wakes up at 08:00, his midpoint is 4, that is, 1 hour of difference which classifies it with JLS. The 1h cutoff point was used to identify JLS.

To assess the quality of sleep, the Pittsburg Sleep Quality Index (PSQI) questionnaire was used, which assesses the subjective quality of sleep and disturbances in the last month, the questionnaire contains 10 objective questions, which classifies the patient as a good sleeper or poor sleeper, indicators greater than five points, indicate poor sleep quality (Bertolazzi, et al., 2011).

For the investigation of Daytime Sleepiness, the Epworth Sleepiness Scale was applied to obtain the degree of daytime sleepiness of the investigated person, the questionnaire indicates 8 probabilities of falling asleep, with the possibility of dozing ranging from 0 to 3, the score is summative and can range from 0 to 24 points, those who exceed 10 points are considered to have excessive daytime sleepiness (Bertolazzi, et al., 2018).

Data collection took place in the second semester of the 2022 school year, during four weeks. Between the months of September and October, the students were invited to participate in the research, if they accepted and met the eligibility criteria, they were sent to a room reserved for the research, it should be noted that the study data were collected by the researcher in the morning, afternoon and night periods

The preparatory treatment for data analysis resulted in the creation of a database, that is, in the tabulation and typing in the Microsoft Excel® program, 2013. Then, the analyzes of the research data were conducted using the JAmovi statistical program. In the present study, descriptive statistical analyzes were carried out by frequency distribution (absolute and percentage), in addition to measures of central tendency.To verify the normality and homogeneity of the data, the Shapiro-Wilk and Levene tests were used, respectively.The comparison between the midpoints was performed using the paired t test,

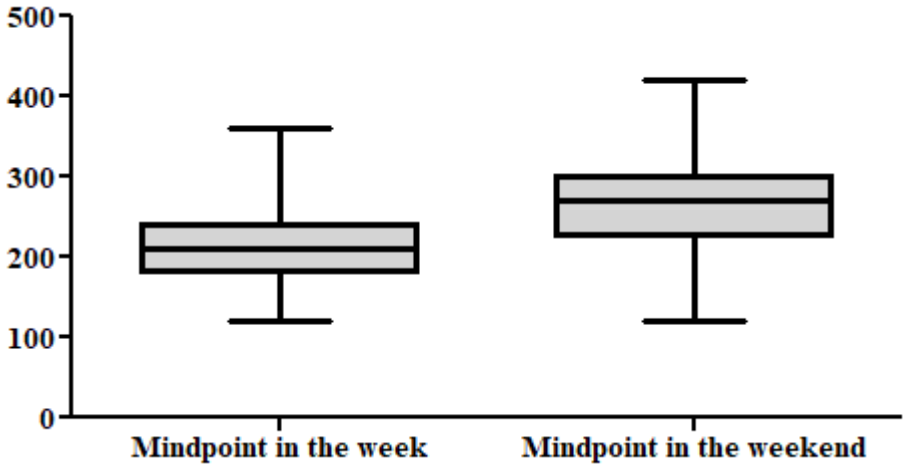
comparison between the scores of sleep quality and daytime sleepiness between university students with and without JLS was performed using the independent t test, in all analyzes adopting an alpha of 0.05

All current ethical procedures were respected, in accordance with Resolution 466/12 of the National Health Council.All participants were informed of the procedures to be adopted in the research. The study was submitted and approved by the Ethics Committee of Centro Universitário Dr. Leão Sampaio, through opinion 2.387.940.

3. Results

Participated 105 university students in the research, most of them female (63; 60.3%), with a mean age of 23.7±5.12 years. It was observed that most university students had a job (75; 71.4%), had a family income greater than one minimum wage (88; 83.8%), were brown (77; 73.3%), had spouse (72; 68.6%), do not drink alcohol (57; 54.8%) and do not smoke (103; 98.1%). The data showed a statistically significant difference between the weekly midpoint (214±46.6) and the weekend midpoint (270±61.3) [t (104) = -7.89, p<0.001, Δ= 26.2%] (Figure 1)

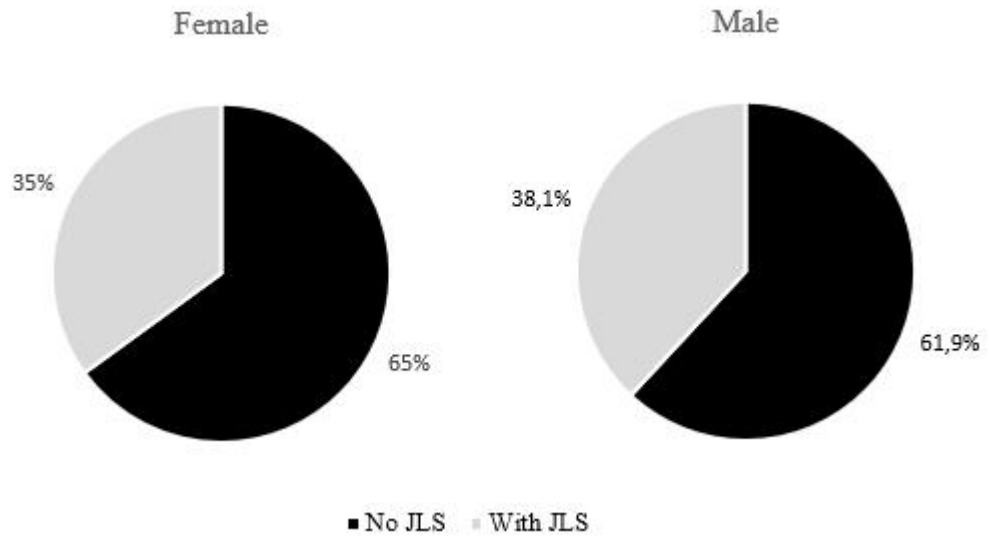
Figure 1 - Distribution of midpoints in minutes for the college week and weekend. Juazeiro do Norte, CE, 2022.



Source: Survey data (2022).

The results indicate that the Social Jet Lag still exists in about 1/3 of the university students (38;36.2%), with emphasis on males (16; 38.1%), (Figure 2)

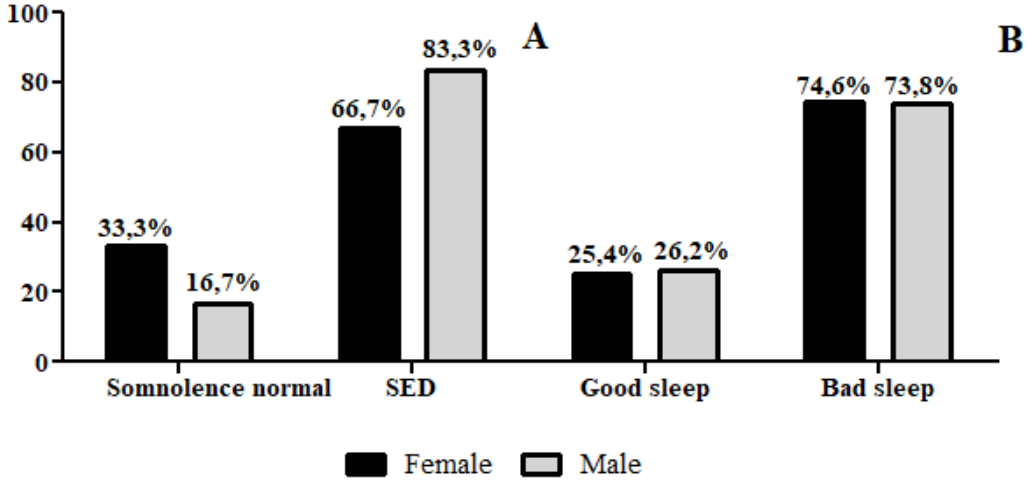
Figure 2 - Distribution of Social Jet Lag (JLS) proportions in university students according to gender, Juazeiro do Norte, CE, 2022.



Source: Survey data (2022).

The data indicate that most college students (77; 73.3%) had levels of excessive daytime sleepiness, with the highest proportion of college students being male (35;83.3%) (Figure 3A). Most university students had poor sleep quality (78; 74.3%), with a higher proportion of females (47; 74.6%) (Figure 3B).

Figure 3 - Distribution of daytime sleepiness proportions and sleep quality of university students according to gender, Juazeiro do Norte, CE, 2022.



Source: Survey data (2022).

When comparing scores of excessive daytime sleepiness and sleep quality between university students with and without JLS, the results point to a statistically significant difference in both variables (Table 1).

Table 1 - Description and comparison of excessive daytime sleepiness scores and sleep quality among college students with and set JLS, 2022.

Variable	Descriptive				Comparative	
	No JLS		With JLS			
	Average	DP	Average	DP	*t*	*P*
Excessive daytime sleepiness	8.15	4.66	10.92	3.25	-3.25	**0.03***
Sleep quality	5.67	2.48	8.18	2.53	-4.95	**<0.001***

* p<0.05. Source: Survey data (2022).

4. Discussão

It should be noted that the objective of the present research was to verify the difference in sleep quality and daytime sleepiness between university students with and without JLS, thus the data indicate that university students with JLS have higher scores of poor sleep quality and excessive daytime sleepiness.

Epidemiological data indicate that Social Jet Lag leads to losses in the lifestyle of individuals (Alves *et al.,* 2016), the authors show a higher prevalence in young people (80%) compared to the older public (20%). Mota (2017) points out that individuals with JLS with a difference in the midpoint of sleep >1 hour are more likely to be obese compared to individuals without JLS.

A longitudinal study, carried out for two years, with 14,894 university students in a learning management system with the purpose of mapping the JLS in a large population, demonstrated that a JLS>30 min, correlates with a decrease in academic performance (Martínez-Lozano *et al.*, 2020).

The literature points out statistically significant differences between the midpoints of sleep on free days and usual days, as in the study by Silva *et al.*, (2020), carried out with 204 university students, in which 91% of the students showed a difference greater than 30 minutes of study days compared to free days. This pattern of behavior was also evidenced in the study by Malone *et al.* (2016) which points out that 76% of students have midpoints of late sleep on free days, thus demonstrating the presence of JLS in academics, which can lead to poor quality of sleep and daytime sleepiness.

Corroborating this hypothesis, Do Rego *et al.* (2019) points out that in Brazil 61.6% of students have poor sleep quality. Research carried out in the northeast region (Silva *et al.*, 2020; Souza; Pinto; Alves 2020; Bezerra *et al.*, 2019) demonstrate similar results, where the analyzes pointed out that most of the investigated had poor sleep quality and had excessive daytime sleepiness.

The results of the present study indicate significant changes in the midpoints on usual days of the week compared to weekends, the research points out that those who have this difference, that is, individuals with JLS, obtained a higher average in relation to the impact on sleepiness daytime activity and sleep quality, with a significant difference, which in theory can cause damage to mental and physical health, such as: increased body mass index (BMI), impaired cognitive and academic performance, mood and depression.

Malone *et al.* (2016) point out in their study that the JLS is correlated with a higher BMI, in addition to showing that those who have long durations of sleep had increases in BMI over time, the results demonstrate that the regulatory patterns of sleep are important to maintain an adequate BMI, the same, academic performance is also associated with adequate sleep duration, that is, the incompatibility in sleep schedules can significantly influence academic and cognitive performance.

Alves (2020), concluded that the JLS is associated with sleep and cognition alteration, contributing to the findings of Polugrudov *et al.* (2016), where the impacts of JLS on the intelligence of subjects were evaluated, the findings found point to cognitive disadvantages for individuals who present JLS ≥ 2 hours.

McGowan; Voinescu; Coogan (2016) in a study carried out with a sample of university students, reported that sleep impairments, accompanied by JLS as a predictive factor, lead to damage such as attention and learning deficits, as well as to academic performance.

According to Phillips *et al.* (2017) the JLS affects the quality of sleep, and when this quality of sleep is affected it can significantly influence academic and school performance (Malone *et al.*, 2016), given this negative impact on the cognitive resulting from sleep disorders, it can be suggest that the JLS is a predictor.

Limitations of this research include the acquisition of data through indirect evaluation of the variable, the type of sampling used, as well as the cross-section of the study, thus making it difficult to investigate low-prevalence conditions. Thus, it is recommended that new studies be carried out in which the limitations mentioned above are taken into account, and that university students from the public network be investigated.

5. Conclusion

It is concluded that JLS is present in 1/3 of university students and that university students with JLS have worse sleep quality and higher levels of excessive daytime sleepiness

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