

ORIGINAL RESEARCH

Impact of Sleep Quality on Academic Performance of Undergraduate Nursing Students: An Analytical Cross-sectional Study in Pakistan

Impacto de la calidad del sueño en el rendimiento académico de los estudiantes universitarios de enfermería: un estudio transversal analítico en Pakistán

Fouzia Jabeen. National University of Medical Sciences, College of Nursing, AFPGMI Rawalpindi, Pakistan.
Email: fjamjd@gmail.com, <https://orcid.org/0009-0004-3081-0415>

Muhammad Alamgir Khan. Army Medical College Rawalpindi, Pakistan.
Email: docalamgir@gmail.com, <https://orcid.org/0000-0002-3065-7631>

Naheed Raza. Aman College of Nursing, Islamabad, Pakistan.
Email: razinaheed@gmail.com, <https://orcid.org/0009-0009-2900-5204>

Shagufta Parveen. College of Nursing, AFPGMI Rawalpindi, Pakistan.
Email: shagufta1947pakistan@gmail.com, <https://orcid.org/0000-0003-4307-6702>

Received: September 29, 2024

Accepted: November 11, 2024

Conflict of interest: none.

DOI: <https://doi.org/10.71164/socialmedicine.v18i2.2025.1903>

Abstract

Background. Sleep is crucial for human health and to perform tasks. Quality of sleep plays a vital role in student's learning abilities and academic performance. Poor sleep quality is common among nursing students due to their hectic schedules, and this can negatively impact their mental abilities and academic performance. **Objective.** The purpose of this study was to determine an association between quality of sleep and academic performance among undergraduate nursing students. **Methods.** An Analytical Cross-Sectional study recruited 194 nursing students from one public sector and one private sector nursing institute in Rawalpindi and Islamabad, respectively. Sleep quality was assessed using a validated tool Pittsburgh Sleep Quality Index (PSQI) and academic performance was measured by the student's current CGPA. The data was analyzed using SPSS version 26, using descriptive and inferential statistics such as Pearson Correlation, logistic regression, and Chi-Square tests, with statistical significance set at $p < 0.05$. **Results.** Of the total participants, 30.9% (60) had good quality of sleep, 59.3% (115) had fairly good, 9.3% (18) had fairly bad, and 0.5% (1) had very bad quality of sleep. Most students had fairly good sleep quality, 65 students had an excellent GPCA, and 75 had very good CGPAs. The study found no significant correlation between academic performance and quality of sleep, possibly due to unresolved confounding factors. The Chi-square analysis indicated a p-value of 0.634 and 0.137. **Conclusion.** Students with high academic scores and those with low scores did not show any discernible difference in their quality of sleep. A longitudinal study is recommended to understand the impact of sleep quality on academic performance, improving data validity and reliability.

Keywords: Academic Performance; Cross-sectional Study; Quality of Sleep; Undergraduate Nursing Students; Pittsburgh Sleep Quality Index (PSQI)

Resumen

Antecedentes. El sueño es crucial para la salud humana y para realizar tareas. La calidad del sueño desempeña un papel vital en la capacidad de aprendizaje y el rendimiento académico de los estudiantes. La mala calidad del sueño es común entre estudiantes de enfermería, debido a sus agitados horarios, esto puede repercutir negativamente en su desempeño. **Objetivo.** el propósito de este estudio fue determinar si existe asociación entre la calidad del sueño y el rendimiento académico en estudiantes de enfermería. **Metodología.** Se llevó a cabo un transversal analítico, reclutó a 194 estudiantes de un instituto de enfermería del sector público y otro del sector privado, en Rawalpindi e Islamabad, respectivamente. La calidad del sueño se evaluó mediante una herramienta validada, el índice de calidad del sueño de Pittsburgh (PSQI), el rendimiento académico se midió mediante su calificación promedio. Los datos se analizaron con SPSS versión 26, utilizando estadística descriptiva e inferencial, como la correlación de Pearson, la regresión logística y la Chi-cuadrada, con significancia estadística fijada en $p < 0.05$. **Resultados.** del total, 30.9% (60) tenían buena calidad de sueño, 59.3% (115) bastante buena, 9.3% (18) bastante mala y 0.5% (1) muy mala. De la mayoría con una calidad bastante buena del sueño, 65 estudiantes tenían un promedio excelente y 75 uno muy bueno. El estudio no encontró una correlación significativa entre el rendimiento académico y la calidad del sueño, posiblemente debido a factores de confusión no resueltos. El análisis de chi-cuadrada indicó un valor de p de 0.634 y 0.137. **Conclusiones.** las y los estudiantes con puntuaciones académicas altas y los que las obtuvieron bajas, no mostraron diferencias perceptibles en su calidad del sueño. Se recomienda un estudio longitudinal para comprender la relación entre las dos variables, mejorando la validez y fiabilidad de los datos.

Palabras clave: rendimiento académico; estudio transversal; calidad del sueño; estudiantes universitarios de enfermería; Índice de Calidad del Sueño de Pittsburgh (PSQI)



Introduction

Sleep is a physiological process characterized by a periodic, reversible decrease in consciousness, while maintaining some awareness of the environment¹. Contemporary perspectives suggest that sleep is more accurately described as a subconscious state rather than a complete unconsciousness, as individuals can still be aroused by stimulants or sensors.² Sleep is essential for human health, playing a vital role in bodily restoration, physical and mental rejuvenation, and cognitive functions such as memory consolidation and learning.¹ The sleep cycle, governed by the circadian rhythm, consists of five phases, culminating in rapid eye movement (REM) sleep. A complete and uninterrupted progression through these stages is necessary for high-quality sleep.³

As individuals age, their sleep patterns evolve, influenced by their circadian rhythms, which regulate alertness and sleep throughout the day⁴. Adequate sleep enhances cognitive functions, including learning and memory, and is crucial for overall health and daily functioning⁵. Conversely, sleep deprivation impairs cognitive abilities such as information processing, attention, and judgment, and is linked to poor academic performance and focus.^{1,2} Excessive sleep deprivation negatively affects health and cognitive function, with severe cases potentially leading to hallucinations or even death, while mild sleep deprivation increases the risk of chronic health issues.^{6,7} Chronic sleep deprivation is associated with various diseases, including cancer, diabetes, and cardiovascular conditions, and is also linked to mental health disorders such as depression and schizophrenia.⁸

Sleep quality, which includes factors such as sleep depth, restfulness, and the ability to wake up refreshed, is as important as sleep quantity. Good sleep quality involves falling asleep easily, sleeping for sufficient time without interruption, and waking up feeling ready for daily activities^{5,9}. The American Academy of Sleep Medicine recommends seven or more hours of sleep for adults, with varying requirements for different age groups.^{10,11}

Inadequate sleep is a global issue, particularly prevalent among students who often sacrifice sleep for academic commitments.¹⁵ Poor sleep quality is associated with diminished cognitive functioning and academic performance.^{4,16} Nursing students, who face intensive academic schedules, are likely to experience significant sleep deprivation, which can negatively impact their cognitive abilities and academic outcomes.¹⁷ This study aims to explore the relationship between sleep quality and academic performance among Pakistani nursing students, addressing a gap in the existing literature and highlighting the need for further research in this area.

Methodology

This study employed an analytical cross-sectional design to examine associations between sleep quality and academic performance among undergraduate nursing students. Conducted across two nursing colleges in Rawalpindi and Islamabad, Pakistan, from November 2023 to August 2024, the research aimed to provide insights into the connection between these factors. The study population included undergraduate nursing students, with a target sample size of 194, calculated using the Open Epi calculator with a 95% confidence level and 5% margin of error, accounting for a 20% attrition rate. A non-probability convenience sampling method was used to select participants based on accessibility and specific inclusion criteria, which required students to be enrolled in the BSN program in their second, third, or fourth year. Exclusion criteria included students on sedative medications or diagnosed with sleep disorders. Data was collected using a pretested, validated questionnaire comprising demographic information, cumulative GPA, and the Pittsburgh Sleep Quality Index (PSQI). The PSQI assessed various dimensions of sleep quality with a total score indicating good or poor sleep quality. The reliability of the PSQI in this context was confirmed with a Cronbach's alpha of 0.703. Data collection involved distributing questionnaires to participants at their colleges, with the researcher providing explanations and ensuring understanding. Data was analyzed using SPSS version 26, employing both descriptive and inferential statistics, including Pearson Correlation, logistic regression and Chi-

Square tests, with statistical significance set at $p < 0.05$. Ethical approval was granted by the Armed Forces Post Graduate Medical Institute (National University of Medical Sciences) Rawalpindi, Pakistan (AFPGMI) (Ref 423-AAA-ERC-AFPGMI), and all participants provided informed consent. Measures were taken to maintain confidentiality and ensure data security. The study was conducted with no reported conflicts of interest, and the findings were derived from rigorous analysis and ethical research practices

Results

The demographic characteristics of the study participants are 61.9% female and 38.1% male

students, indicating that most undergraduate students are female. 99.5% of the total participants are under 25 years of age. In terms of marital status, 97.9% were single individuals. 24.2% of the total were home-based, and 75.6% lived in hostels, 34% of the sample came from the 2nd year of the study, 32.6% from the third year, and 67 34.5% from the fourth year. Many participants, 38.5%, had very good academic performance, followed by excellent academic performance in 33.5% good academic performance in 21.6%, and average academic performance in 12.2%. Overall, the study's findings showed that the majority of participants were female, single, under 25, living in hostels, and had good academic records.

Table 1. Participants Demographic

Variables	Frequency(F)	Percentage(%)
Age		
Below 25 years	193	99.5%
Above 25 years	1	0.5%
Gender		
Male	74	38.1%
Female	120	61.9%
Marital Status		
Single	190	97.9%
Married	4	2.1%
Residence		
Hostel	147	75.8%
Home	47	24.2%
Study Year		
2 nd year	66	34.0%
3 rd year	61	31.4%
4 th year	67	34.5%
Academic Performance		
Excellent	65	33.5%
Very good	75	38.5%
Good	42	21.6%
Average	12	6.2%

Source: own data.

Table 2. Descriptive Statistics

Variables	Minimum	Maximum	Mean	SD	Skewness	Kurtosis
USH	3.25	6.25	4.39	0.82	0.35	-0.85
TS	14.13	54.50	24.33	7.64	1.03	1.10
SQ	3.25	11.25	4.95	1.34	1.02	1.69
RMF	4.20	11.20	5.44	1.38	1.67	3.38

Source: own data.

Study findings indicated that the minimum and maximum values of USH (usual sleeping hours) were (3.25, 6.25) with a mean and standard deviation of 4.39, 0.82 and skewness and kurtosis were 0.35, -0.85 respectively. The minimum and maximum values of TS (trouble in sleeping) were 14.13, 54.50 with a mean and standard deviation of 24.33, 7.64 and skewness and kurtosis are 1.03, 1.10 respectively. Similarly, the minimum and maximum values of SQ (sleep quality) were 3.25, 11.25 with a mean and standard deviation of 4.95, 1.34 and skewness and kurtosis of 1.02, 1.69 respectively. The minimum and maximum values of RMF (roommate feedback) were 4.20, 11.20, with a mean and standard deviation of 5.44, 1.38 and the skewness and kurtosis were 1.67, 3.38 respectively.

Table 3. Correlation between the USH, TS, SQ and RMF

Variables	USH	TS	SQ	RMF
USH	1	.076	.088	.138
TS	.076	1	.250**	.280**
SQ	.088	.250**	1	.154*
RMF	.138	.280**	.154*	1
AP	.023	-.055	-.161*	-.004

Source: own data.

The correlation between USH (usual sleeping hours) and TS (trouble in sleep) is positively correlated but statistically insignificant, the correlation between USH and SQ (sleep quality) is positively correlated and statistically insignificant, and the correlation between USH and RMF (roommate feedback) is also positive and statistically insignificant because the p-value is greater than (0.01). The correlation between SQ and RMF is positively correlated and statistically significant, the p-value is less than (0.01).

**Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 4. Regression Model

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.168 ^a	.028	.008	1.566

Source: own data.

The R-value represents the simple correlation and is 0.168, which indicates a low degree of correlation. The R² value indicates how much of the total variation in the dependent variable AP, can be explained by the independent variables RMF, USH, SQ, and TS. In this case, 2.8% can be explained, which is very low.

Table 5. Coefficient Analysis

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.713	.798	-	3.398	.001
	USH	.069	.140	.036	.493	.622
	TS	-.005	.016	-.024	-.312	.755
	SQ	-.190	.087	-.162	-2.170	.031
	RMF	.026	.086	.023	.306	.760

Source: own data.

The Coefficients table provides us with the necessary information to predict AP from RMF, USH, SQ, and TS, as well as determine whether SQ contributes statistically significantly to the model. The USH, TS, and RMF contribute statistically insignificantly to the model. Furthermore, we can use the values in the "B" column under the "Unstandardized Coefficients" column, as shown above.

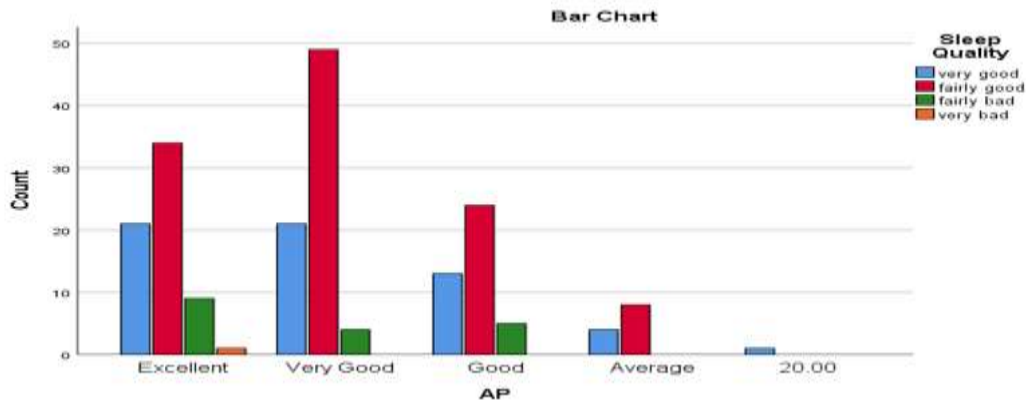
Table 6. Quality of Sleep and Academic Performance

		Quality of sleep				Total
		Very good	Fairly good	Fairly bad	Very bad	
Academic Performance	Excellent	21	34	9	1	65
	Very good	22	49	4	0	75
	Good	13	24	5	0	42
	Average	4	8	0	0	12
	Total	60	115	18	1	194

Source: own data.

Students ranked 60, 115, 18, and 1 in the category of very good, fairly good, fairly bad, and very bad. In contrast, on academic performance 65 students were excellent, 75 were very good, 42 were good, and 12 were average. The researcher identified an outlier as the 1 student who reported very bad sleep quality with excellent CGPA. Out of 60 with very good sleep quality, 21 have excellent, 22 have very good, 13 have good and 4 have average CGPA. Out of 115 with fairly good sleep quality, 34 have excellent, 49 have very good, 24 have good and 8 have average CGPA. Of those with fairly bad sleep quality, 9 had excellent CGPA, 4 had very good, and 5 had good. These findings indicated that sleep quality has a weak association with academic performance, and that there are other factors associated with bad sleep quality.

Figure 1. Quality of Sleep and Academic Performance



Source: own data.

Table 7. Chi-Square Test

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	9.791 ^a	12	.634
Likelihood Ratio	11.208	12	.511
Linear-by-Linear Association	2.212	1	.137
N of Valid Cases	194		

a. 11 cells (55.0%) have expected count less than 5. The minimum expected count is .01.

Source: own data.

The Chi-square analysis indicated a p-value of .634 and .137. Based on the p-value which is higher than 0.05, the study fails to reject the null hypothesis and accept that there is no association between Quality of sleep and Academic performance.

Discussion

This study provides valuable insights into the relationship between sleep quality and academic performance among undergraduate nursing students. The demographic profile of participants reveals a predominance of young, unmarried females living in dormitories, which aligns with patterns often observed in higher education settings^{1,2}. The academic performance of these students was generally satisfactory, with a notable proportion achieving excellent or very good grades. However, the quality of sleep reported by these students was relatively poor, as indicated by their Global Pittsburgh Sleep Quality Index (PSQI) scores.

The findings indicate that 17.6% of participants had a Global PSQI score of 5, while 14.8% scored 6, suggesting that a significant portion of the sample experiences poor sleep quality. This aligns

with previous research where average PSQI scores of around 6.43 have been reported among undergraduates, indicating generally poor sleep quality³. Despite the relatively high academic performance, the poor sleep quality observed in many students highlights a concerning trend, consistent with the results of other studies that found a weak association between sleep quality and academic achievement.⁴

The analysis revealed a small, statistically insignificant association between sleep quality and academic performance, with a correlation coefficient ($r_s = -0.146$). This is consistent with findings from previous literature, which have reported similar weak correlations⁵. Despite the small effect size, it is noteworthy that poor sleep quality could potentially impact cognitive functions and academic outcomes, as suggested by other studies linking sleep problems to academic difficulties.^{6,7} The descriptive statistics from the

study show that participants' average Usual Sleeping Hours (USH) were below recommended levels, with a mean of 4.39 hours. The skewness and kurtosis values indicate that many students may be sleeping less than the mean, which could be contributing to the poor sleep quality reported. This supports previous research highlighting that inadequate sleep is a common issue among students⁸. Furthermore, the mean Trouble in Sleep (TS) score of 24.33, coupled with the standard deviation, suggests that some participants experience severe difficulties falling asleep, likely exacerbated by academic stress or other factors.⁹

Interestingly, while the associations between USH, Sleep Quality (SQ), and Roommate Feedback (RMF) were found to be positive, they were not statistically significant. This contrasts with some earlier studies that found stronger links between sleep duration and quality¹⁰. For instance, Bowers & Moyer¹¹ reported significant correlations between sleep duration and sleep disruptions, which was not observed in our study. It suggests that other factors, such as sleep environment or psychological factors, may play a more significant role in influencing sleep quality than the amount of sleep alone.

The significant positive correlation between TS and RMF suggests that students who experience more difficulty falling asleep also tend to receive more feedback from roommates about their sleep habits. This finding is consistent with research indicating that external feedback may either contribute to or reflect sleep disturbances.¹² Additionally, the positive association between SQ and RMF suggests that better sleep quality is linked to more favorable feedback from roommates, which aligns with studies showing that external perceptions can influence sleep quality.¹³

However, the overall explanatory power of the model used to assess the relationship between sleep quality and academic performance was limited, with an R^2 value of 0.028. This indicates that only a small portion of the variance in academic performance can be explained by the sleep-related variables included in the model. This finding is consistent with other research suggesting that complex interactions between multiple behavioral and psychological factors

contribute to academic performance.¹⁴ Further research incorporating additional variables or alternative methodologies may provide a more comprehensive understanding of these relationships.

Limitation

The study's cross-sectional design constrained the researcher's capacity to infer causality because it collected data at a single point in time rather than over an extended period, making it impossible to pinpoint the precise cause of the association between the quality of sleep and the academic performance of students. A convenient sampling approach on a small sample size might restrict how far the findings can be applied in other contexts. Participants could give incorrect information or replies that are socially acceptable, which could distort the results and compromise the reliability of the conclusions.

Strengths

The primary investigator has collected the data from the participants and remained actively involved in all processes throughout the study. Two different settings have been employed for the recruitment of participants

Recommendation

The educational organizations could develop support programs for students at different levels to address factors affecting sleep and academic achievement. There is a need for care in interpreting the results, and an emphasis on the significance of adding objective sleep evaluations to self-reported measures in further studies. Interventional studies could be planned for students to analyze the effects of social support and a conducive learning environment. Replication of the study with a larger number of students and in a more diverse setting may enhance the validity of findings.

Conclusion

The results of the study showed that there was no discernible link between quality of sleep and academic performance. It is crucial to remember that confounding variables might affect these

results. Longer-term study is recommended in the future to have a more thorough knowledge of the possible influence of sleep quality on academic achievement. More solid and convincing evidence might be found by including and controlling these confounding variables in future studies.

References

1. Gabriel S. The role of sleep in human health. *J Sleep Res.* 2018;27(6)
2. Nor B, McHale SM, Kitzman H, et al. The impact of sleep on cognitive functioning: A review. *Sleep Med Rev.* 2018; 37:70-81.
3. Al-Mutairi N, Nabil Z, Eldin S. The sleep cycle and its impact on health. *Sleep Sci.* 2018;11(3):138-144.
4. Rafi M, Brown T, Allen M. Circadian rhythms and sleep patterns in aging. *Sleep Med Rev.* 2021; 55:101-110.
5. Shehata M, Sharfeldin S, El Sheikh M. The importance of sleep for cognitive function and health. *J Health Psychol.* 2022;27(4):522-536.
6. Amaral J, Galdino S, Martins T. Consequences of chronic sleep deprivation on health. *J Clin Sleep Med.* 2021;17(2):203-214.
7. Rose S, Ramanan S. Sleep deprivation: Effects and implications. *Sleep Med.* 2017; 33:25-32.
8. Ramar K, Olson E, Walker R. Chronic sleep deprivation and its association with disease. *Sleep Med Rev.* 2021; 52:1-9.
9. Kohyama J. Evaluating sleep quality and its impact on daily life. *Sleep Health.* 2021;7(1):56-62.
10. Abdullah A, Sulaiman N, Rahman N. Sleep duration recommendations: A review. *Sleep Health.* 2024;10(2):123-129.
11. Al-Khani S, Al-Ghamdi S, Hussain M. Age-related sleep needs and guidelines. *Sleep Med.* 2019; 64:1-10.
12. Gallego-Gómez J, García-Gómez J, Ruiz-López M. Sleep quality and academic performance in university students. *J Educ Psychol.* 2021;113(2):200-210.
13. Suardiaz-Muro A, Martínez-López A, Pérez-Corrales J. Sleep and academic performance in nursing students: A systematic review. *Int J Nurs Stud.* 2023; 128:103762.
14. Tanveer M, Sultana N, Khan S. Impact of sleep on academic performance in nursing students. *J Nurs Educ.* 2023;62(3):134-142.
15. Alhousseini M, Binsaleh N, Alghamdi M. Sleep patterns and academic performance in college students: A global perspective. *Sleep Health.* 2022;8(1):44-50.
16. Rathakrishnan R, Abascal T, Schaefer A. Poor sleep quality and cognitive decline in students. *Sleep Med Rev.* 2021; 55:90-101.
17. Wuryaningsih W, Fitriani Y, Yuliana S. Sleep deprivation among nursing students: A study of academic impacts. *J Nurs Pract.* 2018;15(4):345-352.
18. Hoxworth L, Davis R, Miele L. Gender distribution in higher education. *J Educ Adm.* 2019;57(2):159-171.
19. Parker K, Lenhart A, Anderson M. Student demographics and engagement in higher education. *Educ Res.* 2021;50(4):232-245.
20. Oduro E, Agyeman A, Mensah J. Sleep quality among university students: A systematic review. *Sleep Med Rev.* 2022; 56:101-115.
21. Dewald-Kaufmann JF, Meijer AM, Oort FJ. Sleep and academic performance: A meta-analysis. *Sleep Med Rev.* 2014;18(3):213-222.
22. Richardson S, Ibrahim K, Al-Shehri S. Academic engagement and sleep quality among university students. *J Educ Psychol.* 2012;104(3):604-613.
23. Walker MP. Sleep and cognitive performance. *Sleep Med Rev.* 2017; 31:69-82.
24. Becker SP, Langberg JM, Ewing LJ. Sleep and academic performance in college students: A longitudinal study. *J Adolesc Health.* 2018;63(3):345-351.
25. Lund HG, Reider BD, Whiting AB. Sleep patterns and predictors of disturbed sleep in a large population of college students. *J Adolesc Health.* 2010;46(2):124-132.
26. Buckner JD, Rhoades HM, Meyer B. Sleep duration and sleep quality: Their relationship with sleep medication use in college students. *Sleep Med.* 2019; 64:43-48.
27. Bowers A, Moyer A. Effects of school start times on students' sleep duration, daytime sleepiness, and attendance: A meta-analysis. *Sleep Health.* 2017;3(6):423-431.
28. Johnson ER, Bowers A, Meyer B. Roommate feedback and sleep disturbances in college students. *Sleep Health.* 2020;6(1):50-58.
29. Lee JH, Lee K, Lee H. External perceptions of sleep behavior and sleep quality: A review. *Sleep Med Rev.* 2022; 56:101-115.
30. Aricò D, Deidda M, Biondi M. Predictors of sleep quality in college students: A review. *Sleep Med Rev.* 2017; 31:1-10.



Social Medicine
Health For All

ISSN: 1557-7112