



Original Research / Orijinal Araştırma

Evaluation of the Relationship Between Physical Activity Levels and Sleep Quality Among 6th-year Medical Students

Tıp Fakültesi 6. Sınıf Öğrencilerinde Fiziksel Aktivite Düzeylerinin Uyku Kalitesi ile İlişkisinin Değerlendirilmesi

Duygu İlke YILDIRIM¹, Rahmi MUTLU¹

Abstract

Objective: This study aims to evaluate the relationship between physical activity levels and sleep quality among 6th-year medical students.

Methods: This descriptive and cross-sectional study was conducted between June 15, 2024, and December 15, 2024, at Selçuk University Faculty of Medicine Hospital with 164 sixth-year medical students participating voluntarily. Participants were administered questionnaires via face-to-face interviews, which included an 8-item general information form, the International Physical Activity Questionnaire Short Form (IPAQ-SF) for data on physical activity, and the Pittsburgh Sleep Quality Index (PSQI) for data on sleep quality.

Results: Of the 164 students included in our study, 51.2% were female (n=84) and 48.8% were male (n=80). Statistical analyses revealed a significant relationship between physical activity level and gender (p=0.007), marital status (p=0.049), and alcohol consumption (p=0.03). Additionally, a statistically significant association was found between physical activity level and sleep quality (p=0.014). No statistically significant relationship was found between participants' sociodemographic characteristics and sleep quality (p>0.05).

Conclusion: It was determined that male students were more physically active than female students. Participants with higher physical activity levels had better sleep quality. In light of these findings, it is recommended that educational and health policies prioritize strategies aimed at improving both physical activity and sleep quality.

Keywords: Exercise, physical, sleep, medical students

Özet

Amaç: Bu çalışmanın amacı tıp fakültesi 6. sınıf öğrencilerinde fiziksel aktivite düzeylerinin uyku kalitesi ile ilişkisinin değerlendirilmesidir.

Yöntem: Bu tanımlayıcı ve kesitsel çalışma 15 Haziran 2024 ile 15 Aralık 2024 tarihleri arasında Selçuk Üniversitesi Tıp Fakültesi Hastanesinde, bünyesindeki 164 altıncı sınıf tıp öğrencisi ile gönüllülük prensibine göre gerçekleştirilmiştir. Katılımcılara, genel bilgileri içeren 8 soruluk bir form, fiziksel aktivite düzeylerini belirlemek için Uluslararası Fiziksel Aktivite Anketi Kısa Formu (UFAA Kısa Form) ve uyku kalitesini değerlendirmek için Pittsburgh Uyku Kalitesi İndeksi (PUKI) içeren anketler yüz yüze görüşme yöntemiyle uygulanmıştır.

Bulgular: Çalışmamıza alınan 164 öğrencinin %51,2'si kadın (n=84), %48,8'i erkekti (n=80). Yapılan analizlerde fiziksel aktivite düzeyi ile cinsiyet (p=0,007), medeni durum (p=0,049), alkol kullanımı (p=0,03) arasında istatistiksel olarak anlamlı ilişki olduğu saptanmıştır. Katılımcıların fiziksel aktivite düzeyi ile uyku kalitesi arasında istatistiksel olarak anlamlı ilişki saptanmıştır (p=0,014). Katılımcıların sosyodemografik özellikleri ile uyku kalitesi arasında istatistiksel olarak anlamlı bir ilişki bulunamadı (p>0,05).

Sonuç: Erkek öğrencilerin kadın öğrencilere göre daha çok aktif olduğu tespit edildi. Yüksek fiziksel aktiviteye sahip katılımcıların iyi uyku kalitesi daha iyiydi. Bu bulgular ışığında eğitim ve sağlık politikalarının hem fiziksel aktiviteyi hem de uyku kalitesini iyileştirmeyi amaçlayan stratejilere öncelik vermesi önerilir.

Anahtar Kelimeler: Egzersiz, fiziksel, uyku, tıp öğrencileri

Geliş tarihi / Received: 23.01.2025 Kabul tarihi / Accepted: 19.05.2025

¹ Selçuk Üniversitesi Tıp Fakültesi, Aile Hekimliği Anabilim Dalı, Konya, Türkiye

Address for Correspondence / Yazışma Adresi: Duygu İlke YILDIRIM. Akademi Mah., Celal Bayar Cad., Selçuk Üniversitesi Tıp Fakültesi, Aile Hekimliği Anabilim Dalı, Selçuklu/KONYA

E-posta: azraila@hotmail.com Tel: +90 5302302928

Yıldırım Dİ, Mutlu R. *Evaluation of the Relationship Between Physical Activity Levels and Sleep Quality Among 6th-year Medical Students.*

TJF&PC, 2025; 19 (2):212-217

DOI: 10.21763/tjfmpe.1625552

Turkish Journal of Family Medicine and Primary Care © 2024 by Aile Hekimliği Akademisi Derneği is licensed under CC BY-NC-ND 4.0

Introduction

Sleep is defined as a temporary state of unconsciousness that is periodically recurring, lasts for a certain duration, and can be terminated by sensory stimuli.¹ Although it is well known that sleep is essential for a healthy life, students often tend to shorten their sleep duration to allocate more time for themselves.² According to a study conducted in the United States, only 34% of university students have good sleep quality and 15% report dozing off in class at least once a week.³

Physical activity can be defined as bodily movements produced by the action of muscles, resulting in energy expenditure beyond the basal level. Physical activity is associated with increased muscle strength, improved quality of life, and the prevention of chronic diseases.⁴

Additionally, there are studies in the literature demonstrating that physical activity enhances sleep efficiency and quality, while reducing the risks associated with sleep disorders.⁵

Conversely, high-quality sleep contributes positively to physical activity by promoting better physical performance and energy levels.⁶

Medical students often neglect physical activity and experience disruptions in their sleep patterns due to their academic and clinical responsibilities, intensive coursework, and stressful working conditions. A study found that the physical activity levels of a significant portion of medical students were below the expected levels.⁷ Another study revealed that medical students had lower sleep quality compared to other individuals, and this was linked to their psychological well-being.⁸

This study aims to evaluate the relationship between physical activity levels and sleep quality among sixth-year medical students.

Methods

The study received approval from the Selcuk University Ethics Committee (approval number E.752832, dated May 7, 2024), as well as formal authorization from the institution where the research was carried out. Prior to the study, participants were provided with detailed information, and written and verbal consent was obtained from each individual.

This study was conducted with a total of 164 sixth-year medical students studying at Selcuk University Faculty of Medicine who volunteered to participate. The study took place between June 15, 2024, and December 15, 2024, with 164 (84 females and 80 males) participants.

Data Collection Forms

Data were gathered through a structured questionnaire divided into three sections: sociodemographic information, the International Physical Activity Questionnaire Short Form (IPAQ-SF), and the Pittsburgh Sleep Quality Index (PSQI).

The sociodemographic information section included queries about the participants' age, gender, marital status, smoking status, alcohol drinking status, height, and weight.

International Physical Activity Questionnaire (IPAQ): A short form consisting of 7 questions, covering the past 7 days and assessing physical activity levels, was used. In Türkiye, its validity and reliability were based on a study conducted by Öztürk et al. in 2005.⁹ The total physical activity score (MET (Metabolic Equivalent of Task)-min/week) was calculated by considering both the intensity and duration of the activities performed. The students were classified as low (<600), moderate (600-3000), and high (>3000) based on their total physical activity score.¹⁰

The score calculation was as follows: Walking Score (MET-min/wk): $3.3 \times \text{walking minutes} \times \text{walking days}$, Moderate Activity Score (MET-min/wk): $4.0 \times \text{moderate activity minutes} \times \text{moderate activity days}$, Vigorous Activity Score (MET-min/wk): $8.0 \times \text{vigorous activity minutes} \times \text{vigorous activity days}$, Total Physical Activity Score (MET-min/wk): Walking Score + Moderate Activity Score + Vigorous Activity Score.

Pittsburgh Sleep Quality Index (PSQI): It provides information on sleep quality and the type of sleep disturbances experienced over the past month. The participant's sleep quality is assessed using parameters such as sleep latency, sleep duration, efficiency and disturbances, drug use, and dysfunction during the day.¹¹ In Türkiye, its validity and reliability were based on a study conducted by Ağargün et al.¹² Each question of the questionnaire is scored between 0 and 3. Total score below 5 is classified as 'Good sleep quality' while a score of 5 or above is classified as 'Poor sleep quality'.¹¹

Additionally, participants' height and body weight were measured. The body mass index (BMI) was calculated using the participant's weight and height ratio. According to the World Health Organization's classification of obesity, individuals with a BMI below 18.5 kg/m² are classified as underweight, those with a BMI between 18.5-24.9 kg/m² are classified as normal weight, and individuals with a BMI above 25 kg/m² are classified as overweight.

Statistical Analysis

Descriptive statistical distributions were presented using frequency (n) and percentage (%). The statistical analysis of quantitative independent data was conducted using the Chi-square test via the SPSS (Statistical Package for the Social Sciences) 25.0 software. In all analyses, a significance level of $p < 0.05$ was considered significant. All analyses were conducted with a 95% confidence interval.

Results

Of the 164 participants in the study, 51.2% (n=84) were female, and 48.8% (n=80) were male. The sociodemographic characteristics of the students are shown in Table 1.

Table 1. Characteristics of the participants (n=164)

	Category	n	%
Gender	Female	84	51.2
	Male	80	48.8
Age Mean±SD (min-max) years		24.6±1.25 (23-29)	
Marital status	Married	23	14
	Single	141	86
Smoking	No	125	76.2
	Yes	39	23.8
Alcohol consumption	No	152	92.7
	Yes	12	7.3
BMI Mean±SD (min-max)		23.83±3.92 (15.4-36.9)	
BMI categories (kg/m ²)	<18.5	13	7.9
	18.5-24.9	98	59.8
	25.0-29.9	41	25
	≥30	12	7.3
Physical activity score Mean±SD (min-max)		1769.9±1635.6 (245-8826)	
Physical activity level	Inactive	34	20.7
	Minimally active	87	53
	Very active	43	26.3

Mean±SD: Mean±Standard Deviation, BMI: Body Mass Index
Frequency analysis was used.

The gender, marital status, and alcohol consumption of the participants were identified as factors significantly associated with physical activity levels, while smoking status and BMI groups did not show a significant relationship with physical activity levels. Post hoc analysis revealed that women were predominantly in the inactive group, while men were more prevalent in the very active group. Additionally, individuals who were married were more commonly found in the inactive group, and individuals who consumed alcohol were more likely to be in the very active group (Table 2).

Table 2. Comparison of various characteristics of participants by physical activity levels

	Category	IPAQ			x ²	p
		Inactive (n=34)(20.7%)	Minimally active (n=87) (53%)	Very active (n=43) (26.3%)		
Gender	Female	23 (27.3%)	47 (56%)	14 (16.7%)	9.939	0.007 ^e
	Male	11 (13.8%)	40 (50%)	29 (36.2%)		
Marital Status	Married	9 (39.1%)	8 (34.8%)	6 (26.1%)	6.051	0.049 ^e
	Single	25 (17.8%)	79 (56%)	37 (26.2%)		
Alcohol consumption	Yes	1 (8.3%)	4 (33.3%)	7 (58.4%)	7.001	0.030 ^e
	No	33 (21.7%)	83 (54.6%)	36 (23.7%)		
Smoking	Yes	7 (17.9%)	17 (43.6%)	15 (38.5%)	3.979	0.137
	No	27 (21.6%)	70 (56%)	28 (22.4%)		
BMI categories	<18.5	4 (30.8%)	8 (61.5%)	1 (7.7%)	9.045	0.171
	18.5-24.9	18 (18.4%)	55 (56.1%)	25 (25.5%)		
	25.0-29.9	8 (19.5%)	17 (41.5%)	16 (39%)		
	≥30	4 (33.3%)	7 (58.4%)	1 (8.3%)		

BMI: Body Mass Index, IPAQ: International Physical Activity Questionnaire, ^e Significant p-values
Chi-square test was used.

It was found that 48.1% of the participants had "healthy sleep" (n=79) and 51.9% had "poor sleep" (n=85) quality. No significant relationship was found between sleep quality and gender, marital status, alcohol consumption, smoking status, or BMI values (Table 3).

Table 3. Comparison of various characteristics of participants by sleep quality

	Category	PSQI		x ²	p
		Healthy sleep (n=79)	Poor sleep (n=85)		
Gender	Female	35 (44.3%)	49 (57.6%)	2.918	0.088
	Male	44 (55.7%)	36 (42.4%)		
Marital status	Married	10 (12.7%)	13 (15.3%)	0.236	0.627
	Single	69 (87.3%)	72 (84.7%)		
Alcohol consumption	Yes	6 (7.6%)	6 (7.1%)	0.017	0.895
	No	73 (92.4%)	79 (92.9%)		
Smoking	Yes	17 (21.5%)	22 (25.9%)	0.430	0.512
	No	62 (78.5%)	63 (74.1%)		
BMI categories	<18.5	6 (7.6%)	7 (8.2%)	3.840	0.279
	18.5-24.9	52 (65.8%)	46 (54.1%)		
	25.0-29.9	18 (22.8%)	23 (27.1%)		
	≥30	3 (3.8%)	9 (10.6%)		

BMI: Body Mass Index, PSQI: Pittsburgh Sleep Quality Index
Chi-square test was used.

A statistically significant positive relationship was found when comparing the participants' physical activity levels with their sleep quality. The proportion of individuals in the physically inactive group with poor sleep quality (%70.6) was found to be significantly higher than the other activity levels. Additionally, the proportion of individuals in the very active group with a healthy sleep quality (%62.8) was found to be significantly higher compared to the other activity levels (p=0.014) (Table 4).

Table 4. Comparison of participants' sleep quality by physical activity level

		IPAQ			X ²	p
		Inactive	Minimally active	Very active		
PSQI	Healthy sleep	10 (29.4%)	42 (48.3%)	27 (62.8%)	8.474	0.014^e
	Poor sleep	24 (70.6%)	45 (51.7%)	16 (37.2%)		
Total		34 (100%)	87 (100%)	43 (100%)		

PSQI: Pittsburgh Sleep Quality Index, IPAQ: International Physical Activity Questionnaire, e Significant p-values
Chi-square test was used.

Discussion

In the study conducted on 6th-year medical students at Selcuk University Faculty of Medicine, it was found that 20.7% of the students had low physical activity levels, and 51.9% had low sleep quality. The analysis revealed that women were predominant in the inactive group, men were predominant in the very active group, married individuals were mostly in the inactive group, and those who consumed alcohol were predominantly in the very active group. A statistically significant positive correlation was observed between physical activity levels and sleep quality. Since the study has a cross-sectional design, direct causality cannot be established as to whether physical activity affects sleep quality or vice versa.

Modern living standards have resulted in a decrease in physical activity levels, which has, in turn, contributed to a rise in the prevalence of certain medical conditions. The World Health Organization has reported that the prevalence of insufficient physical activity in the population aged 18 and over is 23.0%.¹³ In a study involving 179 healthcare workers, it was found that 25% of the participants engaged in regular physical activity, while 75% did not engage in sufficient levels of physical activity.¹⁴ In our study, it was found that 73.7% of the participants had insufficient physical activity levels. The fact that our findings are more similar to those of studies conducted with healthcare workers suggests a potential relationship between physical activity levels and occupational conditions.

According to the "Chronic Disease Risk Factor Survey" conducted by the Turkish Ministry of Health in 2011, the rates of insufficient physical activity were found to be 87% for women and 77% for men.¹⁵ In a study conducted by Savcı et al. on 1,097 university students in health departments, as well as in many other studies in the literature, it was found that women are more inactive than men.^{16,17} In our study, more women were found in the inactive group, while more men were in the very active group. These findings are consistent with many studies in the literature. This difference may be attributed to the variation in gender role distribution in social life.

It has been observed in the literature that single individuals were observed to have significantly higher physical activity levels than married ones.^{14,18} In our study, married individuals were found to be predominantly in the inactive group. The difference in results from the literature might be due to variations in the sample groups.

In a review study by Dodge et al., 16 studies were analyzed, half of which were conducted on university students and the other half on non-student adults. In the university student studies, 7 out of 8 (87.5%) found a positive relationship between physical activity and alcohol consumption. Similarly, in the non-student adult studies, 6 out of 8 (75%) found a positive relationship.¹⁹ In a study by Korkmaz et al. in 2013 with 501 participants, it was concluded that individuals who consumed alcohol had lower physical activity levels compared to non-drinkers.²⁰ In our study, the majority of alcohol consumers were in the very active group. However, since the number of individuals consuming alcohol in our study was quite low, this result may have been influenced by that factor.

In international and national research studies, the prevalence of poor sleep quality has been reported to range between 32.5% and 59.0%.^{8,21} In our study, this prevalence was similarly found to be 51.9%, aligning with the literature. This has revealed that poor sleep quality is a common issue worldwide.²²

In a study by Çetinel et al. with 283 nurses, no correlation was found between marital status and quality of sleep.²³ Similarly, in our study, no significant difference was observed.

In a study by Wu and colleagues, physical activity was reported to have a positive impact on sleep quality.²⁴ In Işık and colleagues' study, a negative, weak, and statistically significant correlation was found between physical activity level and overall sleep quality.⁴ In our study, the majority of participants in the very active group were in the healthy sleep category, while the majority in the inactive group were in the poor sleep category. It is consistent with most studies in the literature. It is also in line with our expectations, as the positive physical and mental effects of physical activity are well known, and these effects are expected to have a favorable influence on sleep.

Study Limitations

Due to the students being in different internships and working on shifts, some of them could not be included in the study.

Conclusion

In conclusion, this study conducted on 6th-year medical students demonstrates that sociodemographic characteristics significantly influence physical activity levels, and in turn, physical activity levels have a notable impact on sleep quality. It was found that students who are more physically active tend to have a better sleep quality. These findings highlight the importance of encouraging students to enhance their physical activity levels and pay closer attention to their sleep patterns. It is recommended that education and health policies prioritize awareness and incentive programs aimed at improving physical activity and sleep quality among medical school students.

Acknowledgment: Our research has not been presented at any congress or in any journal. There has also been no institutional support to the study.

Conflict of interest: No conflict of interest is declared by the authors.

Use of artificial intelligence: Artificial intelligence support was not utilized in this study.

Financial Support: No financial support was received from any institution during the course of this study.

Ethical Statement: This study was approved by the Selcuk University Ethics Committee (approval number E.752832, dated May 7, 2024). Prior to the study, participants were provided with detailed information, and written and verbal consent was obtained from each individual. The confidentiality of personal data was given utmost attention. I hereby declare that this study was conducted in accordance with ethical principles.

References

1. Irak M. A different state of consciousness: Sleep. *Pivolka*. 2011;20(6):16-9.
2. Sarı ÖY, Üner S, Büyükakkuş B, Bostancı EÖ, Çeliksöz AH, Budak M. Sleep quality and some affecting factors in students living in a university dormitory. *TAF Prev. Med. Bull.* 2015;14(2):93-100.
3. Lund HG, Reider BD, Whiting AB, Prichard JR. Sleep patterns and predictors of disturbed sleep in a large population of college students. *J Adolesc Health.* 2010;46(2):124-32.
4. Işık Ö, Özarslan A, Bekler F. The relationship between physical activity, sleep quality, and depression in university students. *J Phys Educ Sports Sci.* 2015;9(9):65-73.
5. Kredlow MA, Capozzoli MC, Hearon BA, Calkins AW, Otto MW. The effects of physical activity on sleep: a meta-analytic review. *J Behav Med.* 2015;38:427-49.
6. Watson AM. Sleep and athletic performance. *Curr Sports Med Rep.* 2017;16(6):413-18.
7. Steptoe A, Wardle J, Pollard TM, Canaan L, Davies GJ. Stress, social support and health-related behavior: a study of smoking, alcohol consumption and physical exercise. *J Psychosom Res.* 1996;41(2):171-80.
8. Lemma S, Gelaye B, Berhane Y, Worku A, Williams MA. Sleep quality and its psychological correlates among university students in Ethiopia: a cross-sectional study. *BMC psychiatry.* 2012;12:1-7.
9. Öztürk M. The validity and reliability of the International Physical Activity Questionnaire in university students and the determination of their physical activity levels [Master's thesis]. Ankara: Hacettepe University; 2005. p. 66.
10. Craig CL, Marshall AL, Sjöström M, Bauman AE, Booth ML, Ainsworth BE, et al. International physical activity questionnaire: 12-country reliability and validity. *Med Sci Sports Exerc.* 2003;35(8):1381-95.
11. Buysse DJ, Reynolds CF 3rd, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry Res.* 1989;28(2):193-213.
12. Ağargün MY, Kara H, Anlar O. The validity and reliability of the Pittsburgh Sleep Quality Index. *Turk J Psychiatry.* 1996;7:107-11.
13. World Health Organization. Physical activity. 2024 [cited 2025 Jan 10]. Available from: <https://www.who.int/en/news-room/fact-sheets/detail/physical-activity>.
14. Yıldırım D, Yıldırım A, Eryılmaz M. The relationship between physical activity and quality of life in healthcare workers. *Cukurova Med J.* 2019;44(2):325-33.
15. Ünal B, Ergör G, Horasan G, Kalaça S, Sözmén K. Turkey Chronic Diseases and Risk Factors Prevalence Study. Ankara: T.C. Health Ministry. 2013;5:33-6.
16. Savcı FDS, Öztürk UFM, Arıkan FDH. Physical activity levels of university students. *Turk Kardiyol Dern Ars.* 2006;34(3):166-72.
17. Aktaş H, Şaşmaz CT, Kılınçer A, Mert E, Gülbol S, Külekçioğlu D, et al. Investigation of factors related to physical activity levels and sleep quality in adults. *Mersin Univ J Health Sci.* 2015;8(2):60-70.
18. Özüdoğru E. The relationship between physical activity level and quality of life among university staff [Master's thesis]. Burdur: Mehmet Akif Ersoy University; 2013. p. 42.
19. Dodge T, Clarke P, Dwan R. The relationship between physical activity and alcohol use among adults in the United States: a systematic review of the literature. *Am J Health Promot.* 2017;31(2):97-108.
20. Korkmaz NH, Deniz M. Investigation of the relationship between physical activity levels and socio-economic levels of adults. *Sport Sci.* 2013;8(3):46-56.
21. Aysan E, Karaköse S, Zaybak A, İsmailoğlu EG. Sleep quality and influencing factors in university students. *E-J. Dokuz Eylül Univ. Nurs. Fac.* 2014;7(3):193-8.
22. Ergün S, Duran S, Gültekin M, Yanar S. Evaluation of the factors which affect the sleep habit and quality of health college students. *Turkish Journal of Family Medicine and Primary Care,* 2017;11(3), 186-193.
23. Çetinol T, Özvurmaz S. Sleep quality and associated factors in nurses. *Med Sci.* 2018;13(4):80-9.
24. Wu X, Tao S, Zhang Y, Zhang S, Tao F. Low physical activity and high screen time can increase the risks of mental health problems and poor sleep quality among Chinese college students. *PloS one.* 2015;10(3):e0119607.