

Investigation of Factors Influencing Sleep Quality Among Patients in the Coronary Care Unit, Cardiology Inpatient Ward, and Outpatient Clinics

Kürşat Kaan Kerimoğlu¹ , Mustafa Bolatkale¹ , Ahmet Çağdaş Acara² 

¹ Alsancak Nevvar-Salih Isgoren State Hospital, Emergency Service, Izmir, Türkiye

² University of Health Sciences, Izmir Bozyaka Training and Research Hospital, Clinics of Emergency Medicine, Izmir, Türkiye

Received: 13 January 2026, Accepted: 27 July 2026, Published: 1 October 2026

© Ordu University Faculty of Medicine, Türkiye, 2026

Abstract

Objective: This study aimed to evaluate sleep quality and related factors among patients in the coronary care unit (CCU), inpatient cardiology ward, and outpatient cardiology clinic using the Pittsburgh Sleep Quality Index (PSQI).

Materials and Methods: This cross-sectional observational study was conducted at a secondary care hospital between March 2019 and March 2020. A total of 153 adult patients from three cardiology settings were included. Sleep quality was assessed using PSQI. Global and component scores were compared across groups using the Kruskal–Wallis test, followed by Bonferroni-adjusted post-hoc pairwise comparisons where appropriate.

Results: The mean global PSQI score was highest in the CCU group (7.5 ± 3.1), followed by the inpatient group (5.6 ± 3.1) and the outpatient group (4.4 ± 1.9). Global PSQI scores differed significantly among the groups (Kruskal–Wallis $H = 27.743$, $p < 0.001$). Bonferroni-adjusted post-hoc analysis showed significantly higher PSQI scores in the CCU group compared with both the inpatient group ($p = 0.003$) and the outpatient group ($p < 0.001$). No significant difference was observed between the inpatient and outpatient groups ($p = 0.166$). Poor sleep quality (PSQI > 5) was most prevalent in the CCU group (77.6%), whereas good sleep quality was most frequent in the outpatient group (75.5%).

Conclusion: Sleep quality differed significantly across cardiology care settings, with the greatest impairment observed in the CCU group. Patients in this group showed worse outcomes in multiple sleep domains, particularly sleep latency, sleep disturbances, use of sleep medication, and daytime dysfunction.

Keywords: Sleep quality, Pittsburgh Sleep Quality Index, Cardiology, Sleep disorders

Koroner Yoğun Bakım, Kardiyoloji Servis ve Poliklinik Hastalarında Uyku Kaliteleri Üzerine Etki Eden Faktörlerin Araştırılması

Özet

Amaç: Bu çalışma, Pittsburgh Uyku Kalitesi İndeksi (PSQI) kullanılarak koroner yoğun bakım ünitesi (KYBÜ), kardiyoloji servisi ve kardiyoloji polikliniğinde takip edilen hastalarda uyku kalitesini ve ilişkili faktörleri değerlendirmeyi amaçlamıştır.

Gereç ve Yöntemler: Bu kesitsel gözlemsel çalışma, Mart 2019 ile Mart 2020 tarihleri arasında ikinci basamak bir hastanede gerçekleştirilmiştir. Üç farklı kardiyolojik bakı biriminde toplam 153 erişkin hasta çalışmaya dahil edilmiştir. Uyku kalitesi PSQI kullanılarak değerlendirilmiştir. Global ve alt bileşen skorları gruplar arasında Kruskal–Wallis testi ile karşılaştırılmış ve uygun durumlarda Bonferroni düzeltilmeli post-hoc ikili karşılaştırmalar yapılmıştır.

Bulgular: Ortalama global PSQI skoru KYBÜ grubunda en yüksek (7.5 ± 3.1) olup, bunu kardiyoloji servisi (5.6 ± 3.1) ve poliklinik grubu (4.4 ± 1.9) izlemiştir. Global PSQI skorları gruplar arasında anlamlı farklılık göstermiştir (Kruskal–Wallis $H = 27.743$, $p < 0.001$). Bonferroni düzeltilmeli post-hoc analiz, KYBÜ grubunun hem servis grubuna ($p = 0.003$) hem de poliklinik grubuna ($p < 0.001$) göre anlamlı derecede daha yüksek PSQI skorlarına sahip olduğunu göstermiştir. Servis ve poliklinik grupları arasında ise anlamlı fark bulunmamıştır ($p = 0.166$). Kötü uyku kalitesi (PSQI > 5) en sık KYBÜ grubunda (%77.6) görülürken, iyi uyku kalitesi en sık poliklinik grubunda (%75.5) saptanmıştır.

Sonuç: Uyku kalitesi, kardiyolojik bakı birimleri arasında anlamlı farklılık göstermiş olup, en belirgin bozulma KYBÜ grubunda gözlenmiştir. Bu gruptaki hastalar, özellikle uyku latensi, uyku bozuklukları, uyku ilacı kullanımı ve gündüz işlev bozukluğu olmak üzere birden fazla uyku alanında daha kötü sonuçlar göstermiştir.

Anahtar kelimeler: Uyku kalitesi, Pittsburgh Uyku Kalitesi İndeksi (PUKİ), Kardiyoloji, Uyku bozuklukları

Suggested Citation: Kerimoğlu KK, Bolatkale M and Acara AÇ. Investigation of Factors Influencing Sleep Quality Among Patients in the Coronary Care Unit, Cardiology Inpatient Ward, and Outpatient Clinics. ODU Med J, 2026;13(2):48-55.

Copyright©Author(s) - Available online at <https://dergipark.org.tr/tr/pub/odutip>

Content of this journal is licensed under a [Creative Commons Attribution-NonCommercial 4.0 International License](https://creativecommons.org/licenses/by-nc/4.0/).



Corresponding Author:

Kürşat Kaan Kerimoğlu

Alsancak Nevvar-Salih Isgoren State Hospital,

Emergency Service, Izmir, Türkiye

E-mail: mdkerimoglu@gmail.com

INTRODUCTION

Among the essential physiological processes necessary for sustaining human life, sleep plays a vital role (1). Adequate sleep plays an integral role in supporting multiple dimensions of human health, including physical integrity, cognitive capacity, emotional stability, and perceived quality of life (2). Beyond its impact on physical health, sleep quality directly influences an individual's psychological state and overall quality of life (3). Sleep deprivation compromises neurocognitive performance by reducing alertness, impairing attentional mechanisms, and decelerating information processing (4). Sleep-related problems constitute a significant public health burden, as epidemiological data indicate that 6–10% of individuals fulfill clinical criteria for insomnia, while nearly one in three report experiencing sleep difficulties at some stage of life (5).

The Pittsburgh Sleep Quality Index (PSQI) is a widely used self-assessment tool in both clinical and research settings, designed to evaluate multiple facets of sleep quality comprehensively (6). Moreover, having been adapted into various languages, PSQI has demonstrated robust validity in a wide range of patient cohorts and diagnostic categories (7). The PSQI is a self-administered tool with 19 items categorized into seven areas: subjective sleep quality, sleep onset latency, total sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medications, and daytime impairment. (8).

Poor sleep quality is a global concern, with its impact observable across virtually all age groups (9). Adequate sleep quality is characterized by individuals feeling refreshed and restored upon awakening (10). Moreover, sleep quality is influenced by a variety of determinants, encompassing physical and mental health status, psychological symptoms and behavioral patterns, as

well as sociodemographic variables (11). In particular, sleep disorders are frequently observed in cardiac patients, driven by environmental factors such as hospital noise and pain or discomfort due to medical interventions, as well as the psychological burden of living with a life-threatening illness and its complications (12).

Although poor sleep quality is a recognized concern in cardiac populations, comparative data evaluating differences across various cardiology care settings remain limited. To address this gap, this study aimed to assess sleep quality and its associated factors among patients hospitalized in the coronary care unit (CCU), cardiology inpatient service, and cardiology outpatient clinic, using the validated PSQI.

MATERIALS AND METHODS

This cross-sectional observational study was carried out from March 1, 2019, to March 1, 2020, at a secondary care hospital, among patients receiving care in the cardiology outpatient clinic, the cardiology inpatient ward, or the CCU. The aim was to compare sleep quality among adult patients receiving care in three cardiology settings: CCU (n=49), the inpatient cardiology ward (n=51), and the cardiology outpatient clinic (n=53).

Patients aged 18 years or older who were fully oriented to person, place, and time and who provided written informed consent were eligible for inclusion. Exclusion criteria were: altered mental status, a history of cardiac arrest, or previously diagnosed sleep disorders.

The minimum required sample size was estimated as 159 participants (approximately 53 per group) using G*Power version 3.1.9.2 (Heinrich Heine University, Düsseldorf, Germany). As no formal power analysis was conducted at the time of the ethics committee application, the sample size calculation was performed during the study planning phase using the omnibus one-way ANOVA model in G*Power for three-group comparisons, as a direct Kruskal–Wallis option was not available in the software. The analysis assumed a medium effect size ($f = 0.25$), a significance level of $\alpha = 0.05$, and 80% power. Despite the planned sample size of 159, the study was completed with 153 participants. This difference was attributable to the exclusion of four patients from the coronary care unit group due to conditions affecting consciousness or a history of cardiac arrest,

and two patients from the inpatient group due to previously diagnosed sleep disorders. In addition, further recruitment was not possible following the closure of the coronary care unit during the study period. Based on the achieved sample size of 153 participants, the post-hoc statistical power was calculated as 78.8%, which was slightly below the initially targeted 80%.

The current study was approved by the Non-Interventional Clinical Research Ethics Committee of Istanbul Medipol University (approval date: 10.08.2016, approval number: 10840098-604.01.01-E.13017).

To assess sleep quality and related factors, participants completed the PSQI, a self-report questionnaire developed initially by Buysse et al. (6) in 1989 and later adapted into Turkish by Ağargün et al. (13) in 1996, which evaluates subjective sleep quality over the previous month. PSQI consists of 19 items grouped into seven component scores: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction (14,15). The global PSQI score ranges from 0 to 21, with scores >5 indicating poor sleep quality (16).

The PSQI was administered at 07:00 a.m. while patients were in a resting state. For hospitalized patients (CCU and inpatient ward), the questionnaire was completed on the second day of hospitalization to minimize the confounding effect of acute hospitalization-related stress on sleep patterns. Outpatients completed the questionnaire after their clinic visit. For participants who were illiterate or had reading difficulties, the questionnaire was read aloud by the researchers, and their verbal responses were recorded accordingly.

The study documentation consisted of two parts:

1. A structured demographic and clinical data form, including variables such as patient age, gender, marital status, educational level, and medical history.
2. The PSQI questionnaire.

Clinical data (e.g., diagnosis, medication use) were obtained from patients' electronic medical records. All questionnaires were completed via face-to-face

interviews conducted by trained researchers to ensure data consistency and reliability.

Statistical analyses were performed using IBM SPSS Statistics version 26.0 (IBM Corp., Armonk, NY, USA). The normality of continuous variables was assessed using the Shapiro–Wilk test. Descriptive statistics were expressed as mean $\pm$ standard deviation (SD). Given the non-normal distribution of PSQI scores and their ordinal nature, comparisons among the three groups were performed using the Kruskal–Wallis test. When a significant difference was detected, pairwise comparisons were conducted using Bonferroni-adjusted post-hoc analysis. Categorical variables were compared using the chi-square or Fisher's exact test, as appropriate. A p -value <0.05 was considered statistically significant.

RESULTS

A total of 153 participants were included in the study, of whom 59 (38.6%) were female and 94 (61.4%) were male. The study groups consisted of 49 patients in the CCU group, 51 in the inpatient group, and 53 in the outpatient group (Figure 1). The mean age of the participants was 58.1 ± 13.6 years. Most participants were married ($n = 108$, 70.6%). High school graduates constituted the largest proportion ($n = 56$, 36.6%), followed by university graduates ($n = 44$, 28.8%) (Table 1).

The CCU group had the highest mean global PSQI score (7.5 ± 3.1), followed by the inpatient group (5.6 ± 3.1) and the outpatient group (4.4 ± 1.9) (Table 2). Comparison of global PSQI scores among the groups showed a statistically significant difference (Kruskal–Wallis $H = 27.743$, $p < 0.001$). Bonferroni-adjusted post hoc analysis demonstrated that the CCU group had significantly higher PSQI scores than both the inpatient ($p = 0.003$) and outpatient ($p < 0.001$) groups, whereas no significant difference was observed between the inpatient and outpatient groups ($p = 0.166$) (Table 3).

Regarding PSQI subcomponents, statistically significant differences were observed among the groups for sleep latency ($p < 0.001$), sleep disturbances ($p < 0.001$), use of sleeping medication ($p = 0.014$), and daytime dysfunction ($p = 0.006$). In contrast, no significant differences were found for subjective sleep quality ($p = 0.588$), sleep duration (p

= 0.176), or habitual sleep efficiency ($p = 0.128$) (Table 2).

When sleep quality was categorized using the PSQI global score cut-off (≤ 5 indicating good sleep quality), a significant difference was observed among the groups ($\chi^2 = 28.647$, $p < 0.001$). Poor sleep quality was most frequent in the CCU group,

whereas good sleep quality was most frequent in the outpatient group. Specifically, 77.6% of CCU patients were classified as having poor sleep quality, while 75.5% of outpatients were classified as having good sleep quality. The inpatient group showed a more balanced distribution (Table 4).

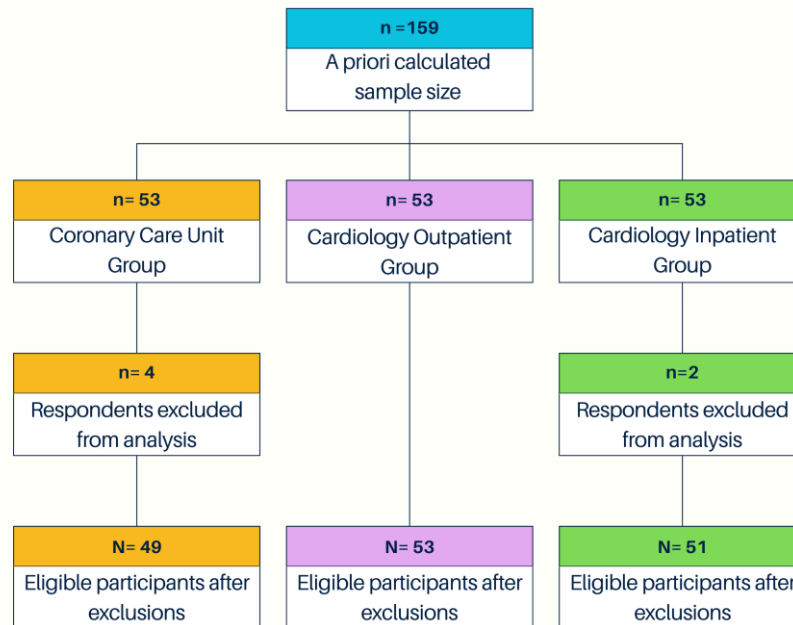


Figure 1. Flow diagram of study participants

Table 1. Baseline characteristics of the study groups

Characteristic		Total (n=153)	Coronary Care Unit Group (n=49)	Inpatient Group (n=51)	Outpatient Group (n=53)	Test	p
Age		58.1±13.6	61.3±11.9 ^a	62.8±11.3 ^a	50.6±14.1 ^b	23.723	<0.001 ^{kw}
Gender	Female	59 (38.6)	22 (44.9)	17 (33.3)	20 (37.7)	1.434	0.488 ^c
	Male	94 (61.4)	27 (55.1)	34 (66.7)	33 (62.3)		
Education status	Primary	33 (21.6)	6 (12.2)	20 (39.2)	7 (13.2)	38.327	<0.001 ^c
	Secondary	20 (13.1)	11 (22.4)	5 (9.8)	4 (7.5)		
	High	56 (36.6)	26 (53.1)	16 (31.4)	14 (26.4)		
	University	44 (28.8)	6 (12.2)	10 (19.6)	28 (52.8)		
Marital status	Married	108 (70.6)	36 (73.5)	35 (68.6)	37 (69.8)	-	0.639 ^f
	Single	37 (24.2)	10 (20.4)	13 (25.5)	14 (26.4)		
	Widowed	8 (5.2)	3 (6.1)	3 (5.9)	2 (3.8)		

* Data are presented as mean ± standard deviation for continuous variables and as number (percentage) for categorical variables unless otherwise specified.

† kw, Kruskal-Wallis; c, Chi-square; f, Fisher's exact.

‡ a,b: Groups with the same letter do not differ significantly, while groups with different letters show a statistically significant difference (Bonferroni-adjusted).

Table 2. Distribution of total PSQI scores and its subcomponents in patient groups

PSQI Subcomponent	Total	Coronary Care Unit Group	Inpatient Group	Outpatient Group	Test	p
Subjective sleep quality	1.1±0.7	1.2±0.9	1.1±0.6	1.0±0.6	1.062	0.588 ^{kw}
Sleep latency	0.9±0.8	1.3±0.7 ^b	0.8±0.8 ^a	0.6±0.7 ^a	19.965	<0.001 ^{kw}
Sleep duration	0.4±0.6	0.4±0.7	0.5±0.6	0.3±0.4	3.477	0.176 ^{kw}
Habitual sleep efficiency	0.5±0.8	0.7±0.9	0.6±0.9	0.4±0.7	4.104	0.128 ^{kw}
Sleep disturbances	1.0±0.7	1.3±0.7 ^b	0.9±0.6 ^a	0.8±0.6 ^a	19.017	<0.001 ^{kw}
Use of sleeping medication	0.6±0.9	1.0±1.1 ^b	0.6±0.9 ^{ab}	0.4±0.7 ^a	8.560	0.014 ^{kw}
Daytime dysfunction	1.0±0.7	1.3±0.8 ^b	0.9±0.7 ^{ab}	0.8±0.6 ^a	10.403	0.006 ^{kw}
Global PSQI Score	5.8±3.0	7.5±3.1 ^b	5.6±3.1 ^a	4.4±1.9 ^a	27.743	<0.001 ^{kw}

* Data are presented as mean ± SD unless otherwise specified.

† KW indicates the Kruskal–Wallis test.

‡ a,b: Groups with the same letter do not differ significantly, while groups with different letters show a statistically significant difference (Bonferroni-adjusted).

Table 3. Comparison of global PSQI scores among patient groups

Patient Group	n	Mean±SD	95% CI	Min–Max	Post-hoc (Bonferroni)	Test	p
Coronary Care Unit Group	49	7.5±3.1	6.6–8.4	2–15	} p=0.003 } p=0.166	27.743	<0.001 ^{kw}
Inpatient Group	51	5.6±3.1	4.7–6.4	2–15			
Outpatient Group	53	4.4±1.9	3.9–5.0	1–10			
Total	153	5.8±3.0	5.3–6.3	1–15			

* Data are presented as mean ± SD unless otherwise specified.

† KW indicates the Kruskal–Wallis test.

Table 4. Distribution of Sleep Quality Status (Good vs. Poor) Based on PSQI Global Scores

Sleep Quality	Total	Coronary Care Unit Group	Inpatient Group	Outpatient Group	Test	p
Good Sleep Quality (PSQI ≤ 5)	76 (49.7%)	11 (22.4%)	25 (49.0%)	40 (75.5%)	28.647	<0.001 ^c
Poor Sleep Quality (PSQI > 5)	77 (50.3%)	38 (77.6%)	26 (51.0%)	13 (24.5%)		

* Data are presented as numbers (percentages) for categorical variables unless otherwise specified.

† c indicates the Chi-square test.

DISCUSSION

This study aimed to compare sleep quality and sleep disturbances among patients in different cardiology care settings. Among individuals with cardiovascular disease, significant differences in sleep quality were observed across these settings. Impaired sleep quality was particularly evident among patients admitted to the CCU, potentially reflecting the combined influence of disease burden, hospitalization-related stress, and the complexity of medical treatment. Our

findings suggest that poor sleep quality may represent a common yet often overlooked comorbidity in cardiovascular disease.

Analysis of PSQI scores revealed significant differences in sleep quality across the cardiology subgroups. According to the established PSQI cut-off value (≤5), the outpatient group was generally characterized by good sleep quality, whereas poorer sleep quality was observed in the inpatient and CCU groups. Although the difference between the

inpatient and outpatient groups was not statistically significant, the CCU group had significantly higher PSQI scores than both other groups, indicating more severe sleep disturbances in critically ill patients. Consistent with our findings, Labrosciano et al. (17) reported impaired sleep quality among cardiac patients admitted to hospital-based care settings. Likewise, Bhattacharya et al. (18) demonstrated that patients with cardiovascular disease exhibited significantly poorer sleep quality than healthy controls, as measured by the PSQI. Environmental factors commonly present in hospital settings, such as elevated noise levels and continuous exposure to artificial lighting, may contribute to the disruption of normal sleep patterns in these populations.

In the present study, the overall mean global PSQI score indicated a moderate level of sleep disturbance across the study population. When examined by clinical setting, the mean global PSQI score was lowest among patients in the outpatient cardiology clinic, higher among those hospitalized in the general cardiology inpatient ward, and highest among patients admitted to the CCU. This pattern suggests that sleep quality may worsen with increasing intensity of care. Notably, the PSQI score observed in the CCU group was comparable to that reported by Kiran and Gowthami (19), who found similarly high levels of sleep disruption in patients hospitalized for acute myocardial infarction. Likewise, the overall mean PSQI score in our sample was similar to that reported by Getahun et al. (20) in a cohort of cardiac patients, suggesting that the general level of sleep disturbance in our population is consistent with previous findings in comparable patient groups.

In our study, several PSQI subcomponents—particularly sleep latency, use of sleep medication, daytime dysfunction, and sleep disturbances—were highest in the CCU group. Sleep latency and sleep disturbances were significantly greater in the CCU group than in both the inpatient and outpatient groups. In addition, the use of sleep medication and daytime dysfunction were also most pronounced in the CCU group, with significant differences observed particularly in comparison with the outpatient group. Taken together, these findings suggest that patients in the CCU experience greater impairment across multiple dimensions of sleep. Supporting this observation, previous research has shown that patients admitted to CCUs are especially vulnerable to circadian disruption and delayed sleep onset due to

a combination of clinical and environmental stressors, including continuous monitoring, nighttime interventions, artificial lighting, noise, and anxiety related to illness (21–24). Moreover, previous studies have reported increased use of hypnotic medications in CCU settings, possibly reflecting a greater reliance on pharmacological approaches to manage sleep disturbances in these environments (25–27). Finally, poor sleep quality in CCUs has been associated with impaired cognitive performance, reduced quality of life, and adverse cardiovascular outcomes (28,29).

This study is among the limited number of investigations comparing sleep quality across different cardiology care settings. The findings indicate that sleep quality is significantly poorer in patients admitted to the CCU and that multiple dimensions of sleep are affected in this group. This impairment may be related not only to disease burden but also to hospital-specific environmental stressors and treatment-related factors. Given the association of poor sleep quality with a broad range of adverse outcomes, including cognitive impairment, reduced quality of life, and unfavorable cardiovascular prognosis, systematic evaluation of sleep in cardiology practice may be of considerable clinical importance.

This study has several limitations that should be acknowledged. First, although the PSQI is a widely validated and frequently used instrument, it primarily assesses subjective sleep quality and does not directly measure daytime sleepiness. The absence of additional validated tools, such as the Epworth Sleepiness Scale, limited a more comprehensive evaluation of daytime sleep-related symptoms. Second, potential confounding variables, including age, sex, comorbidities, and medication use, were not controlled for in the analysis, which may have influenced the interpretation of sleep quality across groups. In addition, all data were obtained through self-report instruments, which may have introduced recall bias or social desirability bias. The study was conducted in a single secondary care center, which may limit the generalizability of the findings to other settings or populations. Participation was voluntary and may therefore have introduced selection bias. Furthermore, the cross-sectional design precludes any causal inferences regarding the relationship between clinical setting and sleep quality. In addition, baseline sleep quality before hospitalization was not available. Since the PSQI evaluates sleep

quality over the previous month, it was not possible to distinguish whether poor sleep quality was primarily attributable to hospitalization, disease severity, or pre-existing sleep-related problems. Furthermore, undiagnosed sleep disorders, particularly obstructive sleep apnea, could not be excluded. Variables such as body mass index and neck circumference were not available and therefore could not be evaluated. Environmental factors such as noise, lighting conditions, and nighttime care interventions were not systematically measured, although they may have contributed to sleep disturbances in hospitalized patients. Finally, the planned sample size could not be fully achieved because some patients were excluded according to the predefined criteria and additional recruitment was not possible after closure of the coronary care unit during the study period, which may have slightly reduced the statistical power of the study.

CONCLUSION

This study demonstrated significant differences in sleep quality across cardiology care settings, with the most pronounced impairment observed in the CCU group. These findings suggest that both disease severity and hospital-related environmental stressors may contribute to poorer sleep quality in cardiac patients. The high prevalence of poor sleep, especially in intensive care settings, underscores the need for routine sleep assessment and targeted interventions in cardiology practice. Given the potential implications of sleep disturbance for recovery, psychological well-being, and cardiovascular prognosis, greater attention to sleep-focused approaches, particularly non-pharmacological and environmental modifications, may be warranted in patient care protocols.

Ethics Committee Approval

The study was approved by the Non-Interventional Clinical Research Ethics Committee of Istanbul Medipol University (approval date: 10.08.2016, approval number: 10840098-604.01.01-E.13017).

Author Contributions

Conception and design - M. Bolatkale, A.Ç. Acara; Data collection and organization - M. Bolatkale; Data analysis and interpretation - K.K. Kerimoğlu, A.Ç. Acara; Writing - K.K. Kerimoğlu; Critical Review - M. Bolatkale, K.K. Kerimoğlu, A.Ç. Acara.

Note

Preliminary findings of this study were presented as an oral presentation at the 19th International Hippocrates Congress on Medical and Health Sciences, held online on October 10–11, 2025.

Conflict of Interest

The authors declare no conflicts of interest.

Financial Disclosure

The authors declared that this study received no financial support.

REFERENCES

- İnce Palamutoğlu M, Karaca KE, Kara A, Ürgün B. Adherence to mediterranean diet and sleep quality in university students. *Izmir Democr Univ Health Sci J*. 2024;7(1):16-28.
- Şalva T, Güllüoğlu MA, Kaya M, Özdemir KU. Maltepe Üniversitesi Tıp Fakültesi 1. ve 6. sınıf öğrencilerinde uyku kalitesi ve etkileyen faktörler. *Maltepe Tıp Derg*. 2020;12(2):27-33.
- Palabıyık O, Erdoğan Kurtaran N, Korkmaz S. Changes in the sleep quality and physical activity habits of vocational school students during the COVID-19. *SHED*. 2021;5(2):39-47.
- Reis M, Ramiro L, Paiva T, Gaspar-De-Matos M. National survey on the importance of sleep in the quality of academic life and mental health of college students in Portugal. *Sleep Sci*. 2021;14(2):125-32.
- Yen CF, Lin HC, Ko CH, Wu HC, Hsu CY, Wang PW. Sleep quality among individuals with ketamine use and the mediating role of craving. *Sci Rep*. 2020;10(1):20535.
- Buyse D, Reynolds CI, Monk T, Berman S, Kupfer D. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry Res*. 1988;(28):193-213.
- Özer M, Doğan Ş. Evaluation of sleep quality in infants with atopic dermatitis and their mothers. *Dicle Med J*. 2024;51(4):495-502.
- Pezzini JV, Trevisan DD, Dominiak Soares VH, Gauer LE, Lima MMS. Sleep quality in parkinson disease: Clinical insights and PSQI reliability assessment. *Sleep Sci*. 2024;18(02):e147-54.
- Neyazi A, Rahimi BA, Mohammadi AQ, Neyazi M, Faizee MI, Daulati MN, et al. Assessment of psychometric properties of the Dari version of the Pittsburgh Sleep Quality Index (PSQI) among Afghans. *Discov Psychol*. 2024;4(1):172.
- Fadzil A. Factors affecting the quality of sleep in children. *Children*. 2021;8(2):122.21.

11. Kuzmik A, Boltz M, Belue R, Galvin JE, Arendacs R, Resnick B. Factors associated with sleep quality in hospitalized persons with dementia. *Alzheimer Dis Assoc Disord.* 2022;36(3):253-8.
12. Babaii A, Adib-Hajbaghery M, Hajibagheri A. Effect of using eye mask on sleep quality in cardiac patients: a randomized controlled trial. *Nurs Midwifery Stud.* 2015;4(4):e28332.
13. Ağargün MY, Kara H, Anlar O. Pittsburgh Uyku Kalitesi İndeksinin geçerliliği ve güvenilirliği. *Türk Psikiyatri Derg.* 1996;7:107-15.
14. Parlak L, Yılmaz H, Parlak S. Quality of life, sleep disorders and psychological conditions of partners of female patients with fibromyalgia syndrome. *Genel Tıp Derg.* 2022;32(6):730-6.
15. Eren F, Öztürk Ş. Gerilim tipi baş ağrısı olan hastalarda uyku bozuklukları, depresyon ve ilişkili faktörlerin değerlendirilmesi. *Genel Tıp Derg.* 2021;31(2):120-4.
16. Şahin AZ, Özdemir N, Şahin Ş, Demir B. The effect of sleep quality of patients under hemodialysis on death anxiety, depression and pain. *Genel Tıp Derg.* 2023;33(5):481-4.
17. Labrosciano C, Tavella R, Reynolds A, Air T, Beltrame JF, Ranasinghe I, et al. The association between sleep duration and quality with readmissions: an exploratory pilot-study among cardiology inpatients. *Clocks Sleep.* 2020;2(2):120-2.
18. Bhattacharya D, Das PK, Awal A, Biswas T, Selim GM, Bhattacharjee K, et al. Association of poor sleep quality and short sleep duration on the development of coronary artery disease. *Int J Res Med Sci.* 2025;13(5):1824-30.
19. Kiran HS, Gowthami T. Perceived sleep quality and quantity before acute myocardial infarction. *J Pract Cardiovasc Sci.* 2022;8(2):102-4.
20. Getahun Y, Demissie WR, Amare H. Sleep quality among cardiac patients on follow up at Jimma Medical Center, southwestern Ethiopia. *Sleep Sci.* 2021;14(1):11-8.
21. Calisanie N, Prayoga H. Factors affecting sleep quality of treated patients in the intensive cardiac care unit room. *Compr Nurs J.* 2023;1(9):88-9.
22. Korompeli A, Muurlink O, Kavrochorianou N, Katsoulas T, Fildissis G, Baltopoulos G. Circadian disruption of ICU patients: A review of pathways, expression, and interventions. *J Crit Care.* 2017;38:269-7.
23. Kamdar BB, King LM, Collop NA, Sakamuri S, Colantuoni E, Neufeld KJ, et al. The effect of a quality improvement intervention on perceived sleep quality and cognition in a medical ICU. *Crit Care Med.* 2013;41(3):800-9.
24. Pisani MA, Friesse RS, Gehlbach BK, Schwab RJ, Weinhouse GL, Jones SF. Sleep in the intensive care unit. *Am J Respir Crit Care Med.* 2015;191(7):731-8.
25. Telias I, Wilcox ME. Sleep and circadian rhythm in critical illness. *Crit Care.* 2019;23(1):82.
26. Kamdar BB, Knauert MP, Jones SF, Parsons EC, Parthasarathy S, Pisani MA, et al. Perceptions and practices regarding sleep in the intensive care unit a survey of 1,223 critical care providers. *Ann Am Thorac Soc.* 2016;13(8):1370-7.
27. Dorsch JJ, Martin JL, Malhotra A, Owens RL, Kamdar BB. Sleep in the intensive care unit: strategies for improvement. *Semin Respir Crit Care Med.* 2019;40(5):614-28.
28. Sun T, Sun Y, Huang X, Liu J, Yang J, Zhang K, et al. Sleep and circadian rhythm disturbances in intensive care unit (ICU)-acquired delirium: a case-control study. *J Int Med Res.* 2021;49(3):300060521990502.
29. Li J, Cai S, Liu X, Mei J, Pan W, Zhong M, et al. Circadian rhythm disturbance and delirium in ICU patients: a prospective cohort study. *BMC Anesthesiol.* 2023;23(1):203.