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Sleep disturbances and their clinical correlates in patients with hemifacial spasm

Hemifasiyal spazm hastalarında uyku bozuklukları ve ilişkili klinik faktörler

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ABSTRACT

Background: This study aims to evaluate sleep quality, insomnia severity, and daytime sleepiness in patients with hemifacial spasm (HFS) and to investigate their associations with clinical characteristics and depressive symptoms.

Materials and Methods: This multicenter, prospective, cross-sectional study included 34 patients with HFS evaluated between September 2024 and December 2024. All participants completed the Pittsburgh Sleep Quality Index (PSQI), Insomnia Severity Index (ISI), Epworth Sleepiness Scale (ESS), Beck Depression Inventory-II (BDI-II), and the Jankovic Hemifacial Spasm Rating Scale. Associations between clinical variables and sleep-related measures were assessed using Spearman correlation analysis.

Results: A total of 34 patients (16 males, 18 females; median age: 49.5 years; range, 26 to 64 years) with HFS were clinically evaluated. Poor sleep quality was identified in 47.1% of the patients. Based on the ISI, 26.5% had subthreshold insomnia and 5.9% had moderate insomnia, whereas none exhibited excessive daytime sleepiness according to the ESS. Patients with poor sleep quality were older ($p = 0.013$), had lower educational levels ($p = 0.003$), and had higher ISI ($p < 0.001$) and ESS ($p < 0.001$) scores than those with good sleep quality. PSQI scores were positively correlated with age (r = 0.429), HFS severity (r = 0.360), ISI (r = 0.892), and ESS (r = 0.684) and negatively correlated with educational level (all $p < 0.05$). The BDI-II scores were positively correlated with ISI (r = 0.425, $p = 0.012$), whereas the association with PSQI approached statistical significance ($p = 0.058$).

Conclusion: Sleep disturbances are common in patients with HFS and are associated with older age and lower educational level. Although disease severity showed a significant correlation with sleep quality, depressive symptoms were more closely associated with insomnia severity. Routine assessment of sleep and mood symptoms may facilitate a more comprehensive clinical evaluation of patients with HFS.

Keywords: Hemifacial spasm, insomnia, sleep quality.

ÖZ

Amaç: Bu çalışmada hemifasiyal spazm (HFS) hastalarında uyku kalitesi, insomnia şiddeti ve gündüz uykululuğunun değerlendirilmesi ve bu parametrelerin klinik özellikler ile depresif belirtilerle ilişkisinin incelenmesi amaçlandı.

Hastalar ve Yöntemler: Bu çok merkezli, prospektif ve kesitsel çalışmaya Eylül 2024 ile Aralık 2024 tarihleri arasında HFS tanısıyla takip edilen 34 hasta dahil edildi. Tüm hastalarda Pittsburgh Uyku Kalitesi İndeksi (PSQI), İnsomnia Şiddet İndeksi (ISI), Epworth Uykululuk Ölçeği (ESS), Beck Depresyon Envanteri-II (BDI-II) ve Jankovic Hemifacial Spasm Rating Scale uygulandı. Klinik ve uyku parametreleri arasındaki ilişkiler Spearman korelasyon analizi ile değerlendirildi.

Bulgular: Hemifasiyal spazm tanılı toplam 34 hasta (16 erkek, 18 kadın; medyan yaş: 49.5 yıl; dağılım, 26 ila 64 yıl) klinik olarak değerlendirildi. Hastaların %47.1'inde kötü uyku kalitesi saptandı. ISI değerlendirmesinde %26.5'inde hafif, %5.9'unda orta şiddette insomnia mevcutken; ESS'ye göre hastaların hiçbirinde aşırı gündüz uykululuğu izlenmedi. Kötü uyku kalitesine sahip hastalar daha ileri yaşta ($p = 0.013$), daha düşük eğitim düzeyine sahip ($p = 0.003$) ve daha yüksek ISI ($p < 0.001$) ve ESS ($p < 0.001$) skorlarına sahipti. PSQI skoru yaş (r = 0.429), HFS şiddeti (r = 0.360), ISI (r = 0.892) ve ESS (r = 0.684) ile pozitif; eğitim düzeyi ile negatif korelasyon gösterdi (tümü $p < 0.05$). BDI-II skoru ISI ile anlamlı korelasyon gösterirken (r = 0.425; $p = 0.012$), PSQI ile ilişki sınırda anlamlıydı ($p = 0.058$).

Sonuç: Hemifasiyal spazm hastalarında uyku bozuklukları yaygındır; ileri yaş ve düşük eğitim seviyesi ile ilişkilidir. Hastalık şiddeti, uyku kalitesi ile anlamlı bir korelasyon gösterse de, depresif semptomlar insomnia şiddeti ile daha yakından ilişkili bulunmuştur. Uyku ve duygu durum semptomlarının rutin olarak değerlendirilmesi, HFS hastalarının daha kapsamlı bir klinik değerlendirmesine olanak tanıyabilir.

Anahtar sözcükler: Hemifasiyal spazm, insomnia, uyku kalitesi.

Hemifacial spasm (HFS) is a chronic hyperkinetic movement disorder characterized by unilateral, involuntary, intermittent, and repetitive contractions of the facial muscles innervated by the facial nerve.[1] Clinically, the abnormal contractions typically begin in the orbicularis oculi muscle and may gradually

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spread to the lower facial muscles over time. The most widely accepted pathophysiological mechanism is neurovascular conflict caused by vascular compression of the facial nerve at its root exit zone from the brainstem. Botulinum toxin injections represent the mainstay of symptomatic treatment, whereas microvascular decompression is considered the treatment of choice in appropriately selected patients.[2,3]

Although HFS has traditionally been regarded as a disorder characterized predominantly by motor manifestations, increasing evidence suggests that its clinical burden extends beyond involuntary facial contractions. A broad spectrum of non-motor symptoms, including depression, anxiety, social withdrawal, perceived stigma, impaired quality of life, pain, and sleep disturbances, has been reported in patients with HFS.[4,5] The visible nature of involuntary facial contractions, particularly during social interactions, may impose a considerable psychosocial burden and adversely affect daily functioning.[5,6] Therefore, comprehensive evaluation of HFS should include not only motor severity but also non-motor manifestations.[4-6] Among these non-motor symptoms, sleep disturbances have recently attracted increasing attention.[7] Polysomnographic studies have demonstrated that involuntary facial contractions do not disappear completely during sleep but persist at a reduced frequency compared with wakefulness.[8,9] Furthermore, a large nationwide cohort study demonstrated that patients with HFS have a significantly increased risk of developing early-onset insomnia compared with the general population.[9] These findings suggest that sleep disturbances represent an important component of the clinical spectrum of HFS rather than merely a coincidental complaint. Nevertheless, clinical studies investigating the relationship between HFS and sleep remain scarce. Existing studies have mainly focused on the development of insomnia, polysomnographic characteristics, or preoperative sleep quality, while comprehensive evaluations integrating subjective sleep quality, insomnia severity, and daytime sleepiness are limited. Moreover, the relationship between these sleep parameters and depressive symptoms or disease-related clinical characteristics has not been adequately investigated.[7-10]

The present study aimed to evaluate sleep quality, insomnia severity, and daytime sleepiness in patients with HFS and to investigate their associations with depression, age, sex, disease duration, disease severity, and duration of botulinum toxin treatment. By comprehensively assessing these sleep-related parameters, we sought to expand the current understanding of the clinical profile of sleep disturbances in HFS and contribute to a more holistic evaluation of affected patients.

PATIENTS AND METHODS

This multicenter, prospective, cross-sectional observational study was conducted at the movement disorders outpatient clinics of two tertiary healthcare centers, namely, İstanbul Medeniyet University, Göztepe Prof. Dr. Süleyman Yalçın City Hospital and University of Health Sciences, Hamidiye Faculty of Medicine, Sancaktepe Prof. Dr. İlhan Varank Training and Research Hospital between September 2024 and December 2024. The inclusion criteria were age ≥ 18 years, a diagnosis of hemifacial spasm established by a movement disorders specialist based on clinical evaluation, ongoing follow-up at one of the participating movement disorders outpatient clinics, and the ability to complete the study questionnaires reliably. Patients with a diagnosis of dementia or those considered unable to complete the study questionnaires reliably due to cognitive impairment were excluded. Written informed consent was obtained from all participants prior to enrollment. The study was approved by the local Institutional Ethics Committee (Date: 28.08.2024, Approval no.: 273). The study was performed using the same study protocol at both centers. The study was conducted in accordance with the principles of the Declaration of Helsinki.

Clinical assessment

Demographic and clinical data, including age, sex, educational level, affected side, disease duration, and duration of botulinum toxin treatment, were recorded for all participants. All clinical and questionnaire-based assessments were performed during the routine outpatient visit immediately before the scheduled botulinum toxin injection. Disease severity was assessed using the severity subscale of the Jankovic Hemifacial Spasm Rating Scale.[11] This scale grades disease severity from 0 (no spasm) to 4 (severe, functionally disabling spasm), with higher scores indicating greater clinical severity. Depressive symptoms were assessed using the Beck Depression Inventory-II (BDI-II).[12] The validated Turkish version of the questionnaire was used.[13]

Sleep assessment

Sleep was evaluated using the Pittsburgh Sleep Quality Index (PSQI), the Insomnia Severity Index (ISI), and the Epworth Sleepiness

Scale (ESS). All questionnaires were administered by the investigators during the routine outpatient visits scheduled for botulinum toxin injections. For patients who were unable to attend the visits, assessments were completed via a standardized telephone interview.

The PSQI is a validated self-reported questionnaire that assesses subjective sleep quality over the previous month and yields a global score ranging from 0 to 21.[14] A global PSQI score > 5 was considered indicative of poor sleep quality.[15]

The ISI is a seven-item self-report questionnaire evaluating the severity of insomnia symptoms during the preceding two weeks, with total scores ranging from 0 to 28.[16] Insomnia severity was categorized as no clinically significant insomnia (0-7), subthreshold insomnia (8-14), moderate insomnia (15-21), and severe insomnia (22-28).[16,17]

The ESS is an eight-item self-report questionnaire that evaluates daytime sleepiness, with total scores ranging from 0 to 24.[18] An ESS score > 10 was considered indicative of excessive daytime sleepiness.[19]

Statistical analysis

Statistical analyses were performed using IBM SPSS Statistics for Windows, Version 27.0 software (IBM Corp., Armonk, NY, USA). The normality of continuous variables was assessed using the Shapiro-Wilk test. Normally distributed variables are presented as mean ± standard deviation (SD), whereas non-normally distributed variables are presented as median (min-max). Categorical variables are expressed as frequency (n) and percentage (%). Participants were categorized into good sleep quality (PSQI ≤ 5) and poor sleep quality (PSQI > 5) groups. Continuous variables were compared using the Mann-Whitney U test, whereas categorical variables were compared using the Pearson Chi-square test or Fisher's exact test, as appropriate. Associations between continuous variables were evaluated using Spearman's rank correlation analysis. All statistical tests were two-tailed, and a *p*-value < 0.05 was considered statistically significant.

RESULTS

A total of 34 patients (16 males, 18 females; median age: 49.5 years; range, 26 to 64 years) with HFS were included in the study. Left-sided involvement was present in 19 patients (55.9%), whereas 15 patients (44.1%) had right-sided involvement. The median disease duration was 60 months (6-180), the median duration of

Table 1. Demographic and clinical characteristics of the study population (n = 34)

Variables	n	%	Median	Min-Max
Sex				
Female	18	52.9		
Male	16	47.1		
Age, years			49.5	26–64
Affected side				
Left	19	55.9		
Right	15	44.1		
Disease duration, months			60	6-180
Duration of botulinum toxin treatment (month)			9.5	3-84
HFS severity score			2	1-4
BDI-II score			11	2-31
PSQI score			4	2-13
ISI score			4.5	1-20
ESS score			3	1-8

HFS, hemifacial spasm; BDI-II, Beck Depression Inventory-II; PSQI, Pittsburgh Sleep Quality Index; ISI, Insomnia Severity Index; ESS, Epworth Sleepiness Scale.

Table 2. Distribution of sleep-related measures

Variables	n	%
Good sleep quality (PSQI ≤ 5)	18	52.9
Poor sleep quality (PSQI > 5)	16	47.1
No clinically significant insomnia (ISI 0-7)	23	67.6
Subthreshold insomnia (ISI 8-14)	9	26.5
Moderate insomnia (ISI 15-21)	2	5.9
Severe insomnia (ISI ≥ 22)	0	0
Excessive daytime sleepiness (ESS > 10)	0	0

PSQI, Pittsburgh Sleep Quality Index; ISI: Insomnia Severity Index; ESS, Epworth Sleepiness Scale.

botulinum toxin treatment was 9.5 months (3-84), and the median HFS severity score was 2 (1-4). The demographic and clinical characteristics of the study population are summarized in Table 1.

According to the PSQI, 16 (47.1%) patients were classified as having poor sleep quality. Based on the ISI, 23 (67.6%) patients had no clinically significant insomnia, nine (26.5%) had subthreshold insomnia, and two (5.9%) had moderate insomnia. None of the patients had severe insomnia or excessive daytime sleepiness according to the ESS. The distribution of sleep-related measures is presented in Table 2.

When patients were stratified according to sleep quality, those with poor sleep quality were significantly older than those with good sleep quality [53.5 (35-62) *vs.* 44.5 (26-64) years; $p = 0.013$]. Patients with poor sleep quality also had significantly lower educational levels ($p = 0.003$) and significantly higher ISI [12 (4-20) *vs.* 2 (1-6); $p < 0.001$] and ESS scores [5 (1-8) *vs.* 2 (1-6); $p < 0.001$]. Although HFS severity tended to be higher in patients with poor sleep quality, the difference did not reach statistical significance [3 (1-4) *vs.* 2 (1-4); $p = 0.070$]. No significant between-group differences were observed in BDI-II score, disease duration, duration of botulinum toxin treatment, sex, or affected side, as shown in Table 3.

Spearman correlation analysis demonstrated positive correlations between PSQI score and age ($r = 0.429$, $p = 0.011$), HFS severity ($r = 0.360$, $p = 0.037$), ISI score ($r = 0.892$, $p < 0.001$), and ESS score ($r = 0.684$, $p < 0.001$), whereas educational level was negatively correlated with PSQI ($r = -0.510$, $p = 0.002$). The association between PSQI and BDI-II score approached statistical significance ($r = 0.328$, $p = 0.058$). ISI score was positively correlated with age ($r = 0.458$, $p = 0.006$), BDI-II scores ($r = 0.425$, $p = 0.012$), PSQI score ($r = 0.892$, $p < 0.001$), and

Table 3. Comparison of clinical characteristics between patients with good and poor sleep quality

	Good sleep quality (PSQI ≤ 5, n = 18)				Poor sleep quality (PSQI > 5, n = 16)				
Variables	n	%	Median	Min-Max	n	%	Median	Min-Max	*p*
Age (year)			44.5	26-64			53.5	35-62	**0.013**
Education level									
Primary school	2	11.1			7	43.8			
Secondary school	2	11.1			1	6.3			
High school	5	27.8			8	50.0			**0.003†**
Graduate	8	44.4			0	0.0			
Postgraduate	1	5.6			0	0.0			
HFS severity score			2	1.4			3	1-4	0.070
BDI-II score			9.5	4.22			13.5	2-31	0.127
ISI score			2	1-6			12	4-20	**< 0.001**
ESS score			2	1-6			5	1-8	**< 0.001**

PSQI, Pittsburgh Sleep Quality Index; HFS, hemifacial spasm; BDI-II, Beck Depression Inventory-II; ISI, Insomnia Severity Index; ESS, Epworth Sleepiness Scale; † Fisher's exact test.

Table 4. Spearman correlation analysis between sleep measures and clinical variables

	PSQI		ISI	
Variables	r	*p*	r	*p*
Age	**0.429**	**0.011**	**0.458**	**0.006**
Education level	**–0.510**	**0.002**	**–0.545**	**0.001**
Disease duration	0.087	0.625	0.046	0.795
Duration of botulinum toxin treatment	–0.051	0.773	–0.074	0.676
HFS severity score	**0.360**	**0.037**	0.277	0.113
BDI-II score	0.328	0.058	**0.425**	**0.012**
ESS score	**0.684**	**< 0.001**	**0.621**	**< 0.001**

PSQI, Pittsburgh Sleep Quality Index; ISI, Insomnia Severity Index; HFS, hemifacial spasm; BDI-II, Beck Depression Inventory-II; ESS, Epworth Sleepiness Scale. Spearman correlation coefficients (r) and corresponding p values. Statistically significant correlations ($p < 0.05$) are shown in bold.

ESS score (r = 0.621, $p < 0.001$), while educational level showed a significant negative correlation with ISI (r = −0.545, $p = 0.001$). Neither disease duration nor duration of botulinum toxin treatment was significantly correlated with PSQI or ISI scores, as shown in Table 4.

In the sex-based analysis, female patients had significantly higher BDI-II scores than male patients [14 (5-31) *vs.* 7.5 (2-20); $p = 0.013$]. The ESS scores were also significantly higher in women [5 (1-8) *vs.* 2 (1-7); $p = 0.040$]. In contrast, PSQI and ISI scores did not differ significantly between female and male patients.

DISCUSSION

In this study, sleep disturbances in patients with HFS were comprehensively evaluated, and the relationships between sleep quality, insomnia severity, daytime sleepiness, and clinical characteristics were investigated. The principal findings were that nearly half of the patients had poor sleep quality, which was associated with older age and lower educational level. In addition, sleep quality tended to deteriorate with increasing disease severity, whereas depressive symptoms were more closely associated with insomnia severity than with overall sleep quality. In contrast, neither disease duration nor duration of botulinum toxin treatment was significantly associated with sleep-related outcomes.

The finding that almost half of our cohort experienced poor sleep quality further supports the concept that HFS is not solely a motor disorder and that sleep disturbances constitute an important component of its non-motor burden.[4,5,7-9] These results highlight the importance of incorporating sleep assessment into the routine clinical evaluation of patients with HFS.

Older age was associated with both poorer sleep quality and greater insomnia severity in our cohort. Aging is known to be accompanied by alterations in sleep architecture, increased nocturnal awakenings, and reduced sleep efficiency.[20] Therefore, the observed association between age and impaired sleep may partly reflect physiological changes related to aging rather than mechanisms specific to HFS. In contrast, the negative correlations observed between educational level and both PSQI and ISI scores are particularly noteworthy. Educational attainment is closely associated with health literacy and self-management skills in chronic diseases, both of which may influence coping strategies and overall health outcomes. Individuals with lower educational levels may also have reduced access to healthcare resources, poorer treatment adherence, and suboptimal sleep hygiene practices.[21-23] To our knowledge, however, no previous study has specifically examined the relationship between educational level and sleep parameters in patients with HFS. Consequently, these findings warrant confirmation in larger cohorts. Although disease severity showed a significant positive correlation with PSQI scores, only a trend toward significance was observed in the group comparison. This discrepancy is most likely attributable to the limited sample size and the

lower statistical power of between-group analyses. Nevertheless, sleep disturbances in HFS are unlikely to be explained solely by motor severity. Psychosocial stress resulting from visible facial contractions, cosmetic concerns, emotional distress, and the overall burden of living with a chronic neurological disorder may all contribute to impaired sleep quality, supporting the concept that sleep disturbances in HFS are multifactorial in origin.[4-5] Another important finding of our study is the relationship between depressive symptoms and sleep disturbances. Although BDI-II scores were higher in patients with poor sleep quality, the between-group difference did not reach statistical significance. In contrast, depressive symptoms showed a significant positive correlation with insomnia severity, whereas the association with overall sleep quality approached statistical significance. The relationship between depression and sleep disturbances is well recognized as bidirectional; depressive symptoms may impair sleep quality, while chronic sleep disturbances may, in turn, contribute to the development or worsening of depression.[24,25] Therefore, it remains difficult to distinguish the extent to which sleep complaints in patients with HFS are attributable to disease-specific neurophysiological mechanisms or to coexisting depressive symptoms. From this perspective, depression may represent a potential confounding factor when interpreting the relationship between HFS and sleep disturbances. Future studies employing multivariable analytical models are warranted to clarify the independent contribution of HFS to sleep impairment.

Neither disease duration nor duration of botulinum toxin treatment was associated with sleep-related measures in the present study. These findings suggest that sleep disturbances may not simply reflect disease chronicity but rather result from more complex biological and psychosocial mechanisms. Furthermore, none of the participants demonstrated excessive daytime sleepiness according to the ESS. This observation suggests that impaired sleep quality and insomnia, rather than excessive daytime sleepiness, may constitute the predominant sleep-related manifestations of HFS.[7-10] Nevertheless, this finding should be interpreted cautiously, given the subjective nature of the ESS and the relatively small sample size.

Several limitations should be acknowledged. First, the sample size was relatively small, and no control group was included. Second, the cross-sectional design precludes any conclusions regarding causality. Third, sleep was assessed exclusively using self-reported questionnaires without objective sleep measures such as polysomnography. In addition, multivariable analyses were not performed; therefore, the potential confounding effect of depressive symptoms on sleep outcomes could not be fully evaluated. Despite these limitations, our study has several strengths. To our knowledge, this is one of the first studies from Türkiye to simultaneously evaluate sleep quality, insomnia severity, daytime sleepiness, and depressive symptoms in patients with HFS. Furthermore, the multicenter design and the comprehensive assessment of both clinical characteristics and sleep-related parameters enhance the clinical relevance of our findings.

In conclusion, sleep disturbances are common among patients with HFS and appear to be associated particularly with older age and lower educational level. Depressive symptoms were strongly associated with insomnia severity and should be considered when evaluating sleep disturbances in this patient population. Routine assessment of both sleep and mood symptoms, in addition to motor manifestations, may facilitate a more comprehensive clinical approach to HFS. Larger prospective studies incorporating objective sleep measures and multivariable analyses are needed to further elucidate the mechanisms underlying sleep disturbances in HFS.

Author Contributions

Ö.G.Ö., G.B.: Concept, data collection and/or processing, literature search, critical review, materials; Ö.G.Ö.: Design, supervision, analysis and/or interpretation, writing the manuscript, references and funding.

Conflict of Interest

The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

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Data Sharing Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

AI Disclosure

The authors declare that artificial intelligence (AI) tools were not used, or were used solely for language editing, and had no role in data analysis, interpretation, or the formulation of conclusions. All scientific content, data interpretation, and conclusions are the sole responsibility of the authors. The authors further confirm that AI tools were not used to generate, fabricate, or 'hallucinate' references, and that all references have been carefully verified for accuracy.

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