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Investigation of Sleep Quality and The Relationship with Symptom Severity in Irritable Bowel Syndrome

Sleep Quality in Irritable Bowel Syndrome

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ABSTRACT

Objective: This study aims to analyze sleep quality and its association with symptom severity in irritable bowel syndrome (IBS).
Materials and Methods: A total of 100 subjects, including 50 IBS patients and 50 healthy controls followed at our center between November 2023 and April 2024, were recruited for the study. All participants were assessed using the Pittsburgh Sleep Quality Index (PSQI), and the results were compared between groups. Additionally, the symptom severity of the IBS group was evaluated using the IBS Symptom Severity Scale (IBS-SSS), and its correlation with the PSQI score was analyzed.
Results: Of the participants, 18 (24%) were male, and the median age was 40.5 years (range: 28–52). The total PSQI score was significantly higher in the IBS group compared to controls (7.5 vs. 4, $p < 0.001$). A positive correlation was identified between the total PSQI score and IBS-SSS (r = 0.501, $p < 0.001$).
Conclusion: IBS is a functional bowel disorder that negatively impacts sleep quality. Moreover, the severity of IBS symptoms is associated with poorer sleep quality.

İrritabl Barsak Sendromunda Uyku Kalitesinin ve Semptom Şiddeti ile İlişkisinin Araştırılması

İrritabl Barsak Sendromunda Uyku Kalitesi

Makale Bilgisi

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ÖZET

Amaç: Bu çalışma, İBS'de uyku kalitesini ve bunun semptom şiddeti ile ilişkisini analiz etmeyi amaçlamaktadır.
Gereç ve Yöntemler: Kasım 2023 ve Nisan 2024 tarihleri arasında merkezimizde takip edilen 50 İBS hastası ve 50 sağlıklı kontrol ile birlikte toplam 100 katılımcı çalışmaya dahil edilmiştir. Tüm katılımcılar Pittsburgh Uyku Kalitesi İndeksi (PSQI) ile değerlendirilmiş ve gruplar arasında karşılaştırılmıştır. Ayrıca, İBS grubunun semptom şiddeti İBS Semptom Şiddeti Ölçeği (İBS-SSS) ile değerlendirilmiş ve PSQI skoru ile korelasyonu analiz edilmiştir.
Bulgular: Hastaların 18'i (%24) erkekti ve ortanca yaş 40,5 (28-52) yıldı. Toplam PSQI puanı İBS grubunda daha yüksekti (7,5 vs 4, $p <0,001$). Toplam PSQI puanı ile IBS-SSS arasında pozitif bir korelasyon tespit edilmiştir (r = 0.501, $p <0.001$).
Sonuç: İBS, uyku kalitesini olumsuz etkileyen fonksiyonel bir bağırsak hastalığıdır. Ayrıca, İBS semptomlarının şiddetinin uyku kalitesindeki düşüşle ilişkili olduğu bulunmuştur.

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Introduction

Irritable bowel syndrome (IBS) is one of the most common types of gastrointestinal disorders, with a prevalence of 10–20% (1). IBS can present with a range of symptoms, including diarrhea, constipation, abdominal discomfort, and pain, significantly reducing the quality of life (2). The diagnosis of IBS is made by excluding other pathological disorders in the presence of characteristic symptoms, as there is no definitive diagnostic test (3).

Although the exact underlying pathology of IBS remains unclear, recent studies have identified the presence of subclinical inflammation in the gastrointestinal tract (4). Additionally, pathological variations in neurotransmitter levels in patients with IBS have been shown to disrupt communication within the gut-brain axis (5). In this context, the impact of IBS on sleep quality has been a focus of interest in previous research. However, the number of studies exploring this relationship is limited, and there is insufficient data on the association between sleep quality and symptom severity (6, 7).

In the present study, we aimed to investigate sleep quality and its relationship with symptom severity in patients with IBS.

Materials and Methods

Study population

This prospective study was conducted in the Gastroenterology Unit of Yenimahalle Teaching and Training Hospital. The study was approved by the Medical and Health Research Ethics Committee of the same institution (Approval date: November 2023; Approval number: E-62). Written informed consent was obtained from all participants prior to their inclusion in the study.

All adult patients diagnosed with IBS between November 2023 and April 2024 were included. Demographic data, smoking status, exercise habits, and the presence of a sleep partner were recorded for each patient during outpatient clinic visits. The diagnosis of IBS was based on the Rome IV diagnostic criteria, as recommended by the guidelines (8). Additionally, IBS subtypes were identified using the Rome IV criteria. During the diagnostic process, organic pathologies that could be considered in the differential diagnosis of IBS were excluded through anamnesis, laboratory tests, and clinical examinations. For cases with uncertain diagnoses, further colonoscopic evaluations were performed, and patients with underlying pathological findings were excluded from the study.

The following exclusion criteria were applied:

i) Age <18 years;

ii) History of malignancy;

iii) Hyperthyroidism or hypothyroidism;

iv) Chronic respiratory, liver, or kidney diseases;

v) Autoimmune diseases;

vi) History of celiac disease or inflammatory bowel disease;

vii) History of severe anxiety or depression.

The control group consisted of hospital staff without any diagnosed diseases and not receiving any treatments. The control group was also evaluated using the same exclusion criteria.

Sleep disturbance and symptom severity evaluation

Both groups were assessed for sleep quality using the Pittsburgh Sleep Quality Index (PSQI), a validated diagnostic tool widely used to evaluate sleep quality in various diseases (9). To assess the symptom severity of IBS, the IBS Symptom Severity Scale (IBS-SSS) was utilized. The IBS-SSS is a questionnaire comprising five evaluation items:

i) Severity of abdominal pain;

ii) Number of days with pain over a 10-day period;

iii) Severity of abdominal distension;

iv) Satisfaction with bowel habits;

v) Impact of IBS on quality of life.

Statistical analysis

Statistical analyses were performed using IBM SPSS Statistics for Windows, version 25.0 (IBM Corp., Armonk, NY, USA). The Kolmogorov–Smirnov test was applied to assess the normality of the distribution of continuous variables. As all continuous variables were non-normally distributed, they were presented as median (interquartile range) and compared using the Mann–Whitney U test. Categorical variables were presented as frequency (percentage) and compared using the Chi-square test. Spearman's correlation test was employed to analyze the relationship between the IBS-SSS score and the total PSQI score. A two-tailed p value of <0.05 was considered statistically significant.

Results

Table 1 presents the demographic characteristics and clinical data of IBS patients. The most common IBS subtype was diarrhea-dominant (n = 22, 44%), followed by constipation-dominant (n = 15, 30%). Regular exercise habits were reported by 22% (n = 11) of IBS patients. Sixteen (32%) patients were smokers, and two-thirds (n = 33, 66%) had a sleep partner. The median IBS-SSS value was 320 (interquartile range: 207.5–368.75).

Table 2 summarizes the comparison of PSQI parameters between IBS patients and the control group. The subjective sleep quality score ($p = 0.004$), sleep latency score ($p < 0.001$), sleep disturbances score ($p < 0.001$), use of sleep medication score ($p = 0.007$), daytime dysfunction score ($p < 0.001$), and total PSQI score ($p < 0.001$) were significantly higher in the IBS group compared to the control group. In contrast, the habitual sleep efficiency score ($p = 0.001$) was significantly higher in the control group. The sleep duration score did not differ significantly between the groups ($p = 0.079$).

The correlation between the IBS-SSS and the total PSQI score is illustrated in Figure 1. A positive correlation was observed between the IBS-SSS and the total PSQI score ($r = 0.501$, $p< 0.001$).

Discussion

In the current study, we found that the sleep quality of patients with IBS was poorer than that of the control group, and sleep quality was correlated with symptom severity.

IBS is a functional bowel disorder that affects

individuals of both sexes across all age groups and significantly impacts quality of life (10, 11). Although the etiology of IBS is not fully understood, recent studies have identified several underlying pathophysiological changes (12, 13). Examination of intestinal pathology specimens from IBS patients has revealed evidence of subclinical inflammatory changes (14, 15). Furthermore, pathophysiological changes mediated by immune, neural, and endocrine effects of gut microbiota-derived signals have been shown to influence the brain (16, 17). This communication pathway, known as the gut-brain axis, is supported by studies demonstrating differences in the intestinal flora of IBS patients compared to healthy individuals (16, 18). With the recognition of gut-brain axis interactions in IBS, recent research has focused on whether these interactions affect sleep quality.

Several studies have shown that sleep disturbances are more common, and sleep quality is poorer, in IBS patients compared to the general population (19, 20). Our findings align with the literature, demonstrating poorer sleep quality in the IBS group. Notably, our study showed that six of the seven primary components of the PSQI—excluding sleep duration—were significantly worse in IBS patients. However, no significant differences were observed in sleep duration between the two groups. Interestingly, Patel et al. found that sleep duration was higher in IBS patients but that they felt less rested (21). Based on these findings, it can be suggested that while sleep duration in IBS patients is not negatively affected, the restorative quality of sleep is diminished.

Although various studies have explored the impact of IBS on sleep quality, there is limited research examining the association between IBS symptom severity and sleep quality (22). In the present study, we demonstrated a positive correlation between PSQI scores and IBS-SSS scores. These findings suggest that an increase in IBS symptom severity is associated with a greater negative impact on sleep quality. However, it is important to note that some studies have reported that a decrease in sleep quality may exacerbate IBS-related symptoms (6, 23). This suggests an interactive relationship between sleep quality and symptom severity. Consequently, it is not possible to draw definitive conclusions about the causality of this relationship based on our study data alone. Further multicenter studies with larger sample sizes are needed to elucidate this interaction.

Conclusion

In conclusion, we found that patients with IBS have impaired sleep quality compared to healthy controls, and symptom severity is associated with worse PSQI scores.

Limitations

The main limitation of this study is that sleep quality was not assessed using polysomnography. Additionally, the impact of treatment on symptom severity, and consequently on sleep quality, could not be evaluated. Lastly, the study's relatively small sample size and single-center design may limit the generalizability of the findings.

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Table 1. Demographic characteristics of subjects with IBS

IBS Type	
IBS-D, n (%)	22 (44)
IBS-C, n (%)	15 (30)
IBS-Mixed, n (%)	13 (26)
Regular exercise habit, n (%)	11 (22)
Smoking habit, n (%)	16 (32)
Sleeping partner, n (%)	33 (66)
IBS-SSS	320 (207.5-368.75)

Data are presented as median (interquartile range) or frequency (percentages). IBS: irritable bowel syndrome, IBS-D; diarrhea dominant, IBS-C: constipation dominant, IBS-SSS: IBS syptom severity scale

Table 2. Pittsbugh Sleep Quality Index (PSQI) scores comprassion between groups

	IBS (n=50)	Control (n=50)	P value
Age, years	40.5 (28-52)	39 (27.75-49.25)	0.868
Sex, male, n (%)	12 (24)	16 (32)	0.373
Subjective Sleep Quality	1 (1-2)	1 (1-1)	**0.004**
Sleep Latency	1 (1-2)	1 (0-1)	**<0.001**
Duration of Sleep	1 (0-2)	1 (1-1)	0.079
Habitual Sleep Efficiency	0 (0-1)	1 (0-1)	**0.001**
Sleep Disturbances	1 (1-2)	1 (0-1)	**<0.001**
Sleep Medication usage	0 (0-1)	0 (0-0)	**0.007**
Dysfunction in Daytime	1 (1-2)	1 (0-1)	**<0.001**
Total PSQI score	7.5 (5-9)	4 (3-4.25)	**<0.001**

Data are presented as median (interquartile range) or frequency (percentages). Significant p values are shown in bold. PSQI: Pittsburgh Sleep Quality Index

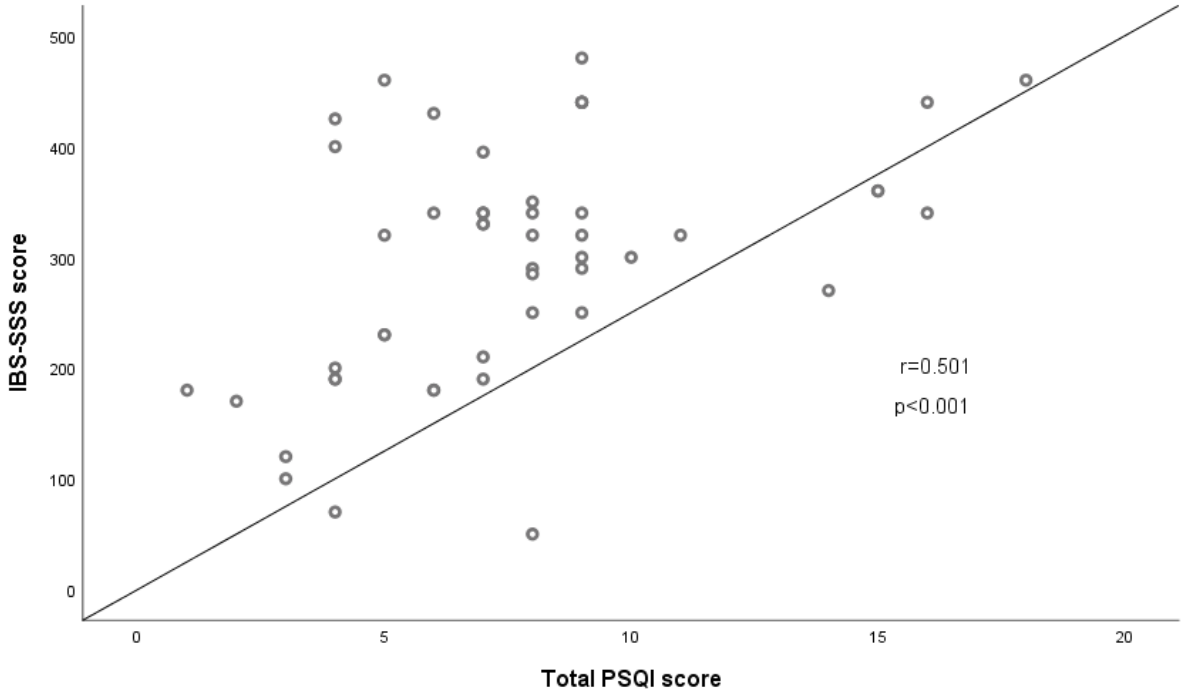

Figure 1. Correlation graph between IBS-SSS score and total PSQI score.