RESEARCH ARTICLE

Asli Enzel Koc[1]
Kader Semra Karatas[2]
Cicek Hocaoglu[3]

[1] Sivas Cumhuriyet University, Faculty of Medicine, Department of Psychiatry, Sivas, Türkiye.
[2] Kutahya Health Science Faculty of Medicine, Department of Psychiatry, Kutahya, Türkiye
[3] Rize Recep Tayyip Erdoğan University, Faculty of Medicine, Department of Psychiatry, Rize, Türkiye

Corresponding Author:
Asli Enzel Koc
mail: enzelkoc@cumhuriyet.edu.tr

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konuralptipdergi@duzce.edu.tr
konuralptipdergisi@gmail.com
www.konuralptipdergi.duzce.edu.tr

Biological Rhythms, Sleep Disturbances, and Women's Mental Health: Findings from a Psychiatric Inpatient Unit

ABSTRACT

Objective: Sleep and circadian rhythm disruptions are common in neuropsychiatric disorders, correlating with symptom severity, relapse rates, and poor treatment response. Women experience higher rates of sleep disturbances than men due to biological, social, and psychological factors. However, data on sleep issues in hospitalized female psychiatric patients remain limited. This study assessed sleep patterns in female psychiatric inpatients at admission and discharge and identified factors influencing changes in sleep quality.

Method: Ninety female psychiatric inpatients were evaluated using the Pittsburgh Sleep Quality Index, Epworth Sleepiness Scale, Insomnia Severity Index and Biological Rhythm Interview of Assessment in Neuropsychiatry at both admission and discharge. Sociodemographic data, psychiatric diagnoses, and treatment details were collected through structured interviews. Data were analyzed using SPSS 22.0.

Results: At admission, 87.8% of patients reported poor sleep quality, which decreased to 63.3% at discharge. Despite improvement, significant sleep disturbances persisted. Poor sleep quality at discharge was associated with higher benzodiazepine use, unemployment, family history of sleep disorders, and frequent hospitalizations. No significant differences were found across psychiatric diagnoses. Age correlated positively with sleep medication use. Disruptions in circadian rhythms were strongly linked to poorer sleep quality and higher insomnia severity.

Conclusions: Sleep disturbances persist in female psychiatric inpatients despite treatment and are influenced by sociodemographic, clinical, and circadian rhythm factors. Targeted, gender-specific interventions addressing biological, psychological, and social contributors, including circadian irregularities, may improve treatment outcomes, reduce hospitalizations, and enhance patient care in psychiatric settings.

Keywords: Sleep, Circadian Rhythm, Women, Hospitalization.

Biyolojik Ritimler, Uyku Bozuklukları ve Kadın Ruh Sağlığı: Bir Psikiyatri Yatan Hasta Ünitesinden Bulgular

ÖZET

Amaç: Uyku ve sirkadiyen ritim bozuklukları, nöropsikiyatrik hastalıklarda yaygın olarak görülmekte ve semptom şiddeti, nüks oranları ve tedaviye yanıtsızlık ile ilişkilendirilmektedir. Kadınlar, biyolojik, sosyal ve psikolojik faktörler nedeniyle erkeklere kıyasla daha yüksek oranda uyku bozuklukları yaşamaktadır. Ancak, hastaneye yatırılan kadın psikiyatri hastalarında uyku sorunlarına ilişkin veriler sınırlıdır. Bu çalışma, kadın psikiyatri hastalarının yatış ve taburculuk sırasındaki uyku örüntülerini değerlendirmeyi ve uyku kalitesindeki değişimleri etkileyen faktörleri belirlemeyi amaçlamıştır.

Yöntem: Doksan kadın psikiyatri hastası, yatış ve taburculuk dönemlerinde Pittsburgh Uyku Kalitesi İndeksi, Epworth Uykululuk Ölçeği, İnsomni Şiddeti İndeksi ve Nöropsikiyatride Biyolojik Ritim Değerlendirme Görüşmesi kullanılarak değerlendirilmiştir. Sosyodemografik veriler, psikiyatrik tanılar ve tedavi detayları yapılandırılmış görüşmeler yoluyla toplanmıştır. Veriler SPSS 22.0 kullanılarak analiz edilmiştir.

Bulgular: Yatış sırasında hastaların %87,8'i kötü uyku kalitesi bildirmiştir, bu oran taburculukta %63,3'e düşmüştür. İyileşmeye rağmen, önemli ölçüde uyku bozuklukları devam etmiştir. Taburculukta kötü uyku kalitesi, yüksek benzodiazepin kullanımı, işsizlik, ailede uyku bozukluğu öyküsü ve sık hastaneye yatış ile ilişkilendirilmiştir. Psikiyatrik tanılar arasında anlamlı bir fark bulunmamıştır. Yaş, uyku ilacı kullanımı ile pozitif korelasyon göstermiştir. Sirkadiyen ritim bozuklukları, kötü uyku kalitesi ve artmış insomni şiddeti ile güçlü bir şekilde ilişkilendirilmiştir.

Sonuç: Kadın psikiyatri hastalarında uyku bozuklukları tedaviye rağmen devam etmekte ve sosyodemografik, klinik ve sirkadiyen ritim faktörlerinden etkilenmektedir. Biyolojik, psikolojik ve sosyal katkıları hedefleyen, cinsiyete özgü müdahaleler, tedavi sonuçlarını iyileştirebilir, hastaneye yatışları azaltabilir ve psikiyatri servislerindeki hasta bakımını güçlendirebilir.

Anahtar Kelimeler: Uyku, Sirkadiyen Ritim, Kadın, Hastaneye Yatış.

INTRODUCTION

Sleep is a fundamental aspect of life and prone to distrubution due to various reasons. Sleep disturbances can contribute to the development of various psychiatric disorders (1). Notably, sleep disturbances are frequently included in the diagnostic criteria for many mental health conditions, highlighting their critical role in overall well-being (2).

Among these disruptions, women are particularly affected, experiencing sleep disorders twice as often as men (3). This makes female gender a significant risk factor for sleep-related issues. Interestingly, while women report more frequent and severe subjective sleep complaints, they appear to show greater resilience to sleep-disrupting cytokines and achieve better outcomes in objective sleep measurements (4). This paradox is closely tied to higher levels of psychological distress in women, emphasizing the need to consider gender-specific factors in addressing sleep disturbances (4, 5).

As a core biological rhythm regulated by circadian cycles, sleep reflects the body's intrinsic 24-hour timing system. Women tend to favor the morning chronotype more than men, though this preference diminishes with age (6). However, the evening chronotype, which is more strongly associated with depression, anxiety, poor sleep quality, and a higher correlation between daytime sleepiness and anxiety symptoms, presents unique challenges for women (7).

Previous research highlights that sleep disorders in psychiatric patients are closely associated with reduced quality of life, greater symptom severity, frequent relapses, and diminished treatment response (8). Sleep problems are particularly common among psychiatric inpatients, with hospitalization often signaling a crisis point in their mental health journey (9). Poor sleep not only affects individual patients but also disrupts the functioning of psychiatric units, challenges medical staff, and strains institutional resources. Severe sleep disturbances in psychiatric inpatients can lead to an increased risk of self-harm, aggressive behavior, and attempts to leave the hospital without permission (10). Despite efforts to reduce the duration and frequency of hospitalizations, approximately 40% of patients are re-admitted within a year, further complicating their recovery process (11).

The significant comorbidity between sleep and psychiatric disorders, coupled with the high rates of readmission, underscores the critical need to evaluate and address sleep issues within this population (8). However, studies focusing specifically on sleep disturbances in psychiatric inpatient settings remain limited, especially those examining female patients, who represent a uniquely vulnerable group in this context (8, 12).

This study seeks to fill this gap by investigating the sleep characteristics and diagnoses of female psychiatric inpatients—both at admission and discharge—focusing on changes in their sleep patterns and identifying the factors influencing these changes. By targeting women at one of the most critical and vulnerable points in their mental health journey, the study aims to shed light on the intricate interplay between biological rhythms, sleep disturbances, and women's mental health, providing a deeper understanding of their impact during psychiatric crises.

MATERIAL AND METHODS

Sample: This cross-sectional study was conducted in the Psychiatry Inpatient Clinic of X University Faculty of Medicine between 01.02.2020 and 01.01.2022, with a total of 90 female participants. Exclusion criteria were as follows: being under 18 years of age, presence of behavioral disorders impairing the ability to comprehend tests, mental retardation, dementia, or other cognitive impairments, and hospitalization lasting less than one week.

Data Collection Tools: A detailed sociodemographic form prepared by the researchers included demographic variables such as age, education level, marital status, employment status, presence of medical illness, family history of sleep disorders and psychiatric illnesses, diagnosis of psychiatric disorders followed in the clinic, duration of illness, previous hospitalizations, length of stay, use of psychotropic drugs before admission, and clinical follow-up.

The Pittsburgh Sleep Quality Index (PSQI) was developed by Buysse et al. (13) to assess subjective sleep quality, sleep duration, habitual sleep efficiency, presence of sleep disorders, frequency of sleep medication use, and severity of daytime dysfunction in the past month. Participants can score between 0-21, with a score greater than 5 indicating poor sleep quality, while a score of 5 or less indicates good sleep quality. The Turkish validity and reliability studies were conducted by Ağargün et al.(14).

The Epworth Sleepiness Scale (ESS) is a self-report scale designed to determine daytime sleepiness and excessive sleep tendency (15). It consists of 8 sections with a Likert scale scoring between 0 and 3. A total score of 10 or more indicates excessive daytime sleepiness. The validity and reliability studies were conducted by Ağargün et al. (16).

The Insomnia Severity Index (ISI) is a self-report scale that screens for the severity of insomnia symptoms (17). It offers a Likert-type measurement. The scores of the seven items are summed for evaluation. The total score ranges between 0-28, and a score of 10 or more suggests clinical insomnia, while a score of 15 or more

indicates a diagnosis of insomnia. The Turkish adaptation was conducted by Boysan et al. (18), and the Turkish version of the scale was identified to be valid and reliable.

The Biological Rhythm Interview of Assessment in Neuropsychiatry (BRIAN) was developed by Giglio et al. (19) to measure individuals' daily circadian rhythms and functionality. The scale consists of 21 items in a four-point Likert format, with higher scores indicating irregularities in biological rhythms. It includes five subscales: sleep, activities, social aspects, eating habits, and dominant rhythm pattern. When calculating the total score of the scale, the dominant rhythm pattern scores are not included. The Turkish adaptation was carried out by Aydemir et al. (20).

Procedure: The initial interviews with the patients included in the study were conducted approximately 72-96 hours after admission, lasting about 30-45 minutes, by the researcher. A final interview was conducted with the patients who continued in the study before discharge.

During the first interview, the participants were administered a semi-structured data collection form, Pittsburgh Sleep Quality Index (PSQI), Epworth Sleepiness Scale (ESS), Biological Rhythm Interview of Assessment in Neuropsychiatry (BRIAN) and Insomnia Severity Index (ISI). The PSQI, ESS, and ISI were re-administered during the final interview before discharge. The diagnoses of the patients, indications for admission, psychiatric history, and any additional diagnoses at discharge were evaluated according to the DSM-5 diagnostic system. The analyzed patients were grouped based on their primary psychiatric diagnoses.

This research was approved by the Ethics Committee of X University Faculty of Medicine on 24.01.2020, with decision number 2020/03. The patients were informed about the study, and their written consent was obtained.

Statistical Method: The normality of the distribution of continuous numerical variables was examined using the Kolmogorov-Smirnov test, and the homogeneity of variances assumption was checked with the Levene test. Descriptive statistics are presented as mean ± standard deviation, median [minimum-maximum], or median (25th-75th percentile) for continuous numerical variables, and as case numbers and (%) for categorical variables.

The Wilcoxon Signed Rank test was used to examine whether there was a statistically significant change in clinical scale scores and sleep-related subscale and total scale scores after treatment compared to before treatment. The McNemar test was used to evaluate whether the improvement in the total sleep quality index in Pittsburgh and the improvement in the frequency of insomnia in terms of total insomnia were statistically significant.

The significance of the difference between groups in terms of continuous numerical variables where parametric test statistics assumptions were met was examined with the Student's t-test. The significance of the difference between groups in terms of continuous numerical variables where parametric test statistics assumptions were not met was examined with the Mann-Whitney U test when there were two independent groups, and the Kruskal-Wallis test when there were more than two independent groups.

In 2x2 contingency tables, categorical data were evaluated with Fisher's exact test when the expected frequency was less than 5 in at least ¼ of the cells, and with the continuity-corrected $\chi 2$ test when the expected frequency was between 5-25. In RxC (row or column categorical variables with more than two outcomes) contingency tables, categorical data were examined with the Fisher Freeman Halton test when the expected frequency was less than 5 in at least ¼ of the cells. Data analysis was performed using the SPSS 22.0 (IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.) statistical software package. Results with $p<0.05$ were considered statistically significant.

RESULTS

1. Sample Characteristics and Clinical Diagnoses: This study initially considered 120 female participants. After applying exclusion criteria, the final sample consisted of 90 women admitted to the Psychiatry Inpatient Clinic of X University Faculty of Medicine. The participants' mean age was 40.7 years (SD = 12.7), ranging from 18 to 74. Among them, 64.4% (n = 58) reported a family history of mental illness, and 50% (n = 50) reported a family history of sleep disorders.

Diagnostic distribution revealed that 37.8% (n = 34) had schizophrenia or other psychotic disorders, 35.6% (n = 32) had bipolar and related disorders, 6.7% (n = 6) had schizoaffective disorder, 33.3% (n = 30) had depressive disorders, 25.6% (n = 23) had anxiety disorders, and 47.8% (n = 43) had other psychiatric conditions. Due to the comorbidity between anxiety and depressive disorders (present in 70.9% of the relevant subgroup), the total number of diagnoses exceeded the number of participants, as multiple diagnoses per individual were recorded (Table 1).

In terms of pharmacological treatment, the usage of antidepressants, antipsychotics, and mood stabilizers (MS) significantly increased by the time of discharge compared to pre-admission usage ($p < .001$). Antidepressant use rose from 34.4% to 51.1%, antipsychotic use from 45.6% to 86.7%, and MS use from 15.6% to 36.7%. However, no significant difference was observed in benzodiazepine (BDZ) use between the admission and discharge periods ($p > .05$).

Table 1. Demographic and Clinical Characteristics of Cases

Variable	Mean ± SD	Median (Min-Max)
Age (years)	40.7 ± 12.7	
Previous Disease Duration (years)		8 [1-40]
Number of Admissions		1 [0-20]
Duration of Inpatient Stay (days)		20 [9-63]
	n	**%**
Marital Status		
Single/Divorced/Widowed	42	46.7
Married	48	53.3
Education Level		
Literate	10	11.1
Primary School	45	50.0
High School	20	22.2
University	15	16.7
Employed in Any Job		
Yes	16	17.8
History of Medical Illness		
Yes	45	50.0
Family History of Mental Illness		
Yes	58	64.4
Family History of Sleep Disorder		
Yes	45	50.0
Psychiatric Diagnoses		
Schizophrenia and Other Psychotic Disorders	34	37.8
Bipolar Disorder	32	35.6
Schizoaffective Disorder	6	6.7
Depressive Disorders	30	33.3
Anxiety Disorders	23	25.6
Other Disorders	43	47.8
History of Previous Admissions		
Yes	49	54.4

2. Sleep Profiles and Their Correlates Before, During, and After Psychiatric Admission: Participants were classified into two groups based on a PSQI total score cutoff of 5 to distinguish between poor and good sleep quality prior to admission. While most sociodemographic and clinical features did not differ significantly between these groups, those with poor sleep quality had a significantly lower employment rate ($p < .05$), a higher median number of previous psychiatric admissions ($p < .05$), and increased BDZ usage during hospitalization ($p < .05$) (Table 2).

From admission to discharge, significant improvements were observed in both sleep quality and insomnia severity. PSQI total and subscale scores (excluding the sleep medication component), as well as ISI total scores, significantly decreased after hospitalization ($p < .001$). The proportion of patients classified as having poor sleep quality dropped from 87.8% to 63.3% following treatment ($p < .001$), and the proportion with clinically significant insomnia decreased from 73.3% to 23.3% ($p < .001$) (Table 3).

Analysis of circadian rhythm disturbances revealed meaningful associations between BRIAN subscale scores and various sleep-related measures. The BRIAN sleep, activity, and social subscale scores were all positively correlated with PSQI total scores and ISI scores ($p < .05$). The BRIAN sleep subscale also correlated with the Epworth Sleepiness Scale (ESS) ($p < .05$). Weak but significant correlations were observed between the BRIAN eating subscale and PSQI and ISI scores ($p < .05$). The total BRIAN score demonstrated a moderate correlation with PSQI total scores ($r = .558$, $p < .05$), in addition to significant correlations with both ESS and ISI scores (Table 4).

Regarding individual characteristics, no significant correlations were found between age and PSQI subscales (excluding sleep medication), PSQI total scores, or ISI scores at admission ($p > .05$). However, age was positively correlated with the PSQI sleep medication subscale ($r = .272$, $p < .05$). Similarly, length of hospital stay was not significantly associated with any sleep-related measures (Table 5).

Finally, participants with a family history of sleep disorders had significantly higher pre-admission PSQI scores in the domains of sleep duration, sleep disturbances, daytime dysfunction, and overall sleep quality ($p < .01$). Their ISI total scores were also significantly higher compared to those without such a history ($p < .05$). No significant differences were observed in other PSQI subscales (Table 6).

Table 2. Demographic and Clinical Characteristics of Cases Based on Sleep Disorder Presence at Admission

	Good Sleep Quality (n=11)		Poor Sleep Quality (n=79)		
	Mean ± SD		Mean ± SD		p-value†
Age (years)	35.6 ± 12.4		41.4 ± 12.7		0.160
Previous Disease Duration (years)	7.45 ± 9.56		11.7 ± 10.2		0.101§
Number of Admissions	0.545 ± 1.21		2.03 ± 3.68		**0.048§**
Duration of Inpatient Stay (days)	20.5 ± 7.17		22.5 ± 11.3		0.839§
	n	**%**	**n**	**%**	**p-value†**
Marital Status					
Single/Divorced/Widowed	4	36.4	38	48.1	0.683‡
Married	7	63.6	41	51.9	
Education Level					
Literate	0	0.0	10	12.7	
Primary School	5	45.5	40	50.6	
High School	3	27.3	17	21.5	
University	3	27.3	12	15.2	0.529¶
Employed in Any Job					
Yes	5	45.5	11	13.9	**0.023¥**
Family History of Mental Illness					
Yes	7	63.6	51	64.6	>0.999¥
Family History of Sleep Disorder					
Yes	3	27.3	42	53.2	0.198‡
Psychiatric Diagnoses					
Schizophrenia and Other Psychotic Disorders	4	36.4	30	38.0	>0.999¥
Bipolar Disorder	5	45.5	27	34.2	0.512¥
Schizoaffective Disorder	1	9.1	5	6.3	0.554¥
Depressive Disorders	3	27.3	27	34.2	0.746¥
Anxiety Disorders	2	18.2	21	26.6	0.722¥
Other Disorders	2	18.2	41	51.9	0.076‡
History of Previous Admissions	3	27.3	46	58.2	0.108‡
Use of Medication Before Admission	4	36.4	49	62.0	0.189¥
Use of BDZ at Admission	7	63.6	72	91.1	**0.026¥**

† Student's t-test, ‡ Continuity-corrected $\chi 2$ test, ¶ Fisher Freeman Halton test, ¥ Fisher's exact probability test, § Mann Whitney U test, BDZ: benzodiazepines and their derivatives.

Table 3. Pre- and Post-Test Scores of Sleep-Related Subscales and Total Scale Scores of Cases

	Pre-Test	Post-Test		
	Median (Min-Max)	**Median (Min-Max)**	**p-value†**	**Change**
ESS	40 (10-80)	30 (00-60)	0.009	-10 (-40 - 20)
PSQI				
Subjective Sleep Quality	20 (10-20)	10 (00-10)	<0.001	-10 (-10 - 00)
Sleep Latency	20 (10-30)	10 (00-10)	<0.001	-10 (-20 - 00)
Sleep Duration	10 (00-30)	00 (00-10)	<0.001	-10 (-20 - 00)
Sleep Efficiency	10 (00-30)	00 (00-03)	<0.001	-10 (-20 - 00)
Sleep Disturbance	20 (10-20)	10 (10-10)	<0.001	-10 (-10 - 00)
Use of Sleep Medication	00 (00-30)	20 (10-30)	<0.001	10 (00 - 20)
Daytime Dysfunction	15 (10-20)	10 (00-10)	<0.001	-10 (-10 - 00)
Total PSQI Score	110 (70-140)	55 (40-80)	<0.001	-40 (-63 - -20)
ISI	120 (70-150)	50 (18-70)	<0.001	-60 (-100 - -40)
	(n, %)	**(n, %)**	**p-value†**	**Change**
PSQI Poor Sleep Quality	79 (87.8%)	57 (63.3%)	<0.001‡	22 (24.4%)
Total Insomnia	66 (73.3%)	21 (23.3%)	<0.001‡	45 (50.0%)

Descriptive statistics were presented as median (25th percentile - 75th percentile). † Wilcoxon signed-rank test, ‡ McNemar test, ¶ Number and percentage of cases showing positive change (improvement) in sleep quality, ¥ Number and percentage of cases showing positive change (improvement) in insomnia, PSQI: Pittsburgh Sleep Quality Index, ESS: Epworth Sleepiness Scale, ISI: Insomnia Severity Index.

Table 4. Correlation coefficients and significance levels between pre-treatment biological rhythm subscale and total scale scores and pre-treatment sleep-related subscale and total scale scores

	Sleep		Activity		Social		Eating		Total	
	r	p-value†	r	p-value†	r	p-value†	r	p-value†	r	p-value†
ESS	0.229	**0.030**	0.123	0.249	0.081	0.449	0.110	0.300	0.216	**0.041**
BRIAN-Dominant Chronotype	0.399	**<0.001**	-0.044	0.681	0.087	0.413	-0.024	0.823	0.111	0.296
PSQI- Total	0.466	**<0.001**	0.429	**<0.001**	0.315	**0.020**	0.287	**0.006**	0.558	**<0.001**
ISI	0.364	**<0.001**	0.223	**0.035**	0.252	**0.016**	0.223	**0.035**	0.361	**<0.001**

† Spearman's rank correlation test; PSQI: Pittsburgh Sleep Quality Index, ESS: Epworth Sleepiness Scale, ISI: Insomnia Severity Index, BRIAN: Biological Rhythm Interview of Assessment in Neuropsychiatry.

Table 5. Correlation coefficients and significance levels between participants' age, length of hospital stay, pretreatment PSQI subscale and total scores, and total insomnia severity scores

	Age		Length of hospital stay	
	r	p-value†	r	p-value†
PSQI				
PSQI - Subjective Sleep Quality	0.073	0.493	-0.011	0.916
PSQI - Sleep Latency	0.056	0.600	-0.094	0.380
PSQI - Sleep Duration	0.028	0.796	0.062	0.559
PSQI - Sleep Efficiency	0.037	0.726	-0.014	0.895
PSQI - Sleep Disturbance	-0.062	0.563	-0.038	0.721
PSQI - Use of Sleep Medication	0.272	**0.010**	0.132	0.213
PSQI - Daytime Dysfunction	0.197	0.062	0.138	0.194
PSQI - Total	0.148	0.165	0.066	0.534
ISI	0.112	0.294	-0.025	0.815

† Spearman's rank correlation test, PSQI: Pittsburgh Sleep Quality Index, ISI: Insomnia Severity Index

Table 6. Pre-Treatment Sleep-Related Subscale and Total Scores of Cases Based on the Presence or Absence of a Family History of Sleep Disorders

	No (n=45) Median (25%-75%)	Yes (n=45) Median (25%-75%)	p-value†
ESS	4.0 (1.0 – 8.0)	4.0 (1.5 – 8.5)	0.604
BRIAN - Total	41.0 (36.0 – 47.0)	43.0 (39.0 – 51.5)	0.082
PSQI			
PSQI - Subjective Sleep Quality	1.0 (1.0 – 2.0)	2.0 (1.0 – 3.0)	0.082
PSQI - Sleep Latency	2.0 (1.0 – 3.0)	2.0 (1.0 – 3.0)	0.544
PSQI - Sleep Duration	0.0 (0.0 – 2.5)	2.0 (0.0 – 3.0)	**0.006**
PSQI - Sleep Efficiency	1.0 (0.0 – 2.0)	2.0 (0.0 – 3.0)	0.129
PSQI - Sleep Disturbance	1.0 (1.0 – 2.0)	2.0 (1.0 – 2.0)	**0.004**
PSQI - Sleep Medication	0.0 (0.0 – 3.0)	0.0 (0.0 – 3.0)	0.834
PSQI - Daytime Dysfunction	1.0 (0.0 – 2.0)	2.0 (1.0 – 2.0)	**<0.001**
PSQI - Total	10.0 (5.5 – 12.0)	12.0 (8.0 – 15.5)	**0.006**
ISI	11.0 (5.0 – 14.0)	12.0 (9.5 – 19.0)	**0.010**

Descriptive statistics are presented as median (25th percentile - 75th percentile). † Mann-Whitney U test, PSQI: Pittsburgh Sleep Quality Index, ESS: Epworth Sleepiness Scale, ISI: Insomnia Severity Index, BRIAN: Biological Rhythm Interview of Assessment in Neuropsychiatry.

DISCUSSION

This study examined the sleep patterns of female psychiatric inpatients at admission and discharge, identifying factors influencing these changes. Although some improvement was observed, the majority of patients still had poor sleep quality at discharge. All patients with poor sleep quality at discharge had also reported poor sleep quality during the initial evaluation. These patients were more likely to be prescribed benzodiazepines during hospitalization, had higher unemployment rates, a greater prevalence of family history of sleep disorders, and more frequent hospital admissions. However, no significant

differences in psychiatric diagnoses were found between female patients with poor and better sleep quality.

Sleep in hospital settings is significantly shorter in duration and poorer in quality compared to home, with inpatient sleep quality being notably worse on psychiatric units than on non-psychiatric units (21). Similar to our findings, studies on sleep disorders in psychiatric units report that over 40% of psychiatric inpatients experience poor sleep quality during hospitalization, with nearly half meeting the diagnostic criteria for insomnia (9, 22). Our study, which focuses on female patients, revealed higher rates and greater severity of poor sleep quality than those reported in the general literature. As previously mentioned, women, despite demonstrating resilience to sleep-disrupting cytokines, are considered a vulnerable group for sleep issues, influenced not only by social and biological factors but also by psychological distress (4,5, 23-25).

In our study, patients with poor sleep quality before hospitalization were found to have significantly lower employment rates than those with better sleep quality. This aligns with findings from another study, which reported that unemployed individuals were 2.13 times more likely to have poor sleep quality compared to employed individuals, with the likelihood increasing to 3.18 in the presence of psychopathology (26). Another key finding of our study was that individuals with poor pre-hospitalization sleep quality had a significantly higher number of psychiatric hospitalizations compared to those with better sleep quality. Addressing sleep disturbances may contribute not only to the alleviation of symptoms but also to the prevention and overall management of psychiatric disorders (27). A substantial body of research has shown that sleep disturbances are closely linked to the risk of relapse in various psychiatric disorders, and that early identification and treatment of these disturbances are associated with more favorable clinical outcomes, including fewer relapses and reduced hospitalization rates (28–31).

Our study identified a significant positive correlation between age and the PSQI sleep medication subscale score, indicating that older patients were more likely to use sleep medications. Aging is associated with gradual alterations in the physiological processes that regulate sleep (32). In particular, both the homeostatic and circadian mechanisms that govern the sleep–wake cycle tend to weaken over time, and these changes—along with a decline in melatonin levels—contribute to the natural deterioration of sleep quality in older adults (32, 33). Studies have shown that sleep medication use increases with age, with one in five elderly individuals using such medications, and the rate being higher among women (34-36).

In this study, significant associations were found between disruptions in biological rhythms and poor sleep quality, as well as increased insomnia severity. In sleep disorders, the disruption of the circadian rhythm is a syndrome in itself. It deserves a longer and better discussion in the context of psychiatric disorders, as addressing biological rhythm irregularities is crucial in the management of sleep-related issues in psychiatric populations (37). Moreover, circadian rhythm disruptions have been shown to play a multifaceted role in the development, maintenance, and progression of psychiatric disorders through genetic and biochemical mechanisms (37). However, as the data on biological rhythms in our study were collected through a self-report scale, this remains a limitation of our research.

Limitations of this study include being conducted at a single center, a relatively small sample size, and the lack of measurements related to hormonal fluctuations, which could have provided deeper insights into the relationship between sleep disturbances and biological rhythms. The reliance on subjective measures for assessing sleep quality is another significant limitation, as psychiatric disorders are well-documented to distort perceptions of sleep quality and quantity. Nevertheless, this study has several strengths, including the use of multiple sleep-specific scales, examination of subcomponents of these scales, and assessment of both pre- and post-treatment periods. The findings provide a foundation for larger-scale and more detailed future studies.

İn conclusion, this study underscores the persistent nature of sleep disturbances in female psychiatric inpatients and their links to sociodemographic, clinical, and circadian rhythm factors. Developing interventions that target gender-specific biological, psychological, and social influences, including disruptions in circadian rhythms, has the potential to enhance treatment outcomes, streamline patient care in psychiatric units, and lower hospitalization rates. Using validated scales to evaluate sleep disturbances is practical, cost-effective, and applicable to patients with diverse psychiatric diagnoses. Developing pharmacological and non-pharmacological treatment protocols tailored to address sleep disturbances is crucial, and further research in this area is warranted.

Availability of data and materials: The data sets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Ethics declarations: Ethics approval and consent to participate: This research was approved by the Ethics Committee of X University Faculty of Medicine on 24.01.2020, with decision number 2020/03. Written informed consent was obtained from all participants after full explanation of the

study steps. Patients were confirmed about the confidentiality of their data and that they were able to stop participation in the study at any time without giving reasons.

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