Epworth Sleepiness Scale and Polysomnographic Evaluation of Dysthymic Women with Chronic Insomnia

Kronik Uykusuzluğu Olan Distimik Kadınlarda Epworth Uykululuk Ölçeğinin ve Polisomnografinin Değerlendirilmesi

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ÖZET

Amaç: Distimi hastalarında uyku bozuklukları, genellikle hastalığın bir parçası olarak değerlendirilmekte, tedavi edilebilir farklı sebepleri çoğunlukla atlanmakta ve uyku sorunları distimi hastalarının yaşamlarının bir parçası haline gelmektedir. Çalışmamızda bu amaçla, hastaların psikiyatrik semptomlarını, uyku değerlendirmesini ve eşlik eden bir uyku bozukluğu olup olmadığını gün içi uykululuk testleri ve polisomnografi ile belirlemeyi amaçladık. Çalışmamızda kronik uykusuzluğu olan distimik kadınlara, Epworth uykululuk testi (ESS) ve polisomnografik inceleme yaptık.

Hastalar ve Yöntem: Çalışmamıza Uludağ Üniversitesi Tıp Fakültesi Psikiyatri Kliniğinde en az iki yıldır distimi tanısıyla takip edilen ve kronik uykusuzluğu olan 20 kadın hasta ve kontrol grubu olarak 18-65 yaş arası 20 kadın alındı.

Bulgular: Distimik hasta ve kontrol grubu arasında ESS ve uyku evreleri arasında anlamlı farklılıklar gözlendi. Distimi hastalarında ESS değerinin daha yüksek olduğu, uyku evrelerinden REM, non-REM-1 (evre 1), non-REM-2 (evre 2) daha yüksek oranda, non-REM-3-4 (evre 3-4) daha düşük oranda olduğu görüldü

Yorum: Bu çalışma bulguları, distimik hastalarda da yapısal uyku değişikliklerinin olduğunu akla getirmekte olup, uyku değişkenlikleri ve depresif durumlarının arasında hiçbir direkt bağlantı olmadığını göstermektedir.

Anahtar Kelimeler: Distimik hastalık, polisomnografi, uyku bozuklukları.

ABSTRACT

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Objective: In patients with dysthymic disorder (DD), sleep problems are assessed as a part of their depressive state, and different treatable conditions, such as other primary sleep disorders, are often skipped. We aimed to determine symptoms related to daytime sleepiness and polysomnographic findings in dysthymic women with chronic insomnia and to find out whether or not there is an accompanying sleep disorder. We suggest that pathologies that can lead to sleep problems in dysthymic patients should be searched, and to this end, application of the Epworth sleepiness scale (ESS) and polysomnography examination should be used much more frequently.

Patients and Methods: We included 20 female dysthymic patients with complaints of chronic sleep problems who had been under follow-up at Uludag University Hospital Psychiatry Outpatient Clinic for at least the last two years. Twenty healthy female volunteers, aged 18-65 years, were included in the study as the control group. ESS and polysomnography examination were applied in all patients.

Results: When patients with DD and healthy controls were compared, significant differences in ESS scores and ratios of sleep phases were determined between groups. DD patients had higher ESS scores and higher ratios of rapid eye movements (REM), non-REM-1 (Stage 1), non-REM-2 (Stage 2) phases and lower ratios of slow wave sleep (Stage 3 + Stage 4).

Conclusion: The findings of our study suggest that there are structural sleep changes in dysthymic patients, but no direct connection between sleep variables and depressive states is evident.

Key Words: Dysthymic disorder, polysomnography, sleep disorders.

INTRODUCTION

Sleep occurs with active participation of the central nervous system, and psychological and biological changes are observed. In this regard, effort has been made to establish a relationship between biological and psychological experiences and sleep (1).

Sleep occurs as a result of simultaneous operations of different systems. After wakefulness, first period sleep, and then second and deep slow sleep are traversed, and approximately 90 minutes later, the rapid eye movement (REM) period starts. Periods apart from REM are also defined as non-REM sleep (2). Polysomnography (PSG) is the "gold standard" method used for evaluation of the basic features of sleep and determination of sleep disorders (3).

Current data demonstrate a high rate of comorbidity between sleep disorders and various psychiatric illnesses, especially mood and anxiety disorders (4). Some patients may complain of insomnia and others of hypersomnia; however, it is almost a general rule that a sleep problem is experienced. It is also common for a mood disorder to arise some point in the future in a patient complaining of insomnia. It may be in the case of depression that a basis of REM sleep behavior disorder may be found in abnormal activation patterns in specific brain structures. PSG can serve as an objective diagnosis instrument for depression with determination of findings such as shortage in REM latency and increase in REM ratio and period in these patients. Thus, searching for the relation between sleep and mood disorders can be important in terms of treatment and prognosis of these diseases (5).

Primary sleep disorders can be accompanied by mood changes. It has been put forth with many studies that in patients diagnosed with insomnia, depression and anxiety disorders can often be jointly observed. Within the scope of sleep apnea syndrome, which is much more often observed in a society with increasing age, apart from typical findings such as extreme drowsiness and snoring in the course of sleep, clinical findings such as deceleration in psychomotor speed, memory impairment, lack of concentration, and anxiety have attracted attention (6). Periodic limb movement disorder (PLMD), which is often encountered in middle-aged women, makes it difficult for patients to drift into sleep and to continue sleeping. In PLMD patients, depression and anxiety are observed among symptoms such as fatigue and sleep interruptions and psychological symptoms (7).

Most of the dysthymic patients complain of sleep problems (8). In the Diagnostic and Statistical Manual of Men-

tal Disorders (4th edition) Text Revision (DSM-IV-TR), "insomnia or daytime sleepiness" takes its place as one of the B cluster diagnostic criteria of dysthymia (9). Dysthymic disorder (DD) is characterized as long-standing fluctuating low-grade depression, experienced as part of the habitual self and representing an accentuation of traits observed in the depressive temperament. Decrease in REM latency and increase in REM ratio are the most common PSG findings in dysthymic patients, which is also common for patients with major depression (10).

In dysthymic patients, sleep problems are assessed as a part of their depressive state, and different treatable conditions such as other primary sleep disorders are often skipped. We suggest that pathologies that can lead to sleep problems in dysthymic patients should be searched, and to this end, application of the Epworth sleepiness scale (ESS) and PSG examination should be used much more frequently. In the scope of our study, we evaluated dysthymic patients suffering from chronic insomnia within the framework of PSG. We aimed to determine psychiatric symptoms, symptoms related to daytime sleepiness and PSG findings of dysthymic patients and to find out whether or not there is an accompanying sleep disorder.

PATIENTS and METHODS

Study Population

We included 20 female dysthymic patients complaining of chronic sleep problems who had been followed in Uludag University Hospital Psychiatry Outpatient Clinic for at least the last two years. Twenty healthy female volunteers, aged 18-65 years, were included in the study as the control group. The study protocol was examined and approved by the Ethics Committee of Uludag University.

Patients and Polysomnography

All 20 patients were informed in the course of outpatient clinic monitoring on sleep hygiene rules such as not sleeping during the day and avoidance of caffeine in the evenings, and they all stated that they were not able to sleep well despite having conformed to these stated rules. All night assessment was made through Grass Telefactor (AS40 Amplifier system) appliance. In standard PSG, four-channel EEG (C3/A2; C4/A1; O1/A2; O2/A1), double-channel electrooculogram (EOG), submental and anterior tibial muscle electromyogram (EMG) and electrocardiogram (ECG) electrodes were used. Thermistor (oronasal airflow), pulse oximetry and abdominal and thoracic body sensors were available as well. Patients went to bed at 23:00 and awoke at 07:00. Sleep scoring was made on the basis of sleep classification according to Rechtschaffen and Kales standard criteria of 30-second epochs. Patients were diagnosed on the basis of "International Sleep Disorders Classification" criteria (11).

Psychophysiologic Insomnia

The usual features indicating objective insomnia include increased sleep latency, increased wakefulness after sleep onset and decreased sleep efficiency. There is an increase in Stage 1 sleep and, possibly, a decrease in delta sleep.

Primary Snoring

PSG demonstrates noncyclic periods of snoring, usually associated with the inspiratory and, less often, the expiratory phase of breathing. Although some distortion of the rib cage or abdominal wall movements may be observed, the snoring is not accompanied by arousals, oxygen desaturation or cardiac arrhythmias.

Periodic Limb Movement Disorder

Periodic limb movements can appear immediately with the onset of non-REM Stage 1 sleep, are frequent during Stage 2 sleep, and decrease in frequency in Stage 3 and Stage 4 sleep. The periodic limb movements are usually absent during REM sleep. The interval between movements is typically 20 to 40 seconds; movements that are separated by an interval of less than 5 or more than 90 seconds are not counted when determining the total number of movements or movement indexes. Contractions occurring during drowsiness, before the onset of Stage 1 sleep, are not counted as part of the sleep disorder. The movements are often reported as an index of total sleep time (TST) called the periodic limb movement index (PLMI); an index of 5 or more is regarded as abnormal.

Obstructive Sleep Apnea Syndrome (OSAS)

Studies of respiration during sleep demonstrate apneic episodes in the presence of respiratory muscle effort. Apneic episodes greater than 10 seconds in duration are considered clinically significant. The episodes usually occur during sleep Stages 1 and 2, are rare during Stages 3 and 4, and are more prevalent and can occur solely during REM sleep. These hypopneas are characterized by a reduction of airflow of greater than 50%, which is associated with a reduction in the blood oxygen saturation levels. The arterial oxygen saturation level falls during the apneic episode and rises to baseline levels at the termination of the apneic episode. Due to a 10-to 20-second delay in detection of oxygen saturation by subcutaneous monitoring devices, a dissociation may occur between the respiratory patterns and the oxygen saturation patterns seen on the polysomnogram (11).

Scales Applied to Participants

Currently, the most frequently used method for determination of drowsiness in the course of the day is the ESS. Cases scoring 10 points and over are accepted as positive (12). The ESS, the Turkish version of which was validated in a reliability study performed by Ağargün and his colleagues, was applied in all patients and healthy control cases (13). DD diagnoses of all 20 patients were confirmed by a psychiatrist through a semi-structured clinical interview of the DSM-IV-TR (9). Current depression and anxiety levels of patients were determined through the Hamilton depression rating scale (HDRS) and the Hamilton anxiety rating scale (HARS).

Statistical Analyses

Analyses of the study were performed using the SPSS 13.0 (Chicago, IL) program. Continuous variables were given with average, standard error of mean, median, minimum and maximum values, and categorical variables were given with numbers and percentages. For comparisons, Mann-Whitney U test was used both between control and dysthymic groups and between subgroups in the dysthymic group. Evaluation of a relation between scale scores in groups was made by Spearman Correlation Analysis. A value of $p< 0.05$ was deemed as statistically significant.

RESULTS

The mean ages of patients and control cases were 52 ± 2.032 (29-64) and 49 ± 1.782 (23-59) years, respectively ($p> 0.05$). Subjective complaints of patients with regard to sleep are shown in (Table 1). The sole common complaint, put forth by all patients, was "tiredness after sleep". Mean ESS score for dysthymic patients was 12.5 ± 0.5. indicating drowsiness in the course of the day, whereas the ESS score of all healthy individuals in the control group was below 10 points (mean ESS score for controls was 6.3 ± 0.4). Difference between ESS scores of these two groups was significant ($p< 0.001$). While the average HDRS score of dysthymic patients was determined as 18.3 ± 1.1 (10-26) and HARS score as 18.8 ± 1.5, these values in the control group were 4.9 ± 0.2 and 4.6 ± 0.2, respectively. Difference between average Hamilton scale scores of the two groups was statistically significant ($p< 0.001$). No significant correlation was determined between the ESS score and scores of the two Hamilton Scales. Patients were separated into two sub-groups as those with HARS scores of 15 and above (n= 14, anxious depression group) or 14 and under (n= 6, non-anxious depression group) likewise, they were separated into two sub-groups as those whose HDRS scores of 17 and above (n= 12, moderate and severe depression group) or 16 and below (n= 8, mild depression group) (14,15). In terms of ESS scores, no statistically significant difference was determined between these subgroups.

Table 1. Subjective complaints of dysthymic patients

Sleep problems	n	%
Tiredness after sleep	20	100
Decreased amount of sleep	18	90
Worrying about sleeping well or not	16	80
Sleepiness in the day	15	75
Sleep fragmentation	14	70
Difficulty in drifting into sleep	13	65
Dreaming a lot	12	60
Waking up early in the morning	7	35

Patients were also divided into two sub-groups as one group including seven patients with the complaint of "awakening early in the morning" and the other group including 13 patients without this complaint. Average HDRS score for the group "awakening early in the morning" was 22.0 ± 1.4 versus an average HDRS score in the other group of 16.5 ± 1.3, indicating a statistically significant difference ($p= 0.025$). However, no difference was detected between these two sub-groups in terms of HARS, sleep time and sleep periods.

When ratios of non-REM-1 (Stage 1), non-REM-2 (Stage 2), non-REM-3-4 (Stage 3 + Stage 4), REM periods, TST and sleep onset (SO) time were evaluated, statistically significant differences were determined between dysthymic patients and control cases. Respiratory-disturbance index (RDI), PLMI and minimum oxygen saturation used in the PSG evaluation of dysthymic patients were different from those of control cases ($p< 0.05$) (Table 2). When compared with control cases, Stage 3 + Stage 4 ratio and TST in dysthymic patients were lower; Stage 1, Stage 2, REM ratios and SO were higher.

When dysthymic patients were divided into two subgroups in terms of average HDRS scores (HDRS ≥ 17 and < 17), sleep period ratios (Stage 1, Stage 2, Stage 3 + Stage 4 and REM ratios) and times (TST and SO) were similar in these sub-groups. In two sub-groups, established on the basis of average HARS scores (HARS ≥ 15 and < 15), REM, Stage 2 ratios and averages of TST and SO were similar. When compared with the non-anxious depression sub-group, the Stage 1 ratio was significantly higher ($p= 0.029$) in the anxious depression sub-group (HARS ≥ 15); the Stage 3 + Stage 4 period was shorter but the difference did not reach the level of statistical significance ($p= 0.205$).

According to history, clinical examination and PSG results, 10 patients were diagnosed with psychophysiological insomnia, five patients with PLMD, tree patients with light

Table 2. Sleep periods of dysthymic patients and control cases

Sleep periods	Dysthymic patients	Control cases	p
Total sleep time (minutes)	402.7 ± 7.07	419.8 ± 4.18	0.045
			< 0.05
N1 (%)	13.57 ± 1.39	9.6 ± 0.59	0.038
			< 0.05
N2 (%)	33.36 ± 1.80	21.75 ± 0.97	0.000
			< 0.05
N3 (%)	32.91 ± 2.48	48.12 ± 1.26	0.000
			< 0.05
REM (%)	22.26 ± 2.2	15.19 ± 0.66	0.028
			< 0.05
Sleep onset time (minutes)	9.21 ± 1.13	5.05 ± 0.41	0.002
			< 0.05
RDI	13.02 ± 1.41	3.03 ± 0.69	0.000
			< 0.05
PLMI	24.35 ± 2.01	1.12 ± 0.11	0.000
			< 0.05
Minimum oxygen saturation (%)	89.80 ± 1.09	96.9 ± 2.03	0.000
			< 0.05

PLMI: Periodic limb movement index, RDI: Respiratory-disturbance index.

Table 3. Results of polysomnographic evaluation

Findings of PSG	Normal	PI	PLMD	Light Snoring	OSAS	Total
Dysthymic patients	0	10	5	3	2	20
Control cases	20	0	0	0	0	20
Total	20	10	5	3	2	40

OSAS: Obstructive sleep apnea syndrome, PI: Psychophysiological insomnia, PLMD: Periodic limb movement disorders, PSG: Polysomnography.

snoring, and two patients with OSAS (Table 3). Within the framework of PSG diagnosis of patients, two sub-groups, which emerged as those having psychophysiological insomnia and other sleep disorders (OSAS, PMD and light snoring), were compared in terms of sleeping periods and times. While the average REM ratio in the psychophysiological insomnia group was determined as 28.74 ± 2.53, the average REM ratio of those having other sleep disorders was determined as 22.26 ± 2.21. While the sole difference emerging between the two groups was in terms of REM ratio (p= 0.002), a statistically significant difference was observed (Table 4). While the average ESS score of the psychophysiological insomnia group was 11.00 ± 0.61, this ratio for those having other sleep disorders was 13.82 ± 0.57, and the difference between them was statistically significant (p= 0.003). Two patients diagnosed with OSAS and one patient diagnosed with PLMD were the three people with the highest ESS scores (i.e. 16) determined in the study.

DISCUSSION

Mood disorders are crucial risk factors for both insomnia and hypersomnia. On the other hand, various epidemiological studies indicate that even if mood disorder symptoms are controlled, residual insomnia symptoms are significant risk factors for recurrence of mood disorders in the future. It was determined that individuals diagnosed with insomnia were in the high-risk group in terms of psychiatric disorder development within the scope of long-term observations (16). Simultaneous emergence of

Table 4. Sleep periods of psychophysiological insomnia and other sleep disorder groups

Sleep periods	1st group*	2nd group**	p
Total sleep time (minutes)	416.00 ± 8.73	390.62 ± 9.88	0.072 (> 0.05)
Stage 1 (%)	12.79 ± 1.86	14.28 ± 2.11	0.605 (> 0.05)
Stage 2 (%)	30.59 ± 2.21	35.87 ± 2.64	0.146 (> 0.05)
Stage 3 + Stage 4 (%)	29.69 ± 3.32	35.85 ± 3.57	0.225 (> 0.05)
REM (%)	28.74 ± 2.53	22.26 ± 2.21	0.002* **(< 0.05)**
Sleep onset time (minutes)	7.20 ± 1.35	11.05 ± 1.63	0.089 (> 0.05)

* Patients with psychophysiological insomnia.
** Other primary sleep disorders (Periodic limb movement disorders, obstructive sleep apnea syndrome and snoring).

insomnia and psychopathologies supports the idea that there is a complicated relationship between the two. It can be said that psychiatric disorder and insomnia are related to structural and functional changes of the central nervous system. Under both cases, pathologies in the thalamic and hypothalamic regions are the basic determinants. Thus, insomnia, beyond being a symptom in psychiatric illness, can also be handled as a disease. The reverse can be accepted as well (17).

The REM period is thought to change as a result of cholinergic domination emerging in relation to monoaminergic inhibition in the course of depression. Another explanation is that as a reflection of impaired circadian rhythm in the course of depression, internal rhythm of sleep is impaired as well, and REM starts earlier (18,19). In our study, when we separated dysthymic patients into two groups in terms of sleep disorders, a statistically significant difference was observed in REM ratios between the group of patients with other primary sleep disorders (PLMD, OSAS and light snoring) and the patient group with psychophysiological insomnia. This fact indicates that organic disorders lead to a decrease in the course of the REM period and that the REM period is much longer in psychophysiological insomnia patients, as expected (18,19). According to the results of our study, the group of patients with other primary sleep disorders had higher ESS scores compared with the psychophysiological insomnia group. This finding could be interpreted as an indication of disrupted sleep quality in the other, which leads to sleepiness in the course of the day.

In a study in which insomnia types were examined in three groups as difficulty in drifting into sleep, difficulty in continuing to sleep, and awakening early in the morning, it was stated that among reasons leading to difficulty in drifting into sleep were dysthymia, PLMD and OSAS, whereas among reasons making it difficult to continue to sleep were dysthymia, OSAS and snoring; waking up early in the morning was frequently related to major depression (20). The stated findings in this study are compliant with the findings of our study. In our study, seven DD patients, who had the complaint of "awakening early in the morning" but did not cover the major depression criteria, were determined to have a higher mean HDRS score than the mean HDRS score of patients without this complaint.

Literature data, stating that depressive disorder is related to increase in Stage 1 ratio, decrease in Stage 3 + Stage 4 ratio, and increase in REM sleep ratio, are consistent with the PSG findings of dysthymic patients in our study (19,21). Time of REM sleep in the first half of the night is found to be longer in patients with depression than in healthy controls, which contradicts the typical pattern within the scope of which REM periods lengthened as sleep progressed (22).

In our study, we determined that ratios of superficial sleep periods Stage 1 and Stage 2 and ratio of REM increased, whereas the ratio of the deep sleep period Stage 3 + Stage 4 was decreased in DD patients. Furthermore, average TST decreased and average SO increased in patients. These PSG results indicate that sleep becomes more superficial in dysthymic patients and could be accepted as an explanation for the complaints such as tiredness after sleep, decreased amo-

unt of sleep, and excessive dreaming (due to awakening in the course of the lengthened REM period).

Arriaga and Paiva stated in their studies that sleep patterns of dysthymic patients and generalized anxiety disorder (GAD) patients were similar and the ratio of slow wave sleep (Stage 3 + Stage 4) in both patient groups was decreased when compared with healthy controls (23). However, REM period, sleep time and continuity were disrupted in GAD patients, while the mentioned parameters of dysthymic patients were similar to those of the healthy controls. In our study, the decrease determined in slow wave sleep ratio of dysthymic patients was in agreement with this study; on the other hand, REM increase and TST decrease, observed in our patients, were different from the results of this study. The REM ratio increase in dysthymic patients in our study is a finding that is compliant with this study. However, no significant difference was determined between the group of anxious dysthymic patients and the group of non-anxious dysthymic patients, in terms of TST, SO averages and REM, Stage 2 ratios. When compared with the non-anxious dysthymia group, the Stage 1 ratio was significantly higher in the anxious dysthymia group, and Stage 3 + Stage 4 ratio was lower, though not significant statistically. This finding could be interpreted as the increase in anxiety may be related to an increase in the ratio of superficial sleep. According to the fact that the "tiredness after sleep" complaint is directly related to the increase in superficial sleep ratio, there are common findings among our study and the study carried out by Akiskal and his colleagues (10).

Regarding the fact that depressive symptoms of dysthymic patients are less severe than symptoms of major depression patients, mean HDRS score determined in our dysthymic patients was found to be slightly higher than expected. This may be attributed to the fact that there are three questions related to sleep in the HDRS scale and the patients with sleep problems are included in our study. 80-85% of depression patients complain of insomnia, whereas 15-20% complain of hypersomnia (24). In the study carried out by Dolenc and his colleagues, results of PSG examinations, continually applied in 12 dysthymic patients complaining of hypersomnia, 12 idiopathic hypersomnia patients and 12 healthy control cases, were compared (24). While no hypersomnia was encountered in the dysthymia group, it was observed that the Stage 1 ratio increased and Stage 3 + Stage 4 ratio decreased. These data, which were similar to those of our study as well, were evaluated as the basis of the subjective hypersomnia complaints of patients. The finding of high ESS scores of dysthymic patients in our study is compliant with subjective hypersomnia complaints of dysthymic patients in the study of Dolenc and his colleagues. In a study in which the relation of fatigue complaint of major depression patients with disruptions in sleep was investigated, it was stated that these symptoms were much more frequently encountered in women, and the degree of fatigue indicated a positive correlation with HDRS and ESS scores (25). This finding is in agreement with the results of our study. All 20 patients in our study complained of "tiredness after sleep", and mean ESS score (12.5), which is an indicator of daytime sleepiness, was significantly high. Despite the fact that daytime sleepiness is a frequently observed symptom in dysthymic patients, the relation of depression and anxiety levels with daytime sleepiness is not clear. Chellappa and Araujo found that there was a positive correlation between ESS scores and depression scores of depression patients determined on the basis of the Beck Depression Scale (26). However, this finding is not consistent with our findings. This incompatibility may arise from differences between the Beck depression scale, which is completed by the patient, and the Hamilton depression scale, which is completed by the doctor, and differences between the study patients with diagnoses of dysthymia and major depression.

There are some studies indicating that depressive symptoms in individuals with insomnia are more common and that increase in depressive symptoms increase both subjective and objective findings in sleep disorders (3,6). These studies support the connection between sleep disorders and depressive mood. There are some studies related to PLMD, putting forth its co-occurrence with especially depression and anxiety, which are among psychiatric symptoms (27). In our study, 5 of 20 patients were diagnosed with PLMD and appropriate medical treatment was arranged. OSAS affects approximately 4% of adult men and 2% of women (28). Since it is a diagnosis that is skipped for many years, it is observed that unnecessary treatments are assigned on the basis of different diagnoses. Furthermore, repetitive hypoxemia and disruption in sleep integrity may affect mood and daily functioning (29). Depression and anxiety are the features frequently encountered in OSAS (6,30). It is claimed that clinical results such as continuous desire to sleep, getting tired easily, lack of concentration, and sexual dysfunction pave the way for development of many psychiatric diseases, primarily depressive disorder. Since OSAS is a diagnosis that can be easily overlooked, OSAS patients are frequently followed as depression patients who do not respond to anti-depressive treatment, until they are properly diagnosed. In severe OSAS cases, there is a clear disruption in life quality when compared with healthy controls (31). The fact that treatment of OSAS improves depressive mood is a result emphasizing the importance of determination of possible OSAS in depression patients.

Patients diagnosed with DD usually take anti-depressive drugs for longer periods than needed for other types of depression and it is difficult to encounter a drug-naive DD patient. DD patients included in our study were using anti-depressive treatment, which may be considered as a limitation of our study.

Although PSG is a gold standard method in the diagnosis of sleep disorders, it is not frequently used since it requires that patients stay overnight at the hospital. This fact can explain the low number of patients in our study and in the literature. Regarding the finding that the average ESS score of patients with other primary sleep disorders is much higher than that of psychophysiological insomnia patients, ESS could be a scanning test, which can be easily applied to all psychiatric patients with complaints related to sleep, and which could be an indicator of the need for PSG examination.

In conclusion, the number of PSG studies with dysthymic patients in recent years is scarce. This study aimed to describe the close relation between dysthymia and sleep problems and the benefit of ESS and PSG in determination of other primary sleep disorders, which are at high risk of being skipped, especially in depressive disorder patients.

The findings of our study indicate that no direct connection can be established between sleep variables and depressive states. On the other hand, our findings support that there are some structural sleep changes in DD patients. Application of ESS and PSG are beneficial in terms of recognition and management of possible sleep disorders such as PLMD and OSAS in dysthymic patients with sleep-related complaints.

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