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Changes in Sleep Parameters in Different Age Groups between Genders

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ABSTRACT

Aim: To examine the changes in sleep parameters related to sex between the patients over 65 years old and younger group. **Material and Methods**:A total of 293 patients who applied to the sleep clinic were included in the study. The medical histories of the patients were retrospectively scanned from the patient files. Total Sleep Time, Sleep Efficiency, REM sleep rate, NREM sleep rate, AHI (Apnea Hypopnea index), REM AHI, NREM AHI, minimum oxygen saturation (min O^2 sat), mean oxygen saturation (mean O2 sat), oxygen desaturation time and oxygen desaturation index (ODI) were recorded. **Results**: When the sleep parameter changes between the age groups were examined, it was observed that the sleep efficiency in the older group, regardless of gender, decreased significantly compared to the younger group (p=0.014). In men total sleep duration (p=0.022) and sleep efficiency data (p=0.002) of the over 65 age group were lower than the young group. When the minimum and mean oxygen saturations in female patients were examined, it was observed that the group over 65 years had lower levels (min O_2 Sat; p=0.021, mean O_2 sat; p=0.030). Desaturation was found to be lower in the elderly group also. **Conclusion**: In this study, decreases in total sleep duration, sleep efficiency, minimum oxygen saturation, average oxygen saturation and desaturation were detected in sleep parameters in advanced age compared to younger ages. Further studies with larger participation and younger patients are needed to support the results and for the new results.
Keywords: PSG, Total Sleep Time, Desaturation, Advanced Age, Sex.

Cinsiyete Göre Farklı Yaş Gruplarında Uyku Parametrelerindeki Değişiklikler

ÖZ

Amaç: 65 yaş üstü ve genç gruptaki hastaların cinsiyete bağlı uyku parametrelerindeki değişiklikleri incelemek.
Gereç ve Yöntem: Çalışmaya uyku polikliniğine başvuran toplam 293 hasta dahil edildi. Hastaların tıbbi öyküleri geriye dönük olarak hasta dosyalarından tarandı. Toplam Uyku Süresi, Uyku Verimliliği (%), REM uyku oranı (%), NREM uyku oranı (%), AHI (Apne Hipopne indeksi), REM AHI, NREM AHI, minimum oksijen satürasyonu (min O2 sat), ortalama oksijen satürasyonu (ort O2 sat), oksijen desatürasyon süresi (dk) ve oksijen desatürasyon indeksi (ODI) kaydedildi. **Bulgular**: Yaş grupları arasındaki uyku parametresi değişimleri incelendiğinde cinsiyete bakılmaksızın yaşlı grupta uyku etkinliğinin genç gruba göre anlamlı olarak azaldığı görüldü (p=0.014). Erkeklerde 65 yaş üstü toplam uyku süresi (p=0.022) ve uyku etkinliği verileri (p=0.002) genç gruba göre daha düşüktü. Kadın hastalarda minimum ve ortalama oksijen satürasyonu incelendiğinde 65 yaş üstü grubun daha düşük değerlere sahip olduğu görüldü (min O^2 Sat; p=0.021, ortalama O2 sat; p=0.030). Desatürasyon yaşlı grupta anlamlı olacak şekilde daha düşük bulundu. **Sonuç**: Bu çalışmada, ileri yaştaki uyku parametrelerinde genç yaşlara göre toplam uyku süresi, uyku etkinliği, minimum oksijen satürasyonu, ortalama oksijen satürasyonu ve desatürasyon oranlarında azalma tespit edildi. Sonuçları desteklemek ve yeni sonuçları desteklemek için daha geniş katılımlı ve daha genç hastaları olan ileri çalışmalara ihtiyaç vardır.
Anahtar Kelimeler: PSG, Toplam Uyku Süresi, Desatürasyon, İleri Yaş, Cinsiyet.

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INTRODUCTION

There is a rapid increase in the elderly population in our country and all over the world. Advances in diagnostic methods and improvements in treatment methods have shown themselves with prolongation in human lifespan. In the United States, while the population over 65 was 34 million in 2000, this number is expected to reach 62 million in 2025 (Census USBot., 2000). In our country, according to TUIK reports, while the ratio of the population over the age of 65 to the total population was 8.2% in 2015, it is predicted that it will increase to 9.5% in 2020 and reach 11% in 2025 (Tuik., 2020). For this reason, health problems related to advanced age have begun to occupy a larger place in the health policies of countries today. Sleep is indispensable at all ages for a healthy physical and mental life. We know that there are many physiological, pathophysiological, metabolic, physical and psychological changes in the body with age. Studies have shown that sleep-related problems increase with age. Complaints such as decreased sleep time, waking up frequently, not being able to fall asleep again, and waking up tired are more prominent (Juergens TM et al 2007). The decrease in sleep quality during the night results in distraction during the day, physical fatigue, and tendency to sleep. In this case, it is plausible that one of the causes of frequent falls in advanced age and the long treatments that accompany it may be distraction and physical fatigue resulting from deterioration in sleep quality. Studies have shown that sleep problems occur in about half of the elderly (Ancoli-Israel S et all 2011; Ohayon MM, 2002).

There are basically two different phases of sleep; REM (Rapid Eye Movement) and NREM (Non Rapid Eye Movement). Sleep begins with NREM and then passes into the REM stage. The brain activities recorded in both phases are different from each other. These 2 phases alternately follow each other 4-6 times until morning. The NREM stage has 3 different subgroups: NREM1, NREM2, and NREM3. As sleep progresses from NREM 1 to 3, sleep deepens and resting occurs. The REM phase is known as the dreaming phase, and the brain is highly active during this phase. Rapid eye movement is seen in this stage and is very important for brain development and memory (Falkmarken ND, 2015). One of the most serious problems experienced during sleep is obstructive sleep apnea syndrome (OSAS), which can be defined as breathing stops (Apnea) or near-stopping (Hypopnea) due to obstruction in the upper airway during sleep, and hypoxia attacks experienced during the night. Hypoxia during sleep causes tissue damage. Combined with advanced age, the appearance of serious cardiovascular diseases is inevitable. The apnea-hypopnea index (AHI) is calculated by dividing the sum of apneas and hypopneas detected during the night by polysomnography (PSG) by the time of sleep. A diagnosis of OSAS is made with an AHI greater than 5. In the study of Odens ML et al., OSAS was found to be 28% in male patients over 65 years of age and 20% in female patients (Odens ML, 1995). In this study, it was aimed to show the changes in sleep and the level of OSAS presence in male and female patients over 65 years of age compared to the younger patient group.

MATERIAL AND METHOD

Patient Selection

Patients who applied to the Sleep Polyclinic of a state hospital subordinate to Ministry of Health between 2011 and 2013 with complaints of snoring, witnessed apnea, Excessive Daytime Sleepiness and were hospitalized in a sleep center for one night and had their Polysomnography (PSG) taken were included in the study. The clinical histories of the patients were retrospectively scanned from their files and permission was obtained from the local authorities for the study. Patients with severe coronary artery disease, severe liver and kidney failure, uncontrolled diabetes and hypertension, and patients using medication for sleep were not included in the evaluation. Reached a total of 293 people in the light of all criteria. 71 of the participants consisted of patients over 65 years of age and 222 patients between 45-60 years of age. Patients first completed the Epworth Sleepiness Scale (ESS).

Polisomnography Parameters

Electroencephalogram (EEG) for detection of brain waves for simultaneous recording in PSG, electromyogram for muscle activities (EMG; submental EMG and Tibialis EMG), electroculogram for eye movements (EOG), electrocardiogram (ECG) for heart rhythm monitoring, respiratory effort Chest and abdominal belts were used for detection, nasal cannula and thermistor for detection of apnea and hypopnea, pulse oximetry for oxygen level and tracheal microphone for snoring. The criteria published by the American Academy of Sleep Medicine (AASM) in 2007 were used to score respiratory events during sleep detected in the records obtained (Iber C et all., 2007). In our study, PSG parameters such as Total Sleep Time (min), Sleep Efficiency (%), REM (%), NREM (%), AHI (Apnea Hypopnea index), REM AHI, NREM AHI, minimum oxygen saturation (min O2 hours), Average oxygen saturation (mean O2 hours), oxygen desaturation time (min) and oxygen desaturation index (ODI) were used. Total sleep time is the time during the night that the person is asleep by the EEG, Sleep Efficiency: Ratio of total sleep time to length of stay in bed, REM (%): Ratio of time in REM to total sleep time, NREM (%): Ratio of time in NREM to total sleep time. Apnea defined as ≥90% decrease in airflow compared to baseline for ≥10 seconds, Hypopnea defined as ≥ 4% decrease in oxygen saturation with a 30% decrease in nasal airflow for at least 10 seconds, or a 3% decrease in oxygen saturation with a 50% decrease in nasal airflow or ending in an arousal. AHI: The sum of the apnea and hypopnea numbers divided by the sleep time. The minimum oxygen saturation was taken as the lowest oxygen saturation detected during sleep recording, and the average oxygen saturation was taken as the average of the oxygen saturations obtained during sleep recording. For the oxygen desaturation time, the time in minutes spent in sleep with oxygen saturation below 90%, and for the percentage of oxygen desaturation, the ratio of the time spent under 90% during sleep to the total sleep time. For the ODI, ≥3% sleep oxygen desaturation number/hour calculation was used. In the differentiation of OSAS groups; AHI= 5-15: Mild OSAS, AHI= >15-30:

Moderate OSAS and AHI= >30 Severe OSAS definitions were used.

Statistical analysis

All data analysis was applied using the Statistical Package for Social Sciences software 21.0 for Windows package software (SPSS, Inc., Chicago, IL, USA). All parameters studied in women and men group showed normal distributions, which were confirmed by the one sample Kolmogorov-Smirnov test. Comparisons between the two groups were made using an independent samples t test or Mann-Whitney U test. The relationship between the PSG measures and other parameters were evaluated by Spearman's correlations analysis. Data are presented as the means ± SD. A p value of <.05 was considered statistically significant.

Ethical approval

Permission was obtained from local ethics committee with the number 2021/7-50. The study was planned according to the ethics guidelines of the Declaration of Helsinki.

RESULTS

A total of 293 patients, 71 of whom were over 65 years old and 222 were between 45-60 years of age, were included in the study. 182 of the participants were male and 111 were female. Of the male participants, 139 were aged 45-60 years, and 43 were aged 65 and over. 83 of the female participants were in the 45-60 age group, 28 of them were in the older group, over 65 years old.

In our study, the elderly group over 65 years of age and the younger (45-60) age group were compared. The mean age of the group over 65 years old was 70.39±4.43 and the mean age of the other group was 53.43±4.32. There was no difference between the groups in terms of body mass indices and excessive daytime sleepiness. When the results of polysomnography were examined; Epworth Sleepiness scale, Total Sleep duration, NREM 1, NREM 2, NREM 3 and REM times, AHI, NREM AHI and REM AHI, minimum oxygen saturation, average oxygen saturation, desaturation time, desaturation percentage and ODI were evaluated and no statistically significant difference was found. When sleep efficiency (the ratio of total sleep time to length of stay in bed) was examined, it was observed that the elderly group had less sleep efficiency than the younger group (73.69±17.49 and 79.44±14.65 p: 0.014) (Table1).

In the study in which we evaluated age groups, we also wanted to see whether there was a change in sleep parameters between genders with age.

Table 1. Polisomnography parameters between ages.

Parameters (X±SD)	45-60 (n= 222)	65< (n=71)	p
Age (year)	53.43±4.32	70.39±4.43	<0.001*
BMI (kg/m$^{2)}$	33.72±6.59	31.98±6.16	0.051
Epworth sleepness scale	9.26±6.16	9.63±5.65	0.656
Excessive daytime sleepiness, n	0.41±0.49	0.36±0.48	0.471
AHI	42.34±24.76	38.11±22.79	0.203
Total sleep time (min)	271.38±95.19	257±102.05	0.277
Sleep efficiency	79.44±14.65	73.69±17.49	0.014*
REM	10.03±8.37	9.44±8.5	0.609
NREM	89.92±8.45	90.44±8.52	0.652
NREM1	2.56±2.74	2.99±3.14	0.277
NREM2	77.62±14.76	77.08±14.43	0.790
NREM3	9.73±10.46	10.36±11.21	0.663
REM-AHI	33.62±27.39	30.78±26.56	0.444
NREM-AHI	41.80±26	38.62±24.49	0.363
Minimum O2 saturation	76.71±11.74	75.01±13.28	0.304
Mean O2 saturation	91.14±5.14	89.92±7.29	0.120
Desaturation (min)	56.21±85.52	68.57±93.69	0.301
Desaturation	17.59±25.13	24.65±31.63	0.089
ODI	38.40±25.59	32.20±21.48	0.066

BMI: Body Mass Index, AHI:Apnea-Hipopnea Index, REM: Rapid Eye Movement, NREM: Non-REM: Non-Rapid eye Movement, ODI: Oxygen Desaturation Index

When male gender is evaluated; The mean age of the over-65 group was 69.88±3.5, and the mean age of the younger group was 50.72±2.9. There was no difference between the groups in terms of body mass indices and excessive daytime sleepiness. As for the results of polysomnography, Epworth Sleepiness scale, NREM 1, NREM 2, NREM 3 and REM times, AHI, NREM AHI and REM AHI, minimum oxygen saturation, average oxygen saturation, desaturation time, desaturation percentage and ODI were evaluated and no statistically significant difference was found. When the total sleep time (minutes) was examined, it was seen that it was 244.38±97.44 and 284.51±93.40 in the elderly and younger groups, respectively. The results were statistically significant (p:0.022). When sleep efficiency was examined, it was shown that the elderly group had lower sleep efficiency than the younger group (73.55±16.16 and 82.19±14.13 p=0.002) (Table 2).

Table 2. Polisomnography parameters between ages in men

Parameters	45-60 (n:139)	>65 (n:43)	p
Age (year)	50.72±2.92	69.88±3.5	**<0,001***
BMI (kg/m^2)	33.04±5.93	30.98±5.96	0.060
Epworth sleepness scale	9.47±6.28	9.53±6.17	0.961
Excessive daytime sleepiness, n	0.41±0.49	0.34±0.48	0.450
AHI	42.47±24.98	37.16±22.05	0.232
Total sleep time (min)	284.51±93.40	244.38±97.44	**0.022***
Sleep efficiency	82.19±14.13	73.55±16.16	**0.002***
REM	10.36±8.54	9.89±8.81	0.765
NREM	89.62±8.53	89.89±8.78	0.862
NREM1	2.68±3.42	2.79±1.89	0.840
NREM2	78.05±14.59	78.56±13.01	0.844
NREM3	8.88±9.96	8.54±9.03	0.845
REM-AHI	34.36±25.94	26.62±24.72	0.102
NREM-AHI	42.53±26.09	37.93±22.60	0.320
Minimum O^2 saturation	77.07±11.08	77.53±12.64	0.828
Mean O^2 saturation	91.31±4.58	90.01±8.68	0.251
Desaturation (min)	60.65±91.78	54.64±82.03	0.713
Desaturation	18.55±22.84	20.83±29.98	0.624
ODI	38.21±25.64	31.34±20.04	0.122

When the female gender was evaluated, the mean age of the over-65 age group was 71.17±5.55, and the mean age of the younger group was 50.86±3.15. When body mass indexes were examined, it was seen that the elderly group had lower values and this was statistically significant (36.84±6.64 and 33.52±6.25 p:0.0307). There was no difference between the groups in terms of excessive daytime sleepiness. As for the results of polysomnography, there was no statistically significant difference in Epworth Sleepiness scale, Total sleep duration, sleep efficiency, NREM 1, NREM 2, NREM 3 and REM durations, AHI, NREM AHI and REM AHI, desaturation time and ODI. When the minimum and mean oxygen saturation was examined, it was seen that the group above 65 years had lower levels (minimum oxygen saturation: 77.97±11.01 and 71.14±13.52 p:0.021, mean oxygen saturation: 91.93±3.70 and 89.78±4.52 p:0.030). Desaturation (%) was found to be lower in the elderly group (12.22±18.97 and 30.52±33.71 p:0.012) (Table 3).

Table 3. Polisomnography parameters between ages in women

Parameters	45-60 (n:83)	>65 (n:28)	p
Age (year)	50.86±3.15	71.17±5.55	**<0,001***
BMI (kg/m^2)	36.84±6.64	33.52±6.25	**0.0307***
Epworth sleepness scale	9.02±5.99	9.78±4.87	0.572
Excessive daytime sleepiness, n	0.48±0.50	0.39±0.49	0.423
AHI	38.77±21.67	39.58±24.22	0.883
Total sleep time (min)	262.79±97.92	276.37±107.65	0.581
Sleep efficiency	76.28±12.23	73.91±19.68	0.570
REM	10.31±8.12	8.76±8.11	0.432
NREM	89.04±9.03	91.28±8.19	0.290
NREM1	2.35±1.95	3.29±4.46	0.219
NREM2	74.71±14.94	74.81±16.36	0.979
NREM3	11.97±11.41	13.16±13.63	0.687
REM-AHI	35.14±28.78	37.17±28.36	0.768
NREM-AHI	37.53±22.97	39.68±27.55	0.720
Minimum O^2 saturation	77.97±11.01	71.14±13.52	**0.021***
Mean O^2 saturation	91.93±3.70	89.78±4.52	**0.030***
Desaturation (min)	50.96±84.72	89.95±107.28	0.089
Desaturation	12.22±18.97	30.52±33.71	**0.012***
ODI	33.96±21.43	33.51±23.84	0.933

It was investigated whether obstructive sleep apnea syndrome (OSAS) showed different results between advanced age and gender. AHI (Apnea-Hypopnea index) was used for the diagnosis of OSAS. AHI is obtained by dividing the sum of apnea and hypopneas occurring during sleep by total sleep hours. AHI ≥ 5 is considered OSAS. In this study, AHI: 5-15 was evaluated as mild OSAS, AHI: >15-30 as moderate OSAS, and AHI: >30 as severe OSAS. In the OSAS evaluations of the group over 65 years old and younger group in the male patient group, Mild OSAS: 10(23%) and 14(14%) p:0.304, Moderate OSAS: 10(23%) and 22(23%) p:0.491, Severe OSAS: 23(54%) and 60(63%) p: 0.493. There was no significant difference in the mild moderate and severe OSAS groups between the male patient group over 65 years of age and younger (Table 4). Likewise, in the OSAS evaluations of the group over 65 years old and younger group in female patients, Mild OSAS: 3(12%) and 3(7%) p: 0.852, Moderate OSAS: 6(24%) and 12(28%) p: 0.941, severe OSAS: 16(64%) and 27(65%) p: 0.5. In the female patient group, there was no significant difference in mild moderate and severe OSAS groups between the age group 65 years and younger (Table 5).

Table 4. Obstructive sleep apnea groups between ages in men.

Parameters	Men		p
	45-60 years	>65 years	
	n (%)	n (%)	
Mild OSAS (AHI=5-15)	14 (14)	10 (23)	0.304
Moderate OSAS (AHI=16-30)	22 (23)	10 (23)	0.491
Severe OSAS (AHI>30),	60 (63)	23 (54)	0.493

Table 5. Obstructive sleep apnea groups between ages in women.

Parameters	Women		p
	45-60 years	>65 years	
	n (%)	n (%)	
Mild OSAS (AHI=5-15)	3 (7)	3 (12)	0.852
Moderate OSAS (AHI=16-30)	12 (28)	6 (24)	0.941
Severe OSAS (AHI>30),	27 (65)	16 (64)	0.5

DISCUSSION

About a third of our lives are spent asleep. Scientific studies on sleep, which was considered as a situation between being awake and death in the past, have gained momentum since the beginning of the 20th century. In 1928, German psychiatrist Hans Berger recorded different brain activities with electrodes placed on the scalp while awake and asleep (Blake H, 1937). Later studies have shown that the electrical waves obtained from the brain during sleep are different, thus revealing that there are stages of sleep (Dement WC, 2005; Patil SP, 2010). As we age, some physiological, hormonal, physical and mental changes in the body cause deterioration in sleep quality. Studies have shown that sleep problems are more common especially in the 65-year-old and older group, and about half of them have sleep-related complaints (Ancoli-Israel S, 1999; Maggi S et all., 2015; Sukegawa T et all., 2003). Memory loss due to sleep problems in the elderly, attention deficit is reflected in a wide range from a simple fall to serious traffic accidents in the early period. In the late period, it causes important health problems such as hypertension, coronary artery disease, vascular diseases, heart failure (Başoğlu ÖK 2015; Gulia KK 2018). Age-related changes occur in sleep duration. While 15 hours or more is considered normal sleep time for newborns, this number is accepted as an average of 8 hours for adults. As age progresses, sleep hours decrease. In addition, factors that reduce sleep quality such as difficulty falling asleep, waking up frequently, and waking up tired are added (Stanley N, 2005). Studies have shown that also as age progresses, NREM1 and 2, which are light sleep increase and NREM 3 which is deep sleep and REM sleep decrease (Ohayon MM et all; 2004). In this study, when the sleep parameters of the over 65 and 45-60 age groups, regardless of gender, were compared, it was found that the sleep efficiency of the elderly patients was significantly lower than the younger group. Sleep efficiency is obtained by dividing the time spent sleeping at night by the time spent in bed to sleep. The low sleep efficiency in the elderly group indicates that there is difficulty in falling asleep or difficulty in falling asleep after waking up. This result is compatible with the literature. Considering the total sleep time, it was observed that the patients in the elderly group slept less in minutes, but this difference was not statistically significant. In addition, although these results obtained for the group over 65 years of age predict higher excessive daytime sleepiness, no difference was found between the groups in the study. The reason for this may be that the 65 years and older group is less in number.

When the polysomnography results between age groups were examined in the study; In Epworth Sleepiness scale, Total Sleep time, NREM 1, NREM 2, NREM 3 and REM times, AHI, NREM AHI and REM AHI, minimum oxygen saturation, mean oxygen saturation, desaturation time, desaturation percentage and ODI were not statistically different. Although there was no difference between the

groups, in accordance with the literature, it was observed that NREM 2 increased up to 77% in both groups, NREM 3 decreased by 10%, and REM period was similarly reduced by 10%. The mean age of the patients in the younger group included in the study was 53.43±4.32, and the mean age of the patients in the older group was 70.39±4.43. Since the age of 53 is actually an age that can be considered as late adult period, it was thought that the increase in light sleep durations and the decrease in deep sleep and REM periods which we expect in advanced age, are also seen in this age group. Studies conducted in sleep clinics applied by younger age groups may be useful in illuminating this issue. In the study, sleep parameters were compared in different age groups between the genders. When the male group was examined, it was seen that the mean age of the elderly group was 69.88±3.5, and the younger group was 50.72±2.92. Considering the difference between sleep parameters, it was observed that the total sleep duration and sleep efficiency were lower in the elderly group. This situation is compatible with the literature. As in the general age groups, no difference was found between light sleep, deep sleep and REM sleep durations between male age groups. When examined in detail, it was seen that the rate of light sleep increased significantly, and the rates of deep sleep and REM sleep were lower than normal. It was concluded that the mean age of the group, which was considered to be the younger group, as explained earlier, was 50, and these changes may have been observed because it was an advanced adult age. When the female group was examined, it was seen that the mean age of the elderly group was 71.17±5.55, and the younger group was 50.86±3.15. Body mass index was found to be significantly lower in the older age group between two different age groups. When the differences in sleep parameters of the female gender according to the age groups were examined, it was noticed that the minimum and average oxygen saturation had significantly lower levels in the group over 65 years of age. At the same time, Desaturation was found to be lower in the elderly group. As women age, they are physiologically exposed to hormonal changes. The menstrual phase, which starts with puberty, turns into menopause at an advanced age with the loss of sex steroids (estrogen, progesterone). Menopause is defined by the World Health Organization as the permanent termination of the menstrual cycle as a result of the cessation of hormonal activities of the ovaries (WHO, 1996). For a woman to be diagnosed with menopause, she must be free from menstrual bleeding for at least 12 months after her last menstruation. As can be understood from this explanation, women do not enter menopause quickly and sharply, but go through a transitional period beforehand. During this period, although estrogen decreases, it continues to exist in the form of fluctuations in the blood hormone level. While the age of menopause is considered to be between 45-55 years in the World (Amore M et all., 2006) the average age of menopause in our country was found to be 46-48 (Turkey Demographic and Health Survey, 2008) The importance of estrogen in women's life is undeniable. Along with menopause, diseases in the cardiovascular system and musculoskeletal system increase in women. It has also been shown in studies that estrogen is necessary for quality sleep. In this study, it is possible that some of the female patients between the ages of 45-60 were in menopause, and some of them were in the menopausal transition phase. The age group over 65 can be considered as postmenopausal. In my study, it was determined that the group over the age of 65 experienced a decrease in oxygen saturation during sleep. Perhaps one of the underlying causes of the increased risk of cardiovascular disease in menopause due to the lack of estrogen may be hypoxia occurring during sleep in these patients. Studies have shown that cardiovascular risk increases in patients as a result of respiratory disorders that occur during sleep (Young, T et all., 2002; Shamsuzzaman, A et all., 2003). However, it is clear that this hypothesis needs a large-scale study. The menopausal transition phase and the postmenopausal period are different from each other and are important periods in a woman's life. If changes in sleep parameters are detected during these periods, it can be a guide in solving the increasing health problems of women in the postmenopausal period. OSAS (Obstructive Sleep Apnea Syndrome) is a condition in which breathing comes to a complete stop (apnea) or close to a stop (hypopnea) as a result of repetitive obstructions of the upper airway during sleep. These repetitive blockages throughout the night cause a decrease in the oxygen concentration in the blood and hypoxic tissue damage 26. In addition, sympathetic activity is induced at the end of upper airway obstruction. Both developing tissue damage and induced sympathetic activity cause an increase in cardiovascular diseases such as HT, Coronary artery disease, Congestive heart failure and ischemic diseases in patients (Cofta S et all., 2007; Peppard PE et all., 2000; Robinson, G et all., 2004). In a study by Young et al., age ranges and AHI were compared. He found the incidence of AHI 5-14 group to be 24% in the 50-59 age group, 32% in the 60-69 age group, and 33%-36% in the 70-year and older age group 24. In this study, no difference was found between the OSAS groups in male patients over 65 years of age and younger groups. When compared with the literature, the results of AHI:5-14 in men in this study (which was named as mild OSAS in this study) were found to be 23% in the group over 65 years of age and 14% in the younger group. Moderate and severe OSAS results were also obtained in the study. According to these results, moderate OSAS was determined as 23% in both age groups. Severe OSAS was found to be 54% in the over 65 age group and 63% in the younger group. Although there is a higher rate of severe OSAS in the younger age group, there is no significant difference between the group over 65 years of age. The reason for this was thought to be that the ages of the groups were close to each other. Further studies are needed for PSG results to be performed on younger patients. Similar to men, no difference was found between age groups and OSAS groups in women.

CONCLUSION

In this study, a decrease in total sleep duration, sleep efficiency, minimum oxygen saturation, average oxygen saturation and desaturation (%) was determined in sleep parameters compared to younger ages. In addition, as a result of the revision made by the World Health Organization in age groups, those over the age of 80 are

now counted as the elderly group. Therefore, further studies with larger participation, including younger (< 35 years) and older (> 80 years) patients are needed for new research.

Study Limitations

The study was conducted among patients admitted to a single sleep center, which limits its generalizability. More accurate results will be obtained in multi-centre participations. In addition, it could not be studied in the desired age groups due to its single-center nature. It is thought that multicenter participation would be very beneficial for studies involving patients in younger (< 35 years) and older (> 80 years) groups.

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Conflict of Interest

The author declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Author Contributions

Contributing to the emergence and maintenance of the article: DE
Plan, design: DE
Financing: DE
Material: DE
Data collection / processing of collected data to prepare for analysis: DE
Data analysis: DE
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