Research Article / Araştırma Makalesi

Association of Sleep Duration with Chronic Diseases and Geriatric Syndromes

Uyku Süresinin Kronik Hastalıklar ve Geriatrik Sendromlar ile İlişkisi

Aysegul AKKAN SUZAN [1], Seyda BILGIN [2], Veysel SUZAN [3]

[1]İstanbul University-Cerrahpasa, Cerrahpasa Medical Faculty, Department of Neurology, Division of Clinical Neurophysiology, İstanbul, TÜRKİYE
[2]İstanbul University-Cerrahpasa, Cerrahpasa Medical Faculty, Department of Internal Medicine, Division of Geriatric Medicine, İstanbul TÜRKİYE
[3]İstanbul Training and Research Hospital, Department of Internal Medicine, Division of Geriatric Medicine, İstanbul, TÜRKİYE

Abstract

Background: It was aimed to investigate the relationship between sleep duration and chronic diseases and geriatric syndromes in geriatric patients.
Materials and Methods: Our cross-sectional study included 174 patients admitted to the geriatric outpatient clinic for the first time between January 2024 and June 2024. Patients under 65 years of age, with active infection, terminal illness, diagnosis of malignancy, and history of trauma and infection in the last month were excluded from the study. In our study, in accordance with the recommendations of the 'National Sleep Foundation' and the 'American Academy of Sleep Medicine (AASM)', we considered sleep duration over 8 hours/day as long sleep in geriatric patients.
Results: In our study, 107 geriatric patients with no long sleep duration (≤8 hours) and 67 geriatric patients with long sleep duration (>8 hours) were included. There was no significant difference between the two groups in terms of age and gender (p=0.174, p=0.739). There was no significant difference between the two groups in terms of chronic diseases, number of chronic diseases and number of medications. Sarcopenia (%49 vs %33, p=0.046) and malnutrition (%35 vs %21, p=0.041) were found to be significantly higher in patients with longer sleep duration. There was no statistically significant difference between the two groups in terms of frailty, depression, cognitive status, basic and instrumental activities of daily living (p=0.208, p=0.062, p=0.097, p=0.110, p=0.117).
Conclusions: Sarcopenia and malnutrition were observed at a higher rate in patients with long sleep duration. Based on this, sarcopenia and malnutrition screening should be emphasised in geriatric patients with long sleep duration.

Keywords: Geriatric Syndrome, Malnutrition, Sarcopenia, Sleep

Öz

Amaç: Geriatrik hastalarda uyku süresinin kronik hastalıklar ve geriatrik sendromlar ile ilişkisini araştırmak hedeflenmiştir.
Materyal ve Metod: Çalışmamız kesitsel olarak Ocak 2024-Haziran 2024 tarihleri arasında geriatri polikliniğe ilk kez kabul edilen 174 hastayı içermekteydi. 65 yaş altı, aktif enfeksiyonu, terminal dönem hastalığı, malignite tanısı, son bir ay içinde travma ve enfeksiyon öyküsü olan hastalar çalışma dışında bırakıldı. Çalışmamızda 'National Sleep Foundation' ve 'American Academy of Sleep Medicine (AASM)' önerileri doğrultusunda geriatrik hastalarda 8 saat/gün üzerindeki uyku sürelerini uzun uyku olarak aldık.
Bulgular: Çalışmamıza uyku süresi uzun olmayan (≤8 saat) 107 ve uyku süresi uzun olan (>8 saat) 67 geriatrik hasta alındı. İki grup arasında yaş ve cinsiyet açısından anlamlı farklılık yoktu (p=0.174, p=0.739). İki grup arasında kronik hastalıklar, kronik hastalık sayısı ve ilaç sayısı açısından anlamlı farklılık yoktu. Uyku süresi uzun olanlarda sarkopeni (%49'a karşı %33, p=0.046) ve malnütrisyon (%35'e karşı %21, p=0.041) istatistiksel olarak anlamlı daha yüksek saptandı. İki grup arasında kırılganlık, depresyon, bilişsel durum, temel ve enstrümental günlük yaşam aktiviteleri açısından istatistiksel anlamlı farklılık yoktu (p=0.208, p=0.062, p=0.097, p=0.110, p=0.117).
Sonuç: Uyku süresi uzun olanlarda sarkopeni ve malnütrisyon daha yüksek oranda görülmüştür. Bundan yola çıkarak uyku süresi uzun olan geriatrik hastalarda sarkopeni ve malnütrisyon taramasına önem verilmelidir.

Anahtar Kelimeler: Geriatrik sendrom, Malnütrisyon, Sarkopeni, Uyku

Corresponding Author / Sorumlu Yazar

Dr. Aysegul AKKAN SUZAN
İstanbul University-Cerrahpasa, Cerrahpasa Medical Faculty, Department of Neurology, Division of Clinical Neurophysiology, Istanbul, TÜRKİYE

E-mail: ayseg_akkan@hotmail.com

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Introduction

Sleep is one of the basic elements of life. The National Sleep Foundation (NSF) and the American Academy of Sleep Medicine (AASM) recommend the upper limit of sleep duration for young adults (18-25 years) and adults (26-64 years) as 9 hours (1,2). There are changes in sleep duration and quality with aging. In geriatric individuals (>65), the upper limit of sleep duration is accepted as 8 hours (1,2). Sleep duration in geriatric patients has a critical importance in terms of physical function, independence and quality of life. There are studies drawing attention to the fact that sleep duration may lead to sarcopenia, malnutrition, impaired cognitive functions and depression in geriatric patients (1-3).

Geriatric syndromes are considered to be clinical conditions with common risk factors in older adult patients (4). Although geriatric syndromes appear complex, they have common features. Geriatric syndromes such as sarcopenia, malnutrition, frailty, cognitive impairment and depression lead to increased mortality, morbidity and health care costs (5). Chen et al. found that sarcopenia was significantly increased in individuals who slept for more than 8 hours (6).There are studies supporting that long sleep duration may adversely affect sarcopenia, malnutrition, frailty, basic and instrumental activities of daily living among geriatric syndromes (7,8).

The aim of this study was to investigate the relationship between long sleep duration and geriatric syndromes such as sarcopenia, malnutrition, frailty, cognitive impairment, depression, basic and instrumental activities of daily living in geriatric patients. In addition, the relationship of sleep duration with chronic diseases and laboratory values was analysed.

Materials and Methods

Our cross-sectional study included 174 patients admitted to the geriatric outpatient clinic for the first time between January 2024 and June 2024. Ethical approval was obtained from the local ethics committee (Date 22.12.2023-Number 352).

Patients over 65 years of age were included in our study. Exclusion criteria included active infection, terminal illness, diagnosis of malignancy, trauma and infection in the last month. In addition, patients with implants that prevented the assessment of muscle mass for the diagnosis of sarcopenia from geriatric syndromes were excluded from the study.

In our study, we considered sleep duration over 8 hours/day as long sleep in geriatric patients in accordance with the recommendations of the NSF and AASM (1,2). The 6-question Mini Nutritional Assessment Short- Form (MNA-SF) was used as a screening tool for malnutrition among geriatric syndromes. 12-14 points are considered normal nutritional status (9).

European Working Group on Sarcopenia in Older People 2 (EWGSOP2) diagnostic criteria were used in the evaluation of sarcopenia (10). The 5-question strength, assistance with walking, rising from a chair, climbing stairs, falls (SARC-F)test was used to screen for sarcopenia, and patients with low muscle strength and low muscle mass were accepted for the diagnosis of sarcopenia (10). The 5-question fatigue, resistance, ambulation, illness, loss of weight fatigue, resistance, ambulation, illness, loss of weight (FRAIL) test was used to assess frailty status (11). A six-question activities of daily living questionnaire (washing, dressing, toileting, eating, bed and chair transfer, continence) and an 8-question instrumental activities of daily living test (telephone use, shopping, food preparation, housework, laundry, transport, medication use, financial management) were performed (12,13). The number of medications and chronic diseases of the patients were noted. C-reactive protein (CRP), erythrocyte sedimentation rate, haemoglobin, ferritin, haemoglobin A1c, thyroid-stimulating hormone (TSH), 25-OH vitamin-D, vitamin B12, folic acid, creatinine and notrophil/lymphocyte ratio at the date of geriatric syndrome evaluation were recorded.

Sample size was calculated using G* Power 3.1 software (14). The power analysis assumed a 5% significance level ($\alpha = 0.05$), 80% power ($1 - \beta = 0.80$) and a moderate effect size (Cohen's $h = 0.4$). GA sample size of 60 patients per group was calculated to provide 80% power to detect the expected difference between the two groups with no long and long sleep duration (14).

Categorical variables were expressed as numbers and percentages. Continuous variables were presented as mean ± standard deviation or median (range of quartiles). Chi-square test was applied for categorical variables. Fisher's exact test was applied in cases that did not fulfil the chi-square criteria. Student's t-test, a parametric test, was used for normally distributed continuous variables. Mann Whitney-U test was used for the comparison of non-normally distributed variables. SPSS-22 statistical programme was used for the analysis and $p<0.05$ was considered statistically significant (15).

Results

In our study, 107 geriatric patients with no long sleep duration (≤8 hours) and 67 geriatric patients with long sleep duration (>8 hours) were included. There was no significant difference between the two groups in terms of age and gender (p=0.174, p=0.739). Sleep duration was 6.52±1.19 h/day in the no long sleep duration group and 9.10±0.88 h/day in the long sleep duration group, and this difference was statistically significant (p<0.001). There was no significant difference between the two groups in terms of number of chronic diseases and number of medications (p=0.256, p=0.154). There were no significant differences between the two groups in terms of hypertension, diabetes mellitus, coronary artery disease, osteoporosis, hypothyroidism, asthma, hyperlipidaemia, chronic obstructive pulmonary disease, atrial fibrillation, benign prostatic hyperplasia and incontinence (p=0. 342, p=0.443, p=0.325, p=0.575, p=0.892, p=1.000, p=0.433, p=0.475, p=0.572, p=0.538, p=0.713; respectively). Detailed analysis is given in Table 1.

Table 1. Comparison of demographic data and chronic diseases of patients with no long/long sleep duration

	Patients with no long sleep duration (≤8 hours)	Patients with long sleep duration (>8 hours)	p
Number of patients	107	67	
Gender (Female /male)	76 / 31	46 / 21	0.739
Age*	69.42±10.58	71.56±9.12	0.174
Sleep Duration*	6.52±1.19	9.10±0.88	**<0.001**
Number of chronic diseases*	2 (1-3)	2 (1-3)	0.256
Number of Drugs *	2 (1-4)	2 (2-4)	0.154
Hypertension	56 (52%)	40 (59%)	0.342
Diabetes Mellitus	20 (19%)	15 (23%)	0.443
Coronary Artery Disease	8 (8%)	2 (3%)	0.325
Osteoporosis	13 (20%)	10 (25%)	0.575
Hypothyroidism	16 (15%)	10 (16%)	0.892
Asthma	5 (5%)	3 (5%)	1.000
Hyperlipidemia	22 (20%)	10 (15%)	0.433
Chronic Obstructive Pulmonary Disease	4 (4%)	4 (6%)	0.475
Atrial Fibrillation	12 (%11)	9 (%14)	0.572
Benign Prostatic Hyperplasia	9 (9%)	3 (5%)	0.538
Incontinence	4 (4%)	3 (5%)	0.713

**Data are shown as mean ± standard deviation (SD) or median(interquartile intervals), Statistically significant P values are indicated as bold*

When we analysed the results of sleep duration and comprehensive geriatric assessment; basic and instrumental activities of daily living were lower in the group with longer sleep duration, but this difference was not statistically significant (p=0.110, p=0.117). Malnutrition rate was 35% in the group with long sleep duration and 21% in the no long sleep duration group. In the MNA-SF test for malnutrition assessment, the values of the group with longer sleep duration were lower and this difference was statistically significant (p=0.046). The FRAIL questionnaire for frailty and the geriatric depression scale for depression assessment were both higher in patients with longer sleep duration, but this difference was not significant (p=0.208, p=0.062). Mini mental test was lower in patients with longer sleep duration, but this difference was not statistically significant (p=0.094). Sarcopenia rate was 49% in the group with long sleep duration and 33% in patients with no long sleep duration, and this difference was statistically significant (p=0.041). The SARC-F questionnaire, which is a sarcopenia screening test, was also statistically significantly higher in the group with long sleep duration (p=0.020). Detailed analysis is given in table 2.

Table 2. Comparison of comprehensive geriatric assessment results of patients with no long /long sleep duration

	Patients with no long sleep duration (≤8 hours)	Patients with long sleep duration (>8 hours)	p
Number of patients	107	67	
Sarcopenia	36 (33%)	33 (49%)	**0.041**
Basic Activities of Daily Living *	5.81±0.87	5.43±1.54	0.110
Instrumental Activities of Daily Living *	7.70±1.19	7.20±1.98	0.117
MNA-SF score*	12.57±1.81	12.00±1.82	**0.046**
FRAIL score*	2 (1-2)	2 (1-3)	0.208
SARC-F score*	1 (0-3)	3 (1-4)	**0.020**
Mini Mental Test score*	27.34±2.80	26.21±3.88	0.094
Geriatric Depression Scale *	2 (0-5)	3 (2-5)	0.062

**Data are shown as mean ± standard deviation (SD) or median(interquartile intervals), Statistically significant P values are indicated as bold*

When the group with long sleep duration and the no long sleep group were compared in terms of laboratory values, there was no statistically significant difference in haemoglobin A1c, ferritin, creatinine, haemoglobin, TSH, 25-Hydroxy Vitamin-D, Vitamin B12, folic acid, CRP and sedimentation rate (p=0.484, p=0.295, p=0.095, p=0.585, p=0.184, p=0.062, p=0.477, p=0.412, p=0.155, p=0.721; respectively). Neutrophil/lymphocyte ratio was higher in patients with long sleep duration than in patients with no long sleep duration and this difference was statistically significant (p=0.009) (See Table 3).

Table 3. Laboratory values of patients with no long/long sleep duration

	Patients with no long sleep duration (≤8 hours)	Patients with long sleep duration (>8 hours)	p
Hemoglobin A1c (%)*	6.0±1.1	5.9±0.6	0.484
Ferritin (ng/ml)*	56 (31-89)	46 (24-90)	0.295
Creatinine (mg/dL)*	0.8±0.3	1.0±0.5	0.095
Hemoglobin (g/dl)*	12.8±1.3	12.5±1.5	0.585
TSH (µIU/ml)*	2.1 (1.3-2.8)	1.8 (1.1-2.6)	0.184
25-Hydroxy Vitamin-D (µg/L)*	25 (20-32)	23 (15-29)	0.062
Vitamin B12 (pg/ml)*	330 (243-469)	320 (229-435)	0.477
Folic acid (ng/mL)*	8.0±4.3	7.5±3.6	0.412
Neutrophil/lymphocyte ratio	2 (1.5-2.6)	2.4 (1.9-2.9)	0.009
CRP (mg/L)*	2.6 (1.0-5.5)	2.7 (1.2-8.9)	0.155
Sedimentation rate (mm/h)*	14 (7-25)	15 (6-30)	0.721

**Data are shown as mean ± standard deviation (SD) or median(interquartile intervals), Statistically significant P values are indicated as bold*

Discussion

Sleep is the most important time period that determines our quality of life. In geriatric age group, the importance of sleep increases even more. Because, apart from chronic diseases, geriatric syndromes affect the quality of life and mortality in geriatric individuals. When we look at the results of this study, there is a statistically significant relationship with sarcopenia and malnutrition among geriatric syndromes. Sarcopenia and malnutrition are directly related to morbidity and mortality in geriatric individuals.

When we reviewed the studies on the relationship between sarcopenia and sleep duration in the literature; a correlation was found between long sleep duration and sarcopenia in the meta-analysis published by Li et al. in 2023 (16). Smith et al. have analysed sarcopenia and sleep duration in a study conducted in low- and middle-income countries and determined a significant relationship between long sleep duration and sarcopenia (17). In a study reported in Korea, sarcopenia was found to be independently associated with long sleep duration (18). Similarly, there is a significant relationship between sarcopenia and long sleep duration in our study.

In a study conducted in China investigating sleep duration and nutritional status in geriatric patients, the MNA-SF test was used to screen for malnutrition and it was shown that long sleep duration increased the risk of malnutrition (19). In addition, sarcopenia and malnutrition are two intertwined geriatric syndromes; based on this relationship, Malnutrition-Sarcopenia Syndrome is defined in the literature (20). In our study, a significant relationship was found between malnutrition and sleep duration. Malnutrition and sarcopenia were the two geriatric syndromes with a significant statistical relationship with sleep duration.

When we look at the articles showing the relationship between sleep duration and inflammation; in the review by Irwin et al. long sleep duration was associated with an increase in systemic inflammation markers, while short sleep duration was not found to be associated (21). In our study, there was no statistical significance with CRP, sedim, ferritin, but neutrophil/lymphocyte ratio was statistically significantly associated with long sleep duration.

This significance may be due to sleep-related diseases (such as obstructive sleep apnea syndrome). Therefore, it is very difficult to establish a causal relationship.

In our study, the geriatric depression scale score was higher in the long sleep duration group, but this difference was not statistically significant. The relationship between long sleep duration and depression is a controversial issue in the literature. In a study conducted in China in 1429 women over 60 years of age, the probability of depressive symptoms was found to be statistically significantly higher in women with long sleep duration (over 8 hours) (22). A web-based cross-sectional survey was applied to 8698 participants in Japan and it was found that long sleep was not associated with depression (23). These different results may be due to methodological differences, sample characteristics and depression assessment tests used. A prospective and controlled study may provide clearer information on this issue.

Limitation

The limitations of our study include the absence of a questionnaire and clinical evaluation related to sleep quality in addition to sleep duration.

Conclusion

Our study showed the relationship between long sleep duration and sarcopenia and malnutrition among geriatric syndromes in geriatric patients. Malnutrition and sarcopenia in geriatric patients are important because they are associated with morbidity and mortality. Therefore, sleep duration should be questioned in the examination of geriatric patients and screening for malnutrition and sarcopenia should not be forgotten if sleep duration is long.

Ethical Approval: *Ethical approval was obtained from the ethics committee of Health Sciences University (Date 22.12.2023-Number 352- Health Sciences University).*

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Concept: A.A.S., S.D., V.S.
Literature Review: A.A.S., S.D.
Design : A.A.S., S.D., V.S.

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