Sleeping pills in the treatment of insomnia in older adults with depression: the role of sleep hygiene

Yaşlı depresyon hastalarında uykusuzluk tedavisinde kullanılan uyku ilaçları: uyku hijyeninin rolü

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Abstract

Aim: This study aimed to determine sleeping pills used for insomnia and investigate the impact of sleep hygiene on insomnia severity in older adults with depression.

Methods: In this study, 120 older adults with depression taking sleeping pills for insomnia were included. We evaluated sleep hygiene, sleep quality, insomnia severity, depression, and anxiety using the Sleep Hygiene Index, Insomnia Severity Index, Pittsburgh Sleep Quality Index, Beck Depression Inventory, and Beck Anxiety Inventory and determined the sleeping pills used for insomnia.

Results: Quetiapine, mirtazapine, and trazodone were the most commonly used sleeping pills. Sleep hygiene was correlated with insomnia overall and was elevated in the group with higher clinical levels of insomnia. In multiple linear regression analyzes, insomnia was predicted by subjective sleep quality (20%) and sleep hygiene (9%) and sleep hygiene (4%) when depression and anxiety were adjusted.

Conclusion: Although the sleeping pills used are similar, the differentiation of insomnia severity in terms of sleep hygiene shows the importance of the latter in the treatment process. Longitudinal studies investigating the effect of simple environmental and behavioral influences on insomnia symptoms are needed.

Keywords: depression; insomnia; older adults; sleep hygiene

Öz

Amaç: Bu araştırma, Yaşlı Depresyon Hastaları'nda (YDH) uykusuzluk tedavisinde kullanılan uyku haplarını belirlemeyi ve uyku hijyeninin uykusuzluk şiddeti üzerindeki rolünü araştırmayı amaçlamıştır.

Yöntemler: Bu çalışmaya uykusuzluk için uyku ilacı kullanmakta olan 120 YDH dahil edildi. Katılımcıların uykusuzluk için kullandıkları uyku hapları belirlendi. Uyku Hijyeni İndeksi (UHİ), Uykusuzluk Şiddeti İndeksi (UŞİ), Pittsburgh Uyku Kalitesi İndeksi (PUKİ), Beck Depresyon Ölçeği (BDÖ) ve Beck Anksiyete Ölçeği (BAÖ) kullanılarak hastaların uyku hijyeni, uyku kalitesi, uykusuzluk şiddeti, depresyon ve anksiyete seviyeleri değerlendirildi.

Bulgular: YDH'da ketiapin, mirtazapin ve trazodon en sık kullanılan uyku haplarıydı. Uyku hijyeni genel olarak uykusuzluk şiddeti ile korelasyon göstermekteydi ve klinik uykusuzluk seviyesi daha yüksek olan grupta daha yüksek seviyelerdeydi. Çoklu doğrusal regresyon analizleri sonuçları uykusuzluk şiddetinin; öznel uyku kalitesi (%20) ve uyku hijyeni (%9) ile depresyon ve anksiyete'den bağımsız olarak tahmin edildiğini gösterdi.

Sonuç: Kullanılan uyku hapları benzer olmasına rağmen uyku hijyeni açısından uykusuzluk şiddetinin farklılaşması tedavi sürecinde uyku hijyeninin önemini göstermektedir. Basit çevresel ve davranışsal etkilerin uykusuzluk semptomları üzerindeki etkisini araştıran boylamsal çalışmalara ihtiyaç vardır.

Anahtar Sözcükler: depresyon; uyku hijyeni; uykusuzluk; yaşlı

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INTRODUCTION

The elderly population is increasing worldwide, and the World Health Organization predicts that the population aged 60 and over will continue to grow (1). In Turkey, it is also estimated that the elderly population will increase in the coming years (2). Sleep problems have become a major psychiatric problem for older people worldwide (3). Degenerations in the circadian rhythm control center and sleep-related brain regions cause deterioration in the rhythm and quality of sleep (4). Studies have shown that older adults have shorter sleep duration, increased sleep fragmentation, and decreased slow-wave sleep, and they go to bed earlier and wake earlier (5). A meta-analysis reported that most age-related sleep changes were present by age 60 (6).

Insomnia, defined as difficulty initiating or maintaining sleep or waking from it feeling rested, is the most common sleep problem in the elderly (3,5). It is linked to an increased risk of falls and mortality (3). Furthermore, it has been emphasized that decreased sleep quality is a core sign of psychiatric disorders and medical conditions in the elderly (3,5,6). For example, studies have shown that sleep quality is critical risk factor for the onset and recurrence of depression (7,8). Research has also revealed that insomnia may be associated with developing, recurring, and worsening depression, whereas depression may also cause insomnia; therefore, the bidirectional relationship between insomnia and depression is remarkable (9,10). Addressing insomnia plays a crucial role in treating depression by improving the quality of life and helping the individual gain functionality, among other things (8,13). However, the treatment of insomnia is complicated in older adults due to decreased sleep duration and quality, neglect of symptoms, increased comorbidities, the use of multiple medications, pharmacokinetics and pharmacodynamics changes, and drug compliance issues (11,12). Therefore, diagnosing insomnia in the elderly is complex, and research on its treatment is ongoing (5).

The sleeping pills used in elderly patients with insomnia are benzodiazepines and non-benzodiazepine sedatives; melatonin receptor agonists; various antidepressants, including phenylpiperazine compounds (trazodone); serotonergic antidepressants (mirtazapine/mianserin); atypic antipsychotics, such as quetiapine; and orexin receptor antagonists (13). However, antidepressants, which are commonly used to treat insomnia, can cause insomnia at the beginning of treatment, exacerbate insomnia, and impair treatment compliance (13). Therefore, while insomnia medications can be effective, the increased risk of drug interactions and drug side effects with aging highlights the importance of attempting treatment with non-pharmacological options before trying pharmacological options (5). Non-pharmacological options for the treatment of insomnia in the elderly include relaxation techniques, sleep hygiene improvement, and cognitive behavioral therapy (CBT) (14). They have been shown to be effective for long periods of insomnia, even in the elderly with cognitive impairment (14).

Sleep hygiene practices have been developed as suggestions for treating insomnia and have been enriched over time. They consist of recommendations for better sleep quality, such as having a personal daily sleep rhythm, regulating drinking and eating habits, considering environmental factors, and increasing physical activity (15,16). Psychosocial, behavioral, and environmental factors, chronic diseases, multiple medication use, and poor sleep hygiene all contribute to decreased sleep quality, which is natural in the elderly (17). Structuring sleep hygiene and taking it into account in the examination and treatment process may contribute to alleviating insomnia in the elderly (14,16). However, studies have shown that sleep restriction and sleep hygiene, which are safe, effective, and inexpensive ways of treating insomnia in the elderly, are not used adequately to treat insomnia in older adults with depression (OADs) (14,18).

This study hypothesizes that sleep hygiene significantly impacts treatment in sleeping pill users. The aim of the study is (a) to determine the sleeping pills used and (b) to investigate the relationship between sleep hygiene and insomnia severity, sleep quality, and depressive symptoms in OADs who are being treated for insomnia symptoms in a psychiatry outpatient clinic.

MATERIAL AND METHODS

Participants

The study participants consisted of 120 elderly individuals who were being treated for insomnia in a psychiatry outpatient clinic. Psychiatrists performed

Table 1. Sociodemographic characteristics

	Total (*n* = 120)	Group 1 (*n* = 66) ISI >7	Group 2 (*n* = 54) ISI <7		
	Mean (*SD*)	Mean (*SD*)	Mean (*SD*)		
Age	65.25 (3.23)	65.44 (3.62)	65.09 (2.90)		
	n (%)	*n* (%)	*n* (%)	*p*	χ^2
Gender†					
Female	65 (54.2)	28 (51.9)	37 (56.1)	0.645	0.212
Male	55 (45.8)	26 (48.1)	29 (43.9)		
Marital status†					
Married	89 (74.2)	40 (74.1)	49 (74.2)	0.983	5.148
Single/divorced	31 (25.8)	14 (25.9)	17 (25.8)		
Smoking†					
Yes	41 (34.2)	18 (33.3)	23 (34.8)	0.862	0.030
No	79 (65.8)	36 (66.7)	43 (65.2)		
Education†					
Low	40 (33.3)	21 (31.8)	19 (35.2)	0.440	1.643
Moderate	19 (59.2)	13 (19.7)	6 (11.1)		
High	61 (7.5)	32 (48.5)	29 (53.7)		
Employment†					
Retired/unemployed	89 (74.2)	51 (87.3)	38 (70.4)	0.287	2.494
Employed	31 (25.8)	15 (22.7)	16 (29.6)		
Presence of chronic diseases†					
Yes	98 (81.7)	57 (86.4)	39 (72.2)	0.054	3.712
No	22 (18.3)	9 (13.6)	15 (27.8)		
Psychiatric history†					
Yes	83 (69.2)	49 (74.2)	34 (63.0)	0.183	1.772
No	37 (30.8)	17 (25.8)	20 (37.0)		

*Sig at $p<.05$, SD = Standard deviation, † = chi-square ($\chi 2$) test, ISI = Insomnia Severity Index, n: number

Table 2. Mean of clinical variables

	Total (*n* = 120)	Group 1 (*n* = 66) ISI >7	Group 2 (*n* = 54) ISI <7		
	Mean *(SD)*	Mean *(SD)*	Mean *(SD)*	*t*	*p*
ISI†	7.89 (5.44)	11.70 (4.35)	3.24 (1.76)	-13.399	<0.001*
SHI†	12.88 (4.42)	14.09 (4.82)	11.39 (3.37)	-3.482	<0.001*
PSQI†	5.27 (2.10)	5.85 (2.19)	4.56 (1.76)	-3.516	<0.001*
BDI†	12.66 (4.18)	13.80 (4.24)	11.26 (3.69)	-3.465	<0.001*
BAI†	11.27 (4.02)	11.56 (3.77)	10.91 (4.32)	-0.884	0.378*

*Sig at *p<0.001*, † = Independent-samples t-test, SD = Standard Deviation, ISI = Insomnia Severity Index, SHI = Sleep Hygiene Index, PSQI = Pittsburgh Sleep Quality Index, BDI = Beck Depression Inventory, BAI = Beck Anxiety Inventory

mental status examinations of the patients. The inclusion criteria were:

- to be diagnosed with a depressive disorder according to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition
- age >60 years
- taking a single antidepressant for depression
- taking a single sleeping pill for insomnia for at least four weeks

The exclusion criteria were:

- ongoing chronic pain management
- diagnosis of sleep disorder (witnessed snoring, sleep apnea, restless legs syndrome)
- diagnosis of dementia, bipolar disorder, psychotic disorders, mental retardation, alcohol and/or substance abuse
- having a serious and unstable medical illness associated with insomnia

Table 3. Sleeping pills used for insomnia

	Total	ISI ≥7	ISI <7
	Total (*n* = 120) %	Group 1 (*n* = 66) %	Group 2 (*n* = 54) %
1. Trazadone	41 34.2%	22 33.3%	19 35.2%
2.Mianserin/Mirtazapine	26 21.7%	13 19.7%	13 24.1%
3.Quetiapine	26 21.7%	16 24.2%	10 18.5%
4.Amitriptyline	9 7.5%	3 4.5%	6 11.1%
5.Hydroxyzine/doxilamine	5 4.2%	3 4.5%	2 3.7%
6.Benzodiazepines	5 4.2%	3 4.5%	2 3.7%
7.Non-benzodiazepines (Zopiclone)	4 3.3%	3 4.5%	1 1.9%
8.Ramelteon	4 3.3%	3 4.5%	1 1.9%

ISI = Insomnia Severity Index, n = number

Table 4. Pearson product-moment correlation coefficients (*n*=120)

	1.	2.	3.	4.	5.	6.
1. Age	1					
2. ISI	-0.097	1				
3. SHI	-0.134	0.444**	1			
4. PSQI	-0.047	0.449**	0.329**	1		
5. BDI	-0.058	0.369**	0.466**	0.533**	1	
6. BAI	-0.068	0.243*	0.073	0.300*	0.285*	1

*Sig at *p*<.01, **Sig at *p*<.001, ISI = Insomnia Severity Index, SHI = Sleep Hygiene Index, PSQI = Pittsburgh Sleep Quality Index, BDI = Beck Depression Inventory, BAI = Beck Anxiety Inventory

Table 5. Multiple Linear Regression Results (n = 120)

Outcome	Predictors	*β*	Adj R^2	ΔR^2	Significance
ISI					
Step 1	PSQI	0.449	0.195	0.202	F (1, 118) = 29.798, p<0.001*
Step 2	PSQI	0.340	0.288	0.098	F (2, 117) = 16.444, p<0.001*
	SHI	0.332			

*Sig at *p*<.001, ISI = Insomnia Severity Index, SHI = Sleep hygiene Index, PSQI = Pittsburgh Sleep Quality Index, ΔR2 = R-squared change

Procedure

This study was based on an observational cross-sectional study determining the sleeping pills used by OADs and evaluating the relationship between insomnia severity and sleep hygiene. This study was conducted with patients who were being treated at the outpatient clinic of a state university hospital in Turkey.

Ethical considerations

Ethical approval for this study was obtained from the Afyonkocatepe University Clinical Research Ethics Committee (No: 2017/11-279, date: 03.11.2017). The study was conducted according to the principles of the Declaration of Helsinki. Written consent was obtained from all participants.

Measures

Sociodemographic data form

The sociodemographic form enquired about the participants' age, sex, education, employment, marital status, previous psychiatric disorders, and chronic illnesses.

Sleep Hygiene Index

The Sleep Hygiene Index (SHI) is a self-report scale consisting of 13 items answered using a Likert-type scale. It includes items that assess environmental and behavioral factors that can cause insufficient sleep. How often participants practice certain behaviors is assessed (always, often, sometimes, rarely, never). The content of the questions of the SHI was obtained from the diagnostic

criteria of impaired sleep hygiene in the "International Classification of Sleep Disorders" (19). The total score is the sum of each item scored between 0–4. Higher scores show worsening sleep hygiene. In this study, the Turkish version of the SHI, which has been validated and found reliable in studies, was used (20).

Pittsburgh Sleep Quality Index

The Pittsburgh Sleep Quality Index (PSQI) was used to determine the sleep quality of the participants. It consists of 19 items and seven sections that evaluate sleep quality, duration, sleep delay, activity, sleep disorders, sleeping pills, and daytime sleepiness. The total score ranges from 0 to 21, with lower scores indicating better sleep quality. The Turkish version of the PSQI was shown to have good validity and reliability (21).

Beck Depression Inventory

In this study, depressive symptoms were evaluated using the Beck Depression Inventory (BDI). This scale is a self-report scale consisting of 21 items. It is one of the most frequently used scales in the clinic for assessing the severity of depression. Each item is scored between 0–3, and the total scale score is calculated by summing all the items. Higher scores show higher levels of depression. This study used the Turkish version of the BDI, the validity, and reliability of which have been studied in a clinical sample (22).

Beck Anxiety Inventory

Anxiety symptoms were assessed using the Beck Anxiety Inventory (BAI). This scale is a self-report scale consisting of 21 items scored between 0–3 on a Likert-type scale. The items cover the subjective, somatic, and panic-related physiological and psychological dimensions of anxiety and measure the individual's anxiety levels in the last week. The Turkish form, which had sufficient validity and reliability in previous studies, was used (23).

Insomnia Severity Index

The Insomnia Severity Index (ISI) is a self-report scale consisting of seven items scored between 0–4 on a Likert-type scale. It evaluates the severity of insomnia, the effect of insomnia on daytime functioning, the awareness of insomnia problems, and distress about sleep difficulties. Higher scores indicate more severe insomnia symptoms. A study on the validity and reliability of the Turkish version of the ISI, which was used in this study, has been conducted (24).

Statistical analyses

Statistical Package for Social Sciences (SPSS) v20 was used for statistical analysis (IBM, New York, USA). The normality distributions of continuous variables were analyzed with skewness and kurtosis values (>-1 and <1). The chi-square test was used to compare categorical variables, and the independent samples *t*-test was used to compare continuous variables of groups that met the normality assumption. Numerical variables were given as mean±standard deviation (*SD*), and categorical variables as numbers or percentages (%). The relationships between age, PSQI, SHI, ISI, BDI, and BAI scores were analyzed using Pearson correlation. Significance levels were accepted as $p<0.05$. Multiple linear regression analysis (with the stepwise method) was used to determine the predictors of the ISI level. No normality, covariance, or multicollinearity violations were observed for the regression assumptions.

RESULTS

The study sample consisted of 120 participants, 65 (54.2%) of whom were female, and the mean age was 65.2 (±3.2). The participants were divided into two groups according to their ISI scores those with and without significant insomnia severity (cut-off score=7). There was no significant difference between the groups with and without significant insomnia symptoms in terms of age, sex, smoking status, marital status, education level, employment status, prior psychiatric history, and presence of chronic disease. All sociodemographic data and comparison analyzes of the groups are shown in Table 1. Insomnia severity, sleep hygiene, depression, and subjective sleep quality scores were significantly higher in the group with significant insomnia symptoms than in those without. However, there was no significant difference in anxiety scores (Table 2). The results also showed that trazodone (*n*=41, 34.2%), mirtazapine/mianserin (*n*=26, 21.7%), and quetiapine (*n*=26, 21.7%) were used most frequently to treat insomnia (Table 3).

According to the results of the Pearson correlation analysis, a positive and significant relationship was found between the severity of insomnia and sleep hygiene, subjective sleep quality, depression, and anxiety scores (r=0.444, r=0.449, r=0.369, and r=0.243 respectively) (Table 4).

In the multiple linear regression analyses, insomnia severity was taken as the dependent variable, and sleep hygiene, subjective sleep quality, depression, and anxiety were taken as the independent variables. In the regression analysis results, subjective sleep quality explained 20% (β=0.340; p=0.001) and sleep hygiene 9% (β=0.332; p=0.001) of insomnia severity. Depression and anxiety were not found to be significant predictors in the model (Table 5). Sleep hygiene practices were associated with insomnia severity independent of subjective sleep quality, depression, and anxiety.

DISCUSSION AND CONCLUSION

The present study investigated whether sleep hygiene was associated with insomnia severity independent of depression, anxiety, and sleep quality in OADs using sleeping pills. The group with clinical insomnia had poorer sleep hygiene, lower subjective sleep quality, and higher levels of depression than the group without clinical insomnia. The results reported that trazodone, mirtazapine, and quetiapine were commonly used to treat insomnia. Further, the results determined that subjective sleep quality and sleep hygiene independently predicted insomnia severity, whereas depression and anxiety did not. The association between sleep hygiene and insomnia severity in OADs highlights simple behavioral approaches to managing insomnia.

The human body, including the nervous system, metabolism, hormones, and many brain activities, is physiologically cyclical (based on a 24-hour cycle) (25). The sleep-wake cycle, managed by the circadian clock and homeostasis, plays an important role in adult sleep quality (26). The circadian clock operates with melatonin relative to light and dark in the suprachiasmatic nucleus (SCN), the biological rhythm center (25). The SCN and related brain regions endure neuronal degeneration during the aging process, disrupting many physiological parameters, such as melatonin release (27). Because of this, sleep difficulties associated with initiating and achieving restful sleep, such as insomnia, have been noticeably observed in the elderly (3). Older adults fall asleep earlier, wake up earlier, and have lower subjective sleep quality than younger adults (3).

Changes in sleep structure in the natural aging process are manifested primarily by decreased subjective sleep quality (6). The results of this study showed that lower subjective sleep quality predicts insomnia severity with the greatest variance in OADs, consistent with previous research results (5). The lower subjective sleep quality in OADs treated for insomnia may also be explained by the side effects of the drugs used and the changes in the sleep structure of the natural aging process (5). The results of the study also showed that sleep hygiene predicted the severity of insomnia during the response to insomnia treatment, independent of subjective sleep quality.

Insomnia, the most common sleep problem in the elderly, is affected by many conditions, such as chronic diseases and sleep habits (17). It is also an important symptom of depression that influences the response to depression treatment (3). Sedative antidepressants, benzodiazepines, and antihistamines are recommended to treat insomnia in the elderly (12). Medications prescribed for insomnia can cause hypotensive and anticholinergic effects, which increase the risk of falls and confusion; the increased drug interactions of those drugs with age can also complicate treatment adherence (12,17). The lowest available dose of most medications should be used with intense caution in older adults (12). The current study determined that sedative antidepressants (mirtazapine and trazodone) and sedative antipsychotics (quetiapine) were frequently used. This may suggest a crucial condition in the elderly, as antipsychotics can cause serious side effects.

The noteworthy clinical finding of this study was that sleep hygiene predicts insomnia severity in OADs using insomnia medication, independent of subjective sleep quality. Although sleep is strongly biologically managed, the ability to fall asleep and stay asleep at the desired time is vulnerable and affected by many factors (29). Identifying and maintaining these factors is central to the treatment of insomnia in the elderly. For example, environmental influences such as screening and light exposure can delay the natural tendency to sleep early in the elderly (28). Furthermore, SCN

degeneration has been reported to be a major factor in developing insomnia and depression (28). Older adults who delay their sleep hours by resisting natural age-related circadian changes may experience increased depressive symptoms, rumination, anxiety, and hopelessness (30). Thus, although the individual's subjective sleep quality may be good, their sleep hygiene may have deteriorated (10). This leads to dysfunctional beliefs about sleep hygiene and distracts them from prevention attempts.

Sleep hygiene education has proven efficacy as a non-pharmacological practice in treating insomnia in the elderly and is included in the guides as an additional option (14). Sleep hygiene is a basic and natural behavioral therapeutic approach to improving sleep quality (16). However, it should be noted that poorer sleep hygiene might be a compensatory response to insomnia (for example, caffeine is used to suppress antidepressant-induced daytime sleepiness) or the result of efforts to socialize in the evening (3). Changes in behavior resulting from sleep problems can worsen insomnia symptoms.

Some limitations of this study should be addressed. First, insomnia severity, depressive symptoms, and sleep hygiene were assessed using self-report scales. Since this was a cross-sectional study, it was not possible to determine the cause-effect relationships between depressive symptoms, insomnia severity, and sleep hygiene. Doses of antidepressants and insomnia medications and differences in chronic diseases were not evaluated. The effect of physical activity or exercise on insomnia severity was not assessed. The results cannot be generalized because the present study was carried out in a single center with small sample size.

To the best of our knowledge, there is no study examining the impact of sleep hygiene on the effect of sleeping pills on insomnia severity in OADs. The results of this study suggest that structuring sleep hygiene practices can contribute to the treatment of insomnia. Longitudinal follow-up studies of structured sleep hygiene approaches in OADs are needed.

Conflict-of-interest and financial disclosure

The author declares that she has no conflict of interest to disclose. The author also declares that she did not receive any financial support for the study.

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