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## Original Article

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### Abstract

**Objectives.** Sleep problems are common in palliative care patients. In addition, psychological problems can affect sleep quality. The aim of this study was to investigate sleep quality, anxiety, and depression in palliative care patients.

**Methods.** The study was conducted between May 1, 2023 and October 31, 2023 in Turkey. The patient information form, the Pittsburgh Sleep Quality Index (PSQI), and the Hospital Anxiety and Depression Scale (HADS) were used to collect data. The data were analyzed using the Pearson correlation and multiple linear regression test.

**Results.** A total of 59.3% of patients were male, 76.7% were married, 89.3% had poor sleep quality, 61.3% had anxiety, and 86.7% were at risk of depression. A positive moderate correlation was found between HADS-anxiety, HADS-depression, and HADS total with subjective sleep quality. A positive moderate correlation was found between HADS-anxiety, HADS depression, and HADS total with the PSQI total. Sleep latency, sleep duration, sleep disturbances, use of sleep medication, and daytime dysfunction showed a weak positive correlation with HADS-depression and HADS total. In the regression analysis, anxiety proved to be a statistically significant predictor of sleep quality, while depression was not a significant predictor. These variables were found to explain 22% of the total variance in sleep quality.

**Significance of results.** The patients' sleep quality was poor. Anxiety and the risk of depression were high. A positive moderate correlation was found between the total score of sleep quality and anxiety and depression. Anxiety was found to be a statistically significant predictor of sleep quality.

## Introduction

According to the World Health Organization (WHO), palliative care is defined as care to improve the quality of life of patients who face challenges associated with life-threatening physical, psychological, social or spiritual illness, and their families. It also improves the quality of life of caregivers. Annually, an estimated 40 million people need palliative care; 78% of them live in low- and middle-income countries. Worldwide, only 14% of people in need of palliative care can currently receive it. To increase access, adequate national policies, programs, resources, and training on palliative care for health professionals are needed. The need for palliative care will continue to grow worldwide as a result of the aging of the population and the increasing burden of nontransmittable diseases and some transmittable diseases. Early delivery of palliative care reduces unnecessary hospitalizations and utilization of health services. Palliative care is a fundamental human right for all people, regardless of disease type, income, or age (WHO 2022). Palliative care benefits patients, their families, and the health system by improving symptom management and patient/family satisfaction, reducing unnecessary hospitalizations and procedures for patients approaching the end of their lives, and reducing prolonged grief and post-traumatic time (Çamcı and Oğuz 2018, 2023; Çamcı et al. 2024).

Sleep problems are among the most common and unsustainable symptoms in palliative care patients. This is a burden not only for the patient but also for his/her family and caregivers (Davies 2019; Jeon et al. 2024; Wilson et al. 2019). More than 60% of palliative care patients have sleep disorders which are strongly associated with increased pain, inflammation, development of depression and delirium, and increased potential for falls (Medic et al. 2017; Mercadante et al. 2015). Poor sleep quality such as falling asleep late, waking up early in the morning, prolonged night awakening periods, nonrestful sleep, and daytime sleepiness are common sleep problems in palliative patients (He et al. 2022a; Mercadante et al. 2017, 2015). It has been reported that these problems are present in 30–50% of patients after diagnosis or initiation of treatment.

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Causes of poor sleep quality may include anxiety, depression, pain, opioid use, fatigue, the cancer treatment itself, and its side effects. Furthermore, symptoms of anxiety and depression can be worsened by poor sleep quality (He *et al.* 2022a; Mercadante *et al.* 2017). In a study conducted with lung cancer patients, it was found that the prevalence of sleep quality, anxiety, and depression were 56.1%, 48.9%, and 56.1%, respectively (He *et al.* 2022a). Sleep disorders are frequently seen in palliative care patients and may be associated with psychological problems. Sleep disorders and psychological issues significantly affect the quality of life. Therefore, it is important to identify and manage sleep quality, anxiety, and depression in palliative care patients (Mercadante *et al.* 2017). This study aimed to determine sleep quality, anxiety, and depression in palliative care patients.

## Material and methods

### Research objective

This descriptive and correlational study was designed to determine sleep quality, anxiety, and depression in palliative care patients.

### Research questions

How is sleep quality in palliative care patients?

What are the anxiety and depression levels of palliative care patients?

Is there a correlation between sleep quality with depression and anxiety in palliative care patients?

Are anxiety and depression significant predictors of sleep quality?

### Research place and time

The study was carried out between May 1 and October 31, 2023 in the palliative care wards of a state hospital and a training and research hospital in Istanbul, Turkey.

### Research sample

The size of the study sample was calculated using the G\*Power 3.1.9.7 program (Faul *et al.* 2007). In the calculation, the sample size was calculated for the correlation: bivariate normal model. In the calculation, the sample size was calculated as 84 considering two tails, an effect size of 0.30 ( $r = 0.30$ ) (Cohen 1988; Polit and Beck 2008), a margin of error of 5% ( $\alpha = 0.05$ ), a power of 80% ( $1 - \beta = 0.80$ ), and an  $h_0$  correlation value of 0. However, the aim was to reach the largest sample size in the study. In the post hoc power analysis, the power was determined as 0.999 based on two-way analysis, an effect size of 0.421 (correlation between total PSQI and depression  $r: 0.421$ ), a total sample size of 150, and an  $h_0$  correlation value of 0. The sample size was found to be adequate.

### Inclusion criteria

Agreeing to participate in the research\approving the informed consent form.

Being able to answer the questionnaire independently or with the help of the researcher.

Being aged over 18 years.

Being hospitalized in a palliative care unit for at least 1 week.

### Exclusion criteria

Wishing to voluntarily withdraw from the study during the study period

Having a psychiatric diagnosis

### Data collection method and tools

A Patient Information Form, the Pittsburgh Sleep Quality Index, and the Hospital Anxiety and Depression Scale were used for data collection. Data were collected face-to-face in patients' rooms. It took approximately 20 minutes to answer the questions.

### Patient information form

The Patient Information Form was prepared based on the literature review (He *et al.* 2022a; Mercadante *et al.* 2017, 2015) and consists of 11 questions regarding the patient's demographic (age, marital status, sex, smoking status, etc.) and medical characteristics (comorbidities, medical diagnosis, etc.).

### Pittsburgh Sleep Quality Index

The Pittsburgh Sleep Quality Index (PSQI) was developed by Buysse *et al.* in 1989. The index questions are answered by considering the last 1 month. In this index, which consists of 24 questions in total, 19 questions are answered by the respondent and 5 questions are answered by the respondent's bedmate or roommate. The 19 questions answered by the respondents are used in the evaluation of sleep quality. Therefore, these 19 questions in the index were asked of the participants. The 5 questions answered by the person's bedmate or roommate were not asked. The instrument consists of 7 subscales. These are Subjective sleep quality, Sleep latency, Sleep duration, Habitual sleep efficiency, Sleep disturbances, Use of sleep medication, and Daytime Dysfunction. Each subcomponent is scored between 0 and 3. The scores on the subcomponents are then summed and a total PSQI score is obtained between 0 and 21. A PSQI score below 5 indicates good sleep quality, while a score of 5 or above indicates poor sleep quality (Buysse *et al.* 1989). Ağargün *et al.* determined that it is a valid and reliable instrument in Turkey in 1996 (Ağargün *et al.* 1996). In this study, the Cronbach alpha coefficient of the index was 0.72.

### Hospital Anxiety and Depression Scale (HADS)

The Hospital Anxiety and Depression Scale was developed by Zigmond and Snaith in 1983. This scale is not a diagnostic tool. It allows for rapid assessment of patients and determination of risk. The scale consists of a total of 14 questions; odd-numbered items identify anxiety and even-numbered items identify depression. Items are scored on a scale between 0 and 3. Items 1, 3, 5, 6, 8, 10, 11, and 13 are scored as 3, 2, 1, 0. Items 2, 4, 7, 9, 12, and 14 are scored as 0, 1, 2, 3. Depression and anxiety are separately scored and a maximum score of 21 is calculated for each (Zigmond and Snaith 1983). The Turkish validity and reliability study of HADS was conducted by Aydemir *et al.* in 1997. The cut-off point of the anxiety subscale is 10 and the cut-off point of the depression subscale is 7. Values above these are included in the risk group. The Cronbach alpha coefficient was 0.85 for the anxiety subscale and 0.77 for the depression subscale (Aydemir 1997). In this study, the Cronbach alpha coefficient was 0.66 for anxiety and 0.75 for depression.

## Ethical consideration

Verbal and written informed consent was taken from the participants. Ethical approval was granted by the noninvasive clinical trials ethics committee of a university (29.12.2022/133).

## Statistical analysis

The data obtained in the study were evaluated in the SPSS statistical program. Frequency and percentage analyses were utilized to determine the descriptive characteristics of the patients, and mean and standard deviation statistics were used to examine the scale. Skewness and Kurtosis values were examined to determine whether the research variables showed normal distribution. Skewness/Kurtosis values were calculated as  $-0.435/0.165$  for sleep quality scale,  $-0.051/0.642$  for anxiety and  $-0.064/0.677$  for depression. The kurtosis and skewness values of the variables between  $+1.5$  and  $-1.5$  or  $+2.0$  and  $-2.0$  indicate normal distribution (George and Mallery 2019). It was determined that the variables showed normal distribution. Parametric methods were used in data analysis. The correlations between the patients' scale scores and continuous variables were analyzed using Pearson correlation analysis. Correlation coefficients ( $r$ ) of 0.00–0.10 were evaluated as insignificant, 0.10–0.39 as weak, 0.40–0.69 as moderate, 0.70–0.89 as high, and 0.90–1.00 as very high (Schober et al. 2018). A multiple linear regression analysis (enter model) was performed to determine the effect of anxiety and depression on sleep quality.

## Results

Of the patients, 59.3% were male, 76.7% were married, 45.3% had a cancer diagnosis, 28.7% had a medical diagnosis of cardiovascular diseases, 10.7% had a medical diagnosis of COPD. Of the patients, 64.7% were aged 65 years or over, 52% were illiterate/literate, 72% were unemployed, 78.7% had an income/expense balance, 93.3% lived with their families; 60% quit smoking, 39.3% had hypertension, and 9.3% had diabetes mellitus. The mean body mass index of the patients was  $23.88 \pm 2.46$  kg/m<sup>2</sup> (Table 1).

The scores of the patients on the seven subscales of PSQI were  $1.82 \pm .79$  for subjective sleep quality,  $1.57 \pm .84$  for sleep latency,  $0.40 \pm .59$  for sleep duration,  $1.20 \pm 1.42$  for habitual sleep efficiency,  $2.06 \pm .59$  for sleep disturbance,  $1.47 \pm 1.05$  for use of sleep medication, and  $1.60 \pm .86$  for daytime dysfunction. The total PSQI score was  $10.14 \pm 3.54$ . The mean HADS scores were  $11.66 \pm 3.60$  for anxiety and  $11.24 \pm 3.76$  for depression. The total HADS score was  $22.90 \pm 6.85$ . According to the cut-off values of the scales, 89.3% of the patients had poor sleep quality, 61.3% had anxiety, and 86.7% had a risk of depression (Table 2).

There was a moderate positive correlation between subjective sleep quality and HADS-anxiety ( $r = .431$ ;  $p < .001$ ), HADS-depression ( $r = .417$ ;  $p < .001$ ), and HADS-total ( $r = .455$ ;  $p < .001$ ). There was a positive moderate correlation between the total PSQI and HADS-anxiety ( $r = .466$ ;  $p < .001$ ), HADS-depression ( $r = .421$ ;  $p < .001$ ), and HADS-total ( $r = .476$ ;  $p < .001$ ). There was a weak positive correlation between sleep latency, sleep duration, sleep disturbance, use of sleep medication, and daytime dysfunction and HADS-depression and HADS-total (Table 3).

A multiple linear regression analysis was performed to determine the effect of anxiety and depression on sleep quality. The model was statistically significant ( $F(2,147) = 22.024$ ;  $p < .001$ ). Anxiety ( $p = .002$ ) was a statistically significant predictor of sleep

**Table 1.** Distribution of patients according to descriptive characteristics ( $n = 150$ )

	Variables	<i>n</i>	%
<b>Gender</b>	Female	61	40.7
	Male	89	59.3
<b>Marital status</b>	Married	115	76.7
	Single	35	23.3
<b>Medical diagnosis</b>	Cancer	68	45.3
	Cardiovascular disease	43	28.7
	Chronic obstructive pulmonary disease	16	10.7
	Alzheimer's disease	12	8
	Parkinson's disease	11	7.3
<b>Age, Mean <math>\pm</math> Sd (min-max) = 69.346 <math>\pm</math> 11.672(36–91)</b>	<64	53	35.3
	$\geq 65$	97	64.7
<b>Education status</b>	Illiterate/literate	78	52
	Primary/secondary school	55	36.7
	High school/university	17	11.3
<b>Working status</b>	Unemployed	108	72
	Retired	42	28
<b>Economic situation</b>	Income expense balanced	118	78.7
	Income more than expenses	29	19.3
	Income less than expenses	3	2
<b>Who lived with</b>	Alone	3	2
	With family (spouse or child)	140	93.3
	With friends or relatives	7	4.7
<b>Smoking status</b>	Never used	60	40
	Quit	90	60
<b>Comorbid diseases</b>	Coronary artery disease	4	2.7
	Diabetes mellitus	14	9.3
	Hypertension	59	39.3
<b>Body mass index mean <math>\pm</math> Sd(min-max)</b>	$23.88 \pm 2.46(16.98 - 33.20)$ kg/m <sup>2</sup>		

quality. These variables explained 22% of the total variance of sleep quality (adjusted  $R_2 = .220$ ) (Table 4).

## Discussion

In this study, patients were found to have poor sleep quality and a high risk of anxiety and depression (Table 2). In a study conducted with patients with advanced liver disease, the risks of poor

**Table 2.** Sleep quality, anxiety and depression scores of patients (N : 150)

Dimission	Mean ± Sd	Min	Max
Subjective sleep quality	1.82 ± .79	0	3
Sleep latency	1.57 ± .84	0	3
Sleep duration	0.40 ± .59	0	2
Habitual sleep efficiency	1.20 ± 1.42	0	3
Sleep disturbance	2.06 ± .59	0	3
Use of sleep medication	1.47 ± 1.05	0	3
Daytime dysfunction	1.60 ± .86	0	3
PSQI total	10.14 ± 3.54	1	19
HADS anxiety	11.66 ± 3.60	0	20
HADS-depression	11.24 ± 3.76	0	21
HADS total	22.90 ± 6.85	0	40
		<b>n</b>	<b>%</b>
PSQI total score	≤5	16	10.7
	>5	134	89.3
HADS-anxiety score	≤10	58	38.7
	>10	92	61.3
HADS-depression score	≤7	20	13.3
	>7	130	86.7

PSQI:Pittsburgh Sleep Quality Index; HADS:Hospital Anxiety and Depression Scale.

sleep quality, anxiety, and depression were reported to be 56.1%, 48.9%, and 56.1%, respectively (He et al. 2022b). Mercadante et al. revealed that more than 60% of palliative care patients had sleep disorders (Mercadante et al. 2015). In some studies, the prevalence of poor sleep in palliative care patients has ranged between 60% and 80%(Bernatchez et al. 2016, 2018; Hugel et al. 2004; Mercadante et al. 2017; Renom-Guiteras et al. 2014; Sela et al. 2005). In studies, approximately 50% of palliative care patients have been found to be at risk for anxiety and depression (Atinafu et al. 2022; Bužgová et al. 2015; Delgado-Guay et al. 2009; Gontijo Garcia et al. 2023; Wilson et al. 2007). In this study, similar results to the above-mentioned studies were observed. Sleep problems, anxiety, and depression are very common in palliative care patients. Symptom control is important in palliative care patients. Good symptom management results in a better quality of life. Therefore, pharmacological and nonpharmacological methods should be implemented for sleep problems, anxiety, and depression in patients.

In this study, a moderate positive correlation was determined between total sleep quality score and anxiety and depression (Table 3). In a study conducted with patients with advanced liver disease, it was found that there was a correlation between sleep quality, anxiety, and depression (He et al. 2022b). Mercadante et al. and Yennurajalingam et al. reported a positive correlation between anxiety and depression scores and sleep disorders (Mercadante et al. 2015; Yennurajalingam et al. 2016). In several studies, a correlation has been found between sleep quality score and anxiety and depression (Mercadante et al. 2017; Renom-Guiteras et al. 2014; Sela et al. 2005; Zengin and Soyaslan 2024). Similar results have been found in the above-mentioned studies. The psychological state of patients affects their sleep quality. Even sleep problems may cause psychological problems.

**Table 3.** Correlation between patients' sleep quality, anxiety and depression

		HADS-anxiety	HADS-depression	HADS-total
Subjective sleep quality	r	.431**	.417**	.455**
	p	<.001	<.001	<.001
Sleep latency	r	.246**	.247**	.265**
	p	.002	.002	.001
Sleep duration	r	.176*	.183*	.193*
	p	.031	.025	.018
Habitual sleep efficiency	r	.039	.064	.056
	p	.634	.439	.500
Sleep disturbance	r	.402**	.300**	.376**
	p	<.001	<.001	<.001
Use of sleep medication	r	.332**	.315**	.347**
	p	<.001	<.001	<.001
Daytime dysfunction	r	.406**	.279**	.366**
	p	<.001	.001	<.001
PSQI total	r	.466**	.421**	.476**
	p	<.001	<.001	<.001
HADS-anxiety	r	1	.733**	.928**
	p		<.001	<.001
HADS-depression	r	.733**	1	.934**
	p	<.001		<.001

\* < 0.05; \*\* < 0.01; r: Pearson Correlation; PSQI: Pittsburgh Sleep Quality Index; HADS:Hospital Anxiety and Depression Scale.

In this study, anxiety was found to be a statistically significant predictor of sleep quality whereas depression was not (Table 4). In the study conducted by Mercadante et al. with palliative care patients, anxiety and depression were found to affect sleep quality according to multivariate regression analysis (Mercadante et al. 2017). In another study, it was found that hopelessness was a predictor of sleep quality in the multiple regression analysis. Depression was not found to be a significant predictor (Mystakidou et al. 2007). The results of the study of Mercadante et al. do not support this study, while the study conducted by Mystakidou et al. revealed similar results to this study. Anxiety, unhappiness, and stress affect sleep quality due to excessive secretion of sympathetic hormones. Depression symptoms differ between individuals. Some individuals experience insomnia, while others tend to sleep. For this reason, only anxiety is considered to be a significant predictor in this study.

## Conclusion

It was found that patients had poor sleep quality and a high risk of anxiety and depression. A moderate positive correlation was

**Table 4.** Effect of anxiety and depression on sleep quality

Model	Unstandardized Coefficients		Standardized Coefficients			%95 CI for B	
	B	SE	$\beta$	t	p	Lower Bound	Upper Bound
(Constant)	4.423	.899		4.922	<.001	2.647	6.200
HADS-anxiety	.334	.104	.340	3.200	.002	.128	.541
HADS-depression	.162	.100	.172	1.614	.109	-.036	.359

$R = .480$ ,  $R^2 = .231$ , Adjusted  $R^2 = .220$ , Durbin-Watson = 1.530,  $F = 22.024$ ,  $p < .001$

CI.:confidence interval; SE: standard error;  $\beta$ :standardized regression coefficient; HADS:Hospital Anxiety and Depression Scale.

found between total sleep quality score and anxiety and depression. Anxiety was determined to be a statistically significant predictor of sleep quality. Sleep disorders are quite common in palliative care patients. It significantly affects the quality of life of patients suffering from terminal illnesses. It is important to realize that poor sleep quality is not an inevitable and untreatable consequence of the end-of-life process. Palliative patients do not report or are not adequately questioned by health professionals. Sleep can be improved through various pharmacological and nonpharmacological interventions. Poor sleep affects quality of life and can increase the severity of symptoms such as pain, depression, or anxiety. Moreover, psychological problems affect sleep quality. The high prevalence of anxiety and depressive symptoms indicates a need for psychological support.

**Data availability statement.** The data that support the findings of this study are not openly available due to reasons of sensitivity and are available from the corresponding author upon reasonable request.

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**Author contributions.** G.Ç., S.O., Ö.O., and Ö.A. made a substantial contribution to the concept and design of the work. G.Ç., Ö.O., and Ö.A. led the data aggregation. G.Ç., S.O., Ö.O., and Ö.A. substantially contributed in the interpretation of data. G.Ç., S.O., Ö.O., and Ö.A. drafted the article and all authors revised it critically. All authors reviewed the manuscript for intellectual content. All authors have reviewed and agreed this version.

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**Competing interest.** All authors declare that they have no competing interests.

**Ethical Approval.** Ethical approval for the study was obtained from Marmara University, Faculty of Health Sciences, Non-Invasive Clinical Research Ethics Committee (29.12.2022/133).

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