RESEARCH ARTICLE

Sleep Quality in Lung Cancer Patients

Rüveyda Gelişken Akyüz[1], *Özlem Uğur[2]*, Ayfer Elçigil[2]

Abstract

Background: The aim of this study was to determine factors affecting sleep quality of 100 patients with advanced stage lung cancer. Methods and Results: it was a descriptive study. A variety of assessment tools were used to provide sleep scores to examine the relation between adverse effects caused by the treatment (nausea, vomiting, fatigue) and sleep quality. As a result, no statistically significant relation between coughing and respiratory problems of patients, or existing depression, and average sleep quality score was found (KW:0.872, p=0.646, KW: 3.174, p=0.205, u: 441.000 p=0.916). It was revealed that nausea and loss of appetite experienced also did not affect the sleep quality score (p>0.05), whereas problems such as vomiting and fatigue did exert effects (p<0.01). Conclusions: Patients with advanced stage lung cancer suffer from sleep problems and cancer related symptoms also affect their sleep quality negatively. Nurses should plan interventions that can control symptoms such as pain, vomiting and fatigue, which affect the sleep of patients.

Keywords: Lung cancer - sleep quality - cancer-related symptoms - patient QOL - Turkey

Asian Pacific J Cancer Prev, **14 (5)**, 2909-2913

Introduction

Lung cancer is the third most common cancer diagnosed among men and women (after prostate cancer and breast cancer), the annual burden of disease is larger than that of any other cancer. In 2012, the American Cancer Society estimates that lung cancer will account for 160,340 deaths, which is approximately 28% of all deaths from cancer in the United State (Wender et al., 2013). The quantity and quality of sleep comprise an important factor that affects the life quality of both healthy and sick individuals (Mercadante et al., 2004). A great deal of symptoms occurs in association with cancer and the treatment (Lutz et al., 2001; Aynur et al., 2010). Majority of problems such as pain, fatigue, anxiety and depression, which develops in association with cancer and the treatment, affect the quality of sleep (Theobald, 2004; Mercadante et al., 2010). Sleep disturbances, such as difficulty in falling asleep, maintaining sleep, poor sleep efficiency, early awakening, and excessive daytime sleepiness, are common in patients with cancer (Zarogoulidis et al., 2013). Developed in patients with lung cancer fatique, anxiety and depression affects patients' sleep and causes mental status (Shuanglan et al., 2013).

Sleep problem is among the adverse effects that is experienced by cancer patients most frequently (Davidson et al., 2002; O'Donnell, 2004; Berger et al., 2005; Kvale and Shuster, 2006; Whıtmer et al., 2006). There are results indicating that sleep problems are experienced by cancer patients more, compared to the other population (Mercadante et al., 2004; Vena et al., 2006; Mystakidou et al., 2009). However, sleep problem is perceived as a normal and temporary reaction that develops in association with the cancer treatment and has not been analysed adequately yet (Davidson et al., 2002; Fortner et al., 2002; Mercadante et al., 2004; Roscoe et al., 2007; Mystakidou et al., 2009; Savard et al., 2011).

Sleep problems are also considered important for patients with lung cancer. As a result of the studies performed, it was determined that patients with lung cancer suffer from sleep problems and this affects the life quality (Chen et al., 2004; O'Donnell, 2004; Vena et al., 2006; Gooneratne et al., 2007; Yale et al., 2007; Joyce et al., 2008; Lis et al., 2008).

Among the sleep problems, there are problems such as difficulty in falling asleep, early wakings, restless sleep, and frequent wakings at night and waking dreams (Lianqi, 2008). Sleep problems experienced by cancer patients cause the poor quality of sleep. The poor quality of sleep cause the development or increase of various physical, cognitive and psychological symptoms, such as impairment of concentration, fatigue, pain, anxiety, irritability, depression, hallucinations, poor apettite, constipation, increase of accident rate (Savard et al., 2004; Myastakidou et al., 2007; Mercadante et al., 2010; Guay et al., 2011).

Among the factors affecting the sleep disorder in cancer patients are gender, age, former sleep history, cancer diagnosis and treatment period, stage of cancer, disease and symptoms experienced in association with the treatment (O'Donnell, 2004; Berger et al., 2005; Kvale and Shuster, 2006; Myastakidou et al., 2007). It was

*[1]Konya Numune Hospital, Konya, [2] Oncology Nursing Department, Dokuz Eylul University Nursing Faculty, İzmir, Turkey *For correspondence: ozlem.ugur@deu.edu.tr*

determined that the symptoms observed on the patient, such as pain, fatigue, dyspnea and cough affect the sleep of the patient. The implemented studies indicated that sleep quality is in association with pain (Mystakidou et al., 2007; 2009), fatigue (Roscoe et al., 2007), dyspnea (Gooneratne et al., 2007) and depression (Chen et al., 2004; Akechi et al., 2007; Mystakidou et al., 2009).

In our country, it is seen that there is a limited number of studies aimed at the sleep problem experienced by patients with lung cancer and its affecting factors (Albayrak, 2006). In his study where she researched sleep disorders in patients with lung cancer, Albayrak (2006) stated that 54.9% of the hospitalized patients (n:87) have sleep problems. Besides, sleep problem is also frequently observed on patients in association with the adverse effects experienced during the chemotherapy and radiotherapy treatments used for lung cancer (Görgüner, 2007). If the sleep problems of the patient and their reasons are diagnosed, the interventions required to increase the sleep quality of the patient can be planned. As well as determining the factors affecting the sleep quality of patients with advanced stage lung cancer, the findings obtained in this study emphasize the importance for nurses to make accurate diagnosis and planning aimed at these problems.

Materials and Methods

The study was performed for determining the factors affecting the sleep quality of patients with advanced stage lung cancer.

Sample

The population of the study is constituted of patients, who were hospitalized in Chest Diseases Service of a university hospital in the Province of İzmir, due to the diagnosis of lung cancer. The population of the study is constituted of 100 patients diagnosed with stage three and four lung cancer, who are older than 18 and have no perceptional problem.

Procedures and measurements

In the study, the data were collected by using three forms were prepared by using the literature: Personal Information Form, Visual Analogous Scale-Pain (VAS-Pain), Visual Analogous Scale-Sleep (VAS-Sleep). The data were filled by the researcher by interviewing with the participants. The pre-application of the study was performed on 10 patients with lung cancer, who were convenient for the election criteria.

Personal Information Form includes the personal characteristics of patients (age, gender, educational status, income state), and their information about the disease (respiration problem, existence of cough and pain, state of receiving chemotherapy and radiotherapy, state of depression) (Foley et al., 2006).

In the VAS-Pain form, the patients were required to evaluate the level of their pain on the visual analogous scale that shows the consecutive numbers from 0 to 10 (Yıldırım et al., 2006).

In the VAS-Sleep form, the patients were required to evaluate the quality of their quality of sleep on the visual analogous scale that shows the consecutive numbers from 0 to 10 (Herbert et al., 1976; Parrot and Hindmarch,1980; Lui and Lo, 2002).

Statistical analysis

During the evaluation of the data, Kruskal Wallis analysis was used for the relation between the frequency and percentage distributions of definitive variables of patients, average of VAS-Pain and VAS-Sleep scores in patients with lung cancer, maximum, minimum and standard deviation values, cough and respiration problem and sleep quality; Mann-Whitney U test was used for the relation between adverse effects caused by the treatment (nausea, vomiting, fatigue) and sleep quality; and Pearson correlation statistical analysis was used for the relation between the VAS-Pain score and VAS-Sleep score.

Ethics

Permission was obtained from the ethics committee of the university hospital in order to implement the study. In addition to this, patients were informed about the object and method of the study by the researcher and patients who accepted to participate in the study were included in the study.

Results

Defining characteristics about the patients who were included in the study are given in Table 1. While 82% of

Table 1. Demographic and Disease-related Patient's Characteristics

Categories		N %	N %
Age (years)	Mean (Sd)	61.9	2-10
Hospitalization time (days)	Mean (Sd)	4.0	4.0
Education	Compulsory school less	3.0	3.0
	Primary education	29.0	29.0
	Secondary education	51.0	51.0
	University degree	17.0	17.0
Economic Status	Revenue at the drain	17.0	17.0
	Equal income and expense	80.0	80.0
	Income and expenditure over	3.0	3.0
Tumor type	Nonsmal cell lung cancer	56.0	56.0
	Smal cell lung cancer	44.0	44.0
Making the diagnosis time	<1 year	16.0	16.0
	12-23 months before	43.0	43.0
	24-35 months before	31.0	31.0
	36 monts and after	10.0	10.0
Chemotherapy Treatment	Yes	85.0	85.0
	No	15.0	15.0
Radiotherapy Treatment	Yes	45.0	45.0
	No	55.0	55.0
Cough	Exists	19.0	19.0
	Sometimes	36.0	36.0
	None	45.0	45.0
Respiration Problem	Exists	37.0	37.0
	Sometimes	36.0	36.0
	None	27.0	27.0
Depression	Exists	10.0	10.0
	None	90.0	90.0
Pain	Exists	68.0	68.0
	None	32.0	32.0

Table 2. The Relation between the Symptoms Experienced by Patients and Averages of Sleep Quality Scores

Symptoms		Sleep Quality		
		Average±ss	Test value	p
Side Effect of Living	Yes	3.79±2.36	u: 840.000	0.705
	No	4.00±2.71		
Cough	Exists	3.60±2.34	kw: 0.872	0.646
	Sometimes	3.36±1.62		
	None	4.82±3.17		
Respiration Problem	Exists	3.60±2.34	kw: 3.174	0.205
	Sometimes	3.36±1.62		
	None	4.82±3.17		
Nausea	Exists	3.45±1.98	t: 1.428	0.156
	None	4.12±2.70		
Vomiting	Exists	2.94±1.47	t: 3.298	0.001
	None	4.32±2.71		
Fatigue/weakness	Exists	3.03±1.98	t: 2.761	0.007
	None	4.36±2.57		
Depression	Exists	3.60±1.96	u: 441.0	0.916
	None	3.87±2.49		
Loss of Appetite	Exists	3.60±2.11	t: 0.930	0.355
	None	4.06±2.70		
Fever	Exists	3.79±2.52	t: 0.1490	0.882
	None	3.87±2.41		
Other Findings	Exists	4.00±3.19	u: 479.500	0.601
	None	3.82±2.34		

the patients are consisted of male patients, their average age was found as 61.9. It was determined that while 43% of the patients were diagnosed 12-23 months ago, 85% receive chemotherapy and 45% receive radiotherapy (Table 1). It was determined that while the pain level average of patients varies between 4.6±3.5, their average of sleep quality score varies between 3.8±2.4. As is seen in Table 2, the relation between the cough, respiration problems of patients, the existing depression in the patient and averages of sleep quality score was not found statistically significant ($p<0.05$, KW: 0.872, $p=0.646$, KW: 3.174, $p=0.205$, u: 441.000, $p=0.916$). It was revealed that nausea and loss of appetite experienced by patients do not affect the sleep quality score ($p>0.05$), whereas, sleep quality score averages of patients suffering from problems such as vomiting, fatigue/weakness are affected ($p<0.01$) (Table 2).

Discussion

In accordance with the findings obtained in the study, it was determined that there is no relation between cough, respiration problem, nausea, depression and sleep quality; on the other hand, there is a positive relation between pain, vomiting and fatigue.

Dyspnea is an important problem for cancer patients that affect the daily life of the individual (Tanaka et al., 2002; Redy et al., 2009). In our study, it was determined that there is no relation between the respiration problem and sleep quality ($p>0.05$). In their study performed on patients with lung cancer, Gooneratne and colleagues (2007) determined that uncontrollable dyspnea and cough affect the sleep quality of patients negatively.

Pain is a symptom that is experienced by cancer patients and causes insomnia most frequently (Savard and Morin, 2001; Theobald, 2004). It is specified in literature that sleep quality is negatively affected by pain (Moore and Dimsdale, 2002; Lianqi, 2008; McMillan et al., 2008; Mystakidou et al., 2009). It is specified in our study that 60.3% of the patients suffer from pain and their sleep is affected negatively. While the VAS-pain score average of patients was determined to be 4.6±3.5, their average of VAS-sleep score was determined as 3.18±2.11. A negative and medium-level relation was observed between the score averages of pain and sleep quality. In many of the studies, it was determined that cancer pain affects the sleep quality of patients negatively (Beck et al., 2005; Whıtmer et al., 2006; Gooneratne et al., 2007; Myastakidou et al., 2007; Mystakidou et al., 2009; Eyigör et al., 2010; Cheng and Lee, 2011; Guay et al., 2011).

Nausea and vomiting are observed in association with the cancer treatment Nausea and vomiting are usually specified by patients as one of the symptoms causing physical and psychological stress (Faubert andVaessen, 2005). While no relation was observed between the nausea and sleep quality in our study, a relation was determined between vomiting and sleep quality. Sleep quality of patients with vomiting was determined to be lower. Since vomiting is the process of throwing out the stomach contents by using a force, it might cause the interruption of an individual's sleep.

In their study, Bergkvist and colleagues (2006) indicated that 60% of patients receiving chemotherapy suffer from nausea and vomiting and this condition affects the life quality and sleep routine of the patient negatively. The study performed by Foubert and colleagues (2005) supports this data.

Fatigue is one of the most frequently encountered symptoms of the cancer patients (Sela et al., 2005; Whıtmer et al., 2006; Donovan and Jacobsen, 2007; Hsiang et al., 2008). The perception of sleep quality is poor among newly diagnosed lung cancer patients and is correlated with fatigue (Zarogoulidis et al., 2013). In our study, fatigue was determined to be a factor affecting the sleep quality. Fatigue can affect the sleep quality negatively by causing snoozes within the day. In the studies, a relation was observed between fatigue and insomnia (Moore and Dimsdale, 2002; Berger et al., 2005; Israel, 2005; Rosco et al., 2007; Aynur et al., 2010; Shuanglan et al., 2013). Cancer patients indicated that their sleep problems increase other symptoms including fatigue and fatigue increases the insomnia (Anderson et al., 2003; Beck et al., 2005; Donovan and Jacobsen, 2007; Cheng and Lee, 2011).

In their studies, Davidson and colleagues 2002 indicated that among the patients diagnosed with lung cancer, 56.1% suffer from fatigue and 46.5% suffer from insomnia; on the other hand, Donnell and colleagues (2004) indicated that 50% of the cancer patients complain about insomnia and that complaints about fatigue, pain, nausea and vomiting experienced during the treatment cause insomnia.

In one of his studies performed on cancer patients of palliative stage, Sela and colleagues (2005) determined the existence of a medium-level relation between fatigue and decrease of sleep time, fatigue and sleep-maintenance insomnia. In their studies performed on patients with

lung cancer, Görgüner (2007) also explained that adverse effects experienced in association with treatments affect the daily activities, psychological conditions and sleep qualities of patients negatively.

Depression is one of the most frequently encountered symptoms of the cancer patients. In our study, no relation was observed between depression and sleep quality. However, many studies indicate that psychological problems such as anxiety, depression and stress affect the sleep quality of cancer patients negatively (Sela et al., 2005; Akechi et al., 2007; Donovan and Jacobsen, 2007; Cheng and Lee, 2011). While insomnia could be caused by depression, there is also a possibility that insomnia might cause depression (Okuyama et al., 2000). Cancer patients might suffer from depression or anxiety, since they feel themselves desperate and can not cope with it in a convenient way (Theobald, 2004). In the study performed by Mystakidou et al. (2009), 96% of the patients indicated that they suffer from sleep problem. A statistically significant relation was determined between sleep and depression, desperateness and life quality (Mystakidou et al., 2009; Shuanglan et al., 2013).

In a study performed by Mystakidou and colleagues (2007) with 102 cancer patients; it was determined that patients suffering from depression and desperateness experience sleep problems as well. Redeker and colleagues (2004), on the other hand, indicated that there is a positive relation between insomnia and depression in cancer patients. A relation was observed between psychological stress and sleep problems.

In conclusion, the patients with advanced stage lung cancer suffer from sleep problems and other symptoms also affect their sleep quality negatively (Yavuzşen and Kömürcü, 2008). It is well known that sleep is an important factor for individuals to sustain their life quality. Consequently, the nurse is supposed to handle all symptoms, rather than just one symptom such as pain, fatigue and evaluate their relation with one another (Redeker and Lev, 2000; Beck et al., 2005). After chemotherapy, self-reported sleep impairment is present and sleep efficiency is reduced, without significant change in sleep architecture (Zarogoulidis et al., 2013). The nurse is also supposed to plan interventions that would restrain other symptoms such as pain, vomiting, fatigue, which affect the sleep of the patient. Regular discussion with and referral to medical team on detection of any new symptom or rapid worsening of condition (Moore et al., 2002).

References

Akechi T, Okuyama T, Akizuki N, et al (2007). Associated and predictive factors of sleep disturbance in advanced cancer patients. *Psycho-Oncology*, **16**, 888-94.

Albayrak S (2006). Sleep Disorders in Patients with Lung Cancer.Thesis, Izmir, Turkey.

Anderson KO, Getto CJ, Mendoza TR, et al (2003). Fatigue and sleep disturbance in patients with cancer, patients with clinical depression, and community dwelling adults. *J Pain and Symp Manag*, **25**, 307-18.

Aynur A, DeclanW, Rybicki L (2010). Review: symptom clusters: myth or reality. *Palliat Med*, **24**, 373-85.

Beck SL, Dudley WN, Barsevick A (2005). Pain, sleep disturbance, and fatigue in patients with cancer: using a mediation model to test asymptom cluster. *Oncol Nurs For*, **32**, 48-55.

Berger AM, Parker KP, Young-McCaughan S, et al (2005). Sleep wake disturbances in people with cancer and their caregivers: state of the science. *Oncol Nurs Forum*, **32**, 98-126.

Bergkvist K, Wengström Y (2005). Symptom experiences during chemotherapy treatment-with focus on nausea and vomiting. *Eur J Oncol Nurs*, **10**, 21-9.

Chen LM, Chang KH (2004). Physical symptom profiles of depressed and nondepressed patients with cancer. *Palliat Med*, **18**, 712-8.

Cheng KKF, Lee DTF (2011). Effects of pain, fatigue, insomnia, and mood disturbance on functional status and quality of life of elderly patients with cancer. *Oncology Hematology*, **78**, 127-37.

Davidson JR, Maclean AW, Brundage MD, Schulze K (2002). Sleep Disturbance In Cancer Patients. *Social Sci and Med*, **54**, 1309-21.

Donovan KA, Jacobsen PB (2007). Fatıgue, depressıon, and insomnıa: evıdence for a symptom cluster in cancer. *Semin in Oncol Nurs*, **23**, 127-35.

Eyigör S, Eyigör C, Uslu R (2010). Assessment of pain, fatigue, sleep and quality of life (QQL) in elderly hospitalized cancer patients. *Archiv Geront and Geriatri*, **51**, 57-61.

Faubert J, Vaessen G (2005). Nausea: the neglected symptom? *Eur J Oncol Nurs*, **9**, 21-32.

Foley KL, Farmer DF, Petronis VM, et al (2006). A qualitative exploration of the cancer. experience among long-term survivors:comparisons by cancer type, ethnicity, gender, and age. *Psycho-Oncology*, **15**, 248-58.

Fortner B, Stepanski EJ, Wang SC, Kasprowicz S, Durrence HH (2002). Sleep and quality of life in breast cancer patients. *J Pain Symptom Manage*, **24**, 471-80.

Gooneratne NS, Dean GE, Rogers AE, et al (2007). Sleep and quality of life in long-term lung cancer survivors. *Lung Cancer*, **58**, 403-10.

Görgüner M (2007). Lung Cancer. Turkish Torax Association Professional Development Course 2007; Ankara, Turkey.

Guay MD, Yennurajalingam S, Parsons H, Palmer JL, Bruera E (2011). Association between self-reported sleep disturbance and other symptoms in patients with advanced cancer. *J Pain Symptom Manage*, **41**, 819-27.

Herbert M, Johns MW, Dore C (1976). Factor analysis of analogue scales measuring subjective feelings before and sleep. *Br J Med Psych*, **49**, 373-49.

Hsiang Y, Tsai YF, Lai YH, Tsai CM (2008). Fatigue experience and coping Strategies in Taiwanese lung cancer patients receiving chemotherapy. *J Clinical Nurs*, **17**, 876-83.

Israel AS (2001). The relationship between fatique and sleep in cancer patients: a review. *Eur J Cancer Care*, **10**, 245-55.

Joyce M, Schwartz S, Huhmann M (2008). Supportıve care in lung cancer. *Semin Oncology Nurs*, **24**, 57-67.

Kvale EA, Shuster JL (2006). Sleep disturbance in supportive care of cancer: a review. *Palliat Med*, **9**, 437-51.

Lianqi L (2008). Sleep disturbances in cancer. *Psychıatrıc Ann*, **38**, 627-34.

Lis CG, Gupta D, Grutsch JF (2008). The relationship between insomnia and patient satisfaction with quality of life in cancer. *Support Care Cancer*, **16**, 261-6.

Lui SL, Ng F, Lo WK (2002). Factors associated with sleep disorders in chinese patients on continuous ambulatory peritoneal dialysıs. *Perit Dialy İnter*, **22**, 677-682.

Lutz S, Norrell R, Bertucıo C, et al (2001). Symptom frequency and severity in patients with metastatic or locally recurrent lung cancer: a prospective study using the lung cancer symptom scale in a community hospital. *Palliat Med*, **4**,

157-65.

McMillan SC, Tofthagen C, Morgan MA (2008). Relationships among pain, sleep disturbances, and depressive symptoms in outpatients from a comprehensive cancer center. *Oncol Nurs For*, **35**, 603-11.

Mercadante S, Gireli D, Casuccio A (2004). Sleep Disorders In Advanced Cancer Patients:Prevalence And Factors Associated". *Support Care Cancer*, **12**, 355-9.

Moore P, Dimsdale JE (2002). Opioids, sleep and cancer-related fatigue. *Medical Hypotheses*, **58**, 77-82.

Myastakidou, K, Parpa E, Tsilika E, et al (2007). Sleep quality in advanced cancer patients. *Psychosomatic Research*, **62**, 527-33.

Mystakidou K, Parpa E, Tsilika E, et al (2009). How is sleep quality affected by the psychological and symptom distress of advanced cancer patients? *Palliat Med*, **23**, 46-53.

O'Donnell JF (2004). Insomnia in cancer patients. *Clin Cornerstoner*, **6**, 6-14.

Okuyama T, Akechi T, Kugaya A. et al (2000). Factors correlated with fatigue in disease-free breast cancer patients: application of the cancer fatigue scale. *Support Care Cancer*, **3**, 215-22.

Parrot AC, Hindmarch I (1980). The leeds sleep evaluation questionnaire in psychopharmacological ınvestigations- a review. *Psychopharmacology*, **71**, 173-9.

Redeker NS, Lev EL, Ruggiero J (2000). Insomnia, fatigue, anxiety, depression, and quality of life of cancer patients undergoing chemotherapy. *Schol Inquir Nurs Prac*, **14**, 275-90.

Redyy SK, Parsons HK, Elsayem A, Palmer JL, Bruera E (2009). Characteristics and correlates of dyspnea in patients with advanced cancer. *J Pallıat Med*, **12**, 29-36.

Roscoe JA, Kaufman ME, Matteson-Rusby SE, et al (2007). Cancer-related fatigue and sleep disorders. *Oncologist*, **12**, 35-42.

Savard J, Ivers H, Villa J, Caplette-Gingras A, Morin CM (2011). Natural course of insomnia comorbid with cancer: an 18-month longitudinal study. *J Clin Oncol*, **29**, 3580-6.

Savard J, Morin CM (2001). Insomnia in the context of cancer: A review of a neglected problem. *J Clin Oncol,* **19**, 895-908.

Sela RA, Wantanabe S, Nekolaichuc CL (2005). Sleep disturbances in palliative cancer patients attending a pain and symtom control clinic. *Palliat and Supp Care*, **3**, 23-31.

Shuanglan L, Chen Y, Yang L, Zhou J (2013). Pain, fatigue, disturbed sleep and distress comprised a symptom cluster that related to quality of life and functional status of lung cancer surgery patients. *J Clin Nurs*, **22**, 1281-90.

Tanaka K, Akechi T, Okuyama T, Nishiwaki Y, Uchitomi Y (2002). Impact of dyspnea, pain, and fatigue on daily life activities in ambulatory patients with advanced lung cancer. *J Pain and Symp Manag*, **23**, 417-23.

Theobald ED (2004). Cancer pain, fatigue, distress, and insomnia in cancer patients. *Clin Cornerstone*, **6**, 15-21.

Vena C, Parker K, Allen R, et al (2006). Sleepwake disturbances and quality of life in patients with advanced lung cancer. *Oncol Nurs Forum*, **33**, 761-9.

Wender R, Fontham TH, Barrera E, et al (2013). American Cancer Society lung cancer screening guidelines. *CA Cancer J Clin*, **63**, 106-17.

Whıtmer MK, Pruemer JM, Nahleh ZA, Jazıeh AR (2006). Symptom management needs of oncology outpatients. *Palliat Med*, **9**, 628-30.

Yale DP, Tamı RB, Marıanna K, Gwen U, Betty RF (2007). Symptom concerns and resource utilization in patients with lung cancer. *Palliat Med*, **10**, 899-903.

Yavuzşen T, Kömürcü Ş (2008). Evaluation of fatigue symptoms and associated clinical problems in patients with cancer. *Gulhane Medical Journal*, **50**, 141-6.

Yıldırım YK, Uyar M, Uslu R (2006). Tools for Evaluating cancer pain. Cancer and Palliative Care, 45-50, Izmir, Turkey.

Zarogoulidis P, Steiropoulos P, Perantoni E, et al (2013). Subjective sleep quality in lung cancer patients before and after chemotherapy. *Thoracic Cancer*, **4**, 138-42.