Original Article

The Examination of Sleep Quality and Pain in the Early Post-Operative Period in Chest Surgery Patients

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Abstract

Background: The nursing care and intervations play an important role in prevention the sleep problem and pain.
Aim: This study was performed in order to examine pain and sleep quality in chest surgery patients.
Methods: Descriptive and cross sectional study was prospectively obtained from 118 chest surgery patients in the University Hospital between January and December 2014. For data collection, a questionnaire prepared by the researchers, the Pittsburg Sleep Quality Index, and the Visual Analog Scale were used. Descriptive analyses were performed, with a 5% significance level.
Results: Among the patients with a mean age of 53.30±15.96, it was found that 72.9% had continuous pain before surgery. The sleep qualities of those patients who had sleep problems before surgery were found to be worse compared to those who didn't experience sleep problems previously in a statistically significant manner ($U=8,994$; $p< 0.001$). The pain scores of patients with bad sleep quality in the first feeding post operation were found to be higher in a statistically significant manner.
Conclusion: The postoperative sleep qualities of patients who have sleep problems before surgery and who smoke are negatively affected. Patients with bad sleep quality after the first postoperative feeding experience more pain.

Keywords: Nursing care, Thoracic surgery, Sleep, Pain, Parients

Introduction

Sleep is necessary for the continuation of physical and mental health, relaxes the individual by distancing them from stress and responsibilities, enables him/her to store energy again, and prepares him/her for a new day (Hoey, Fulbrook, Douglas, 2014). In studies, it has been reported that there was a relationship between disruptions in sleep order and quality and many health problems, with this relationship negatively affecting healing in patients in surgical clinics and those in critical condition (Cappuccio et al., 2011; Delaney, Haren, Lopez 2015; Carrol, Irwin, Olmstead, 2016). In patients in surgical clinics, pain, environmental noise, the bedside care applications of nurses, concerns regarding the disease, and anxiety have all been stressed as factors that affect sleep order. It has been reported that open heart surgeries, orthopedic surgeries, and abdominal surgeries affect sleep, with pain being the most important factor (Propper et al., 2015; Myoji et al., 2015; Kleman, Hansen, Gogenur, 2015; Dolan et al., 2016;

Grande , Jackson, Murphy, 2016 ; Ozlu and Ozer, 2017).

Like all surgical operations, thorax surgery, which has an incidence of complications that varies between 15% and 37.5% with the most common complication being pulmonary complications, has many negative effects on the individual (Naithani et al., 2011; Das, Paradhan, Sashimata, 2015). In the early post-operative period, patients may experience sleep problems especially because of pain and changes in the pulmonary functions. Because of these problems, the pain of the patients may increase and they may experience difficulty in performing daily functions (Karagozoglu, Cubuk, Tahta, 2007; Propper et. al, 2015). Considering the lack of studies examining pain and sleep quality in thorax surgery patients, this study was performed in order to examine pain and sleep quality in thorax surgery patients.

Methodology

Study design: The data for this descriptive and cross-sectional study was prospectively obtained from inpatients in the Thorax Surgery Clinic of a University Hospital between the dates of 1 January and 30 December 2014.Setting and sample: In the period assigned for data collection (12 months), all of the patients staying at the thorax surgery clinic post operation were attempted to be reached without sample selection. Out of the 503 patients undergoing surgery in the Thorax Surgery Clinic between the aforementioned dates, 135 patients who agreed to participate in the study formed the sample of the study. 35 of the patients were excluded from the study since they underwent small operations and were discharged the morning after, while 15 patients were excluded because of missing study data. The study was completed with data from 118 patients.

Ethical considerations: The principles of Helsinki declaration were taken into account in the study. For the collection of data, permission from the university hospital and the chest surgery clinic were taken, as well as an Ethical Board Permission (No: 16359) The patients who volunteered to participate in the study were informed on the aim of the study. It was explained to the patients that the information obtained would only be used for this study, and the verbal consents of the patients were taken.

Measurements/Instruments: For data collection, the 27 item questionnaire prepared by the researchers according to literature, the Pittsburg Sleep Quality Index (PSQI), and the Visual Analog Scale (VAS) were used.

The Pittsburg Sleep Quality Index: The PSQI is applied to many patient groups as a consistent and reliable scale that is widely used to determine sleep quality within the last month. The scale, which was developed by Buysse et al in 1998 can be used to determine the course of sleep disorders, relationships between various variables, the presence of sleep disorders or their relapse, or good and bad sleep (Buyyse et al., 1989). The validity and reliability study of the PSQI in our country has been performed. [18] In the present study, the Cronbach Alpha coefficient of the PSQI scale was found to be 0.725.

The Visual Analog Scale: The scale, which is used to evaluate pain intensity, is used to convert certain values that can't be measured numerically into numeric form. In the scale, to evaluate pain, the patient is asked to mark the point explaining his/her situation on a 10 cm line with the writings "no pain" on one end and "very severe pain" on the other end. The distance from "no pain" to where the patient marked is measured using a ruler. Thus, pain can be evaluated numerically. Higher scores indicate more intense pain (Williamson and Hoggart, 2015). In this study, a new scale was used each time in pain measurement.

Data collection/Prosedure: The questionnaire and the PSQI were applied in the first day post operation, and the VAS was applied in post op service admission, after the first post op feeding, and post operation before mobilization.

Data analysis: The data obtained was analyzed in a computerized environment using the MedCalc Statistical Software version 12.7.7 program. Descriptive statistics were used to define continuous variables, consisting of mean values, standard deviation, minimums and maximums, and median values. To examine the relationship between categorical variables, the Chi Squared test was used (replaced by the Fisher Exact test when appropriate). For the comparison of two independent, normally distributed continuous variables, the Student t test was used, while the comparisons between two variables that didn't comply with normal distribution were

performed using the Mann Whitney U test. The level of statistical significance was accepted as p<0.05 with a 95% confidence interval.

Results

Among the patients with a mean age of 53.3±15.96, 65.3% were male, 53.4% were elementary school graduates, 78% were married, and the mean hospitalization duration was 5±3.03 days. It was found that 69.5% of the patients smoked, 72.9% had continuous pain before surgery, 85.6% continuously used painkillers, and 20.3% had sleep problems before their operations. When status regarding post op complication development was examined, the first three most common complications were found to be respectively prolonged air leak with 11%, distension with 4.2%, and immobilization with 2.5% (Table1). When Table 2 was examined, it was seen that 59.3% of the patients had generally bad sleep quality, that those with sleep quality experienced sleep disorder symptoms less than once a week with a rate of 70.3%, that those with bad sleep quality experienced sleep disorder symptoms 1-2 times a week with a rate of 71.4%, and that 31.4% of patients with bad sleep quality used sleeping medicine 1-2 times a week (Table 2).No statistically significant difference between sleep quality and post op complication development status or gender, marital status, education, employment status, and smoking status from among socio demographic characteristics could be found (p>.005). However, a statistically significant difference in PSQI scores with regard to the variables of constant pain before surgery, continuous use of painkillers, and pre-operative sleep problems was found (p<.005) (Table 3).No significant difference could be found in postoperative service and pre-mobilization pain scores according to status regarding good or bad sleep quality (p>.005). The VAS mean scores of patients with bad sleep quality in the first feeding post op (4.54±1.76) was found to be higher in a statistically significant manner (p<.005) (Table 4).

Table 1 The socio demographic and disease related characteristics of the patients

Characteristics		
Education		
Literate/elementary	63	53.4
Middle/high	32	27.1
College and graduate	23	19.5
Smoking status		
Yes	82	69.5
No	36	30.5
Preop constant pain		
Yes	86	72.9
No	32	27.1
Continuous painkiller use		
Yes	101	85.6
No	17	14.4
Sleep problems before surgery		
Yes	24	20.3
No	64	54.2
Sometimes	30	25.4
Postop complication status (n:27)		
Prolonged air leak	13	11.0
Distension	5	4.2
Immobilization	3	2.5
Pneumonia	2	1.6
Atelectasis	2	1.7
Admission to ICU post op	1	0.8
Naso tracheal aspiration	1	0.8

Table 2 The distribution of Pittsburg Sleep Quality Index scores

Pittsburg Sleep Quality Index Dimensions	Sleep Quality Good (n:48)		Bad (n:70)	
	n	**%**	**n**	**%**
Subjective sleep quality				
Very good	29	60.4	2	2.9
Good	19	39.6	45	64.3
Bad			22	31.4
Very bad			1	1.4
Sleep latency				
Below 15 minutes	18	37.5	6	8.6
Between 16-30 minutes	23	47.9	27	38.6
Between 31-60 minutes	5	10.4	24	34.3
60 minutes and above	2	4.2	13	18.6
Sleep duration				
7 hours and above	38	79.2	37	52.9
6-6,9 hours	7	14.6	14	20.0
5-5,9 hours	3	6.3	9	12.9
5 hours and below			10	14.3
Habitual sleep activity				
%85 and above	48	100	57	81.4
%75-84			8	11.4
%65-74			3	4.3
%65 and below			2	2.9
Sleep disorder frequency				
None	4	8.3		
Less than once a week	34	70.8	14	20.0
1-2 times a week	9	18.8	50	71.4
3 or more times a week	1	2.1	6	8.6
Day function disorder frequency				
None	38	79.2	28	40.0
Less than once a week	8	16.7	22	31.4
1-2 times a week	2	4.2	15	21.4
3 or more times a week			5	7.1
Sleeping medicine use				
None	29	60.4	2	2.9
Less than once a week	19	39.6	45	64.3
1-2 times a week			22	31.4
3 or more times a week			1	1.4
Global Pittsburg Sleep quality score				
Good sleep quality (Global Score <5)	48	40.7		
Bad sleep quality (Global Score ≥ 5)	70	59.3		

Table 3 The Comparison of Factors Related to Sleep Quality

Characteristics	PSQI Ort (SD)	Statistical method	p
Gender			
Female	6.37±3.36	U=-0.233	*p=0.815*
Male	6,17± 3,29		
Marital status		U=-1.285	*p=0.199*
Married	5.98± 3.18		
Single	7.11± 3.62		
Smoking status	5.90± 3,32	U=-1.795	*p=0.730*
Yes			
No	7.0± 3.15		
Continuous pre-op pain			
Yes	5.69±29.0	U=-2.597	*p=.009**
No	7,69±3,69		
Continuous painkiller use	5.95±3.24	U=-2.200	*p=.028**
Yes			
No	7.94±3.23	Kw-x2=17.222	*p=.000**
Sleep problems before surgery			
No	5.08±2.53		
Sometimes	6.83±2.80		
Presence of complications			
Yes	6.30+3.77	U=1260.5	*p=.711*
No	5.21+3.14		

Kw-x^2= Kruskall wallis, PSQI= Pittsburg Sleep Quality Index, U=Mann-Whitney U, *p<.005

Table 4 The comparison of the VAS and PSQI scores of the patients

VAS	**PSQI**	**N**	$\bar{x}$ **±SD**	**Min-Max**	**z**	**p**
Post op service VAS-mean	Good	33	5.18±3.04	0-10	-1.27	*.200*
	Bad	50	6.04±2.59	0-10		
After first feeding post op VAS	Good	44	3.23±2.56	0-10	-3.015	*.000*
	Bad	69	4.54±1.76	0-9		
Pre-mobilization VAS	Good	45	3.44±2.13	0-8	-1.13	*.250*
	Bad	68	3.97±1.83	0-8		

PSQI: Pittsburg Sleep Quality Index, VAS: Visual analog scale

Discussion

Surgical interventions constitute an unexpected negative life experience for the patient. This period, which differs from the patient's usual living environment and style, can bring along little or much pain, functional changes, and events that may risk their mental and bodily integrity (Cilingir, Hindistan, Ergene, 2016). Thorax surgery comes first among surgical fields where post op complications can arise and sleep problems related to respiratory difficulties and pain may arise. In this study, the pain and sleep quality of patients who underwent thorax surgery were examined. After thorax surgery, many complications, especially those regarding respiration, may arise. In a meta-analysis study, it was found that 5.2% of thorax surgery patients were admitted to the ICU with cardiac problems while 11.6% were admitted to the ICU with lung complications (Pedato and Heerdt, 2009). In a study performed in Turkey, the rate of admission into the ICU after thorax surgery was found to be 10% with the reasons for admission being cardiac problems with 12% and acute respiratory failure with 6%. The first three complications the patients in our study group presented with were respectively prolonged air leak with 11%, distension with 4.2%, and immobilization with 2.5% (Table 1).

With a value of 0.8%, the rate of admission into the ICU for post op complications pertaining to our patients was found to be very low compared with other studys (Pedato and Heerdt, 2009; Oren, Kaymak and Bozkurt, 2015). This result can be interpreted as patient care and monitoring being performed in the university hospital where the study was conducted being performed with greater care, the technology being used in surgery shortening operation durations as time passes, or serious complications occurring less because of earlier patient mobilization. Smoking is an important factor with regard to the surgery process and post op complications. With regard to the development of post op complications, individuals who smoke are under greater risk compared to those who don't (Moller, Villebro and Pedersen, 2002). In those who smoked before their surgical operation, respiratory and circulatory problems, infections, sleep problems, and the need for ICU have all been reported to seen more (Nakagawa, Tanaka and Tsukuma, 2001; Moller, Villebro and Pedersen, 2002).

In compliance with literature, in our study, 69.5% of the patients were found to smoke, and a statistically significant difference in sleep quality was found with regard to smoking status (U=4.383; p=0.003) (Table 4). In patients who smoke and have chest diseases, it should be considered that post-operative complications can occur and sleep quality may especially be deteriorated. 20.3% of the patients in our study group stated that they had sleep problems before their surgeries. The sleep qualities of those patients were found to be worse compared to those who didn't experience sleep problems previously in a statistically significant manner (U=8. 994; p< .001) (Table 4). This result suggests that preoperative sleep problems have an effect in the formation of postoperative sleep problems. Additionally, chest surgery patients may experience night pains and related sleep problems in the first days and nights after their surgery because of being tied to medical equipment and drainage systems and the large number of invasive procedures being applied. This situation may get even worse in patients who had preoperative sleep problems. A study show that the sleep deprivation has been associated with an increased morbidity and mortality (Yuan and Wangl, 2016). And other study is reported that poor sleep quality at 6 months was associated with prehospital insomnia, and physical and mental health related quality of life (Caruanaer al., 2018).In our study, while no significant difference could be found in post-operative service and pre-mobilization pain scores according to status regarding good or bad sleep quality, a significant difference in pain scores according to sleep status after postoperative feeding. It can be thought that problems experienced after feeding, such as distension, cause pain and negatively affect sleep. In the literature, it has been stated that pain comes first among factors affecting sleep, with individuals in pain either having difficulty sleeping or not sleeping at all. [6,8,9,12] In a study the main factors affecting sleep in chest surgery patients were found to be discomfort with pain, the bed, and medical equipment. However, the relationship between pain and sleep wasn't examined in that study.

Conclusion: As a result, patients who undergo chest surgery experience pain and sleep problems. The postoperative sleep qualities of patients who have sleep problems before surgery

and who smoke are negatively affected. Patients with bad sleep quality after the first postoperative feeding experience more pain. It is important for doctors and nurses who carry out the treatment and care of those patients to consider these characteristics of the patients and plan treatment and care to ensure sufficient pain management and good sleep quality. It can be suggested that the study should be repeated in different centers with larger patient groups, and that the relationship between pain and sleep should be examined further using nonpharmacological methods that may affect sleep and pain in addition to the regular use of painkillers.

References

Atar NY, Kirbiyik E, Kaya N, Kaya H, Turan N, Pallos A. (2012) Patients' sleep quality and factors affecting sleep in surgery clinic of one university hospital. Turkiye Klinikleri Journal of Nursing Sciences 4:74-84.

Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ. (1989) The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. Psychiatry Research 28:193-213.

Cappuccio FP, Cooper D, D'Elia L, Strazzullo P, Miller MA. (2011) Sleep duration predicts cardiovascular outcomes: a systematic review and meta-analysis of prospective studies. Eurpan Heart Journal 32:1484-92.

Carroll JE. Irwin MR,Olmstead R. (2016) Sleep disturbance, sleep duration, and inflammation: a systematic review and meta-analysis of cohort studies and experimental sleep deprivation. Biological Psychiatry Journal 80 :40-52.

Caruana N, McKinley S, Elliott R, Gholizadeh L. (2018) Sleep quality during and after cardiothoracic intensive care and psychological health during recovery. J of Cardiovasc 33:40-49.

Cilingir D, Hintistan S, Ergene O. (2016) Factors affecting the sleep status of surgical and medical patients at a University Hospital of Turkey 66: 1535-1540.

Das S, Deepa OV, ParadhanJ, Sashimata K. (2015) Factors of sleep disturbances among hospitalized patients, jeopardizing the prognosis. Asian Journal. of Nursing Education. and Research 5:137-139.

Delaney LJ, Haren F, Lopez V. (2015) Sleeping on a problem: the impact of sleep disturbance on intensive care patients-a clinical review. Annals of Intensive Care 5 :3-10.

Dolan R, Huh J, Tiwari N, Sproat T, Camilleri-Brennan J. (2016) A prospective analysis of sleep deprivation and disturbance in surgical patients. Annals of Medicine and Surgery 6:1-5.

Hoey LM, Fulbrook P, Douglas JA. (2014) Sleep assessment of hospitalised patients: A literature review. International Journal of Nursing Stududies 51:1281-8.

Karagozoglu S, Cabuk S, Tahta Y, Temel F. (2007) Some factors influencing the sleep of hospitalized adult patients. Turkish Thoracic Journal 8 :234-40.

Klemann N, Hansen MV, Gogenur I. (2015) Factors affecting post-operative sleep in patients undergoing colorectal surgery -a systematic review. Danish Medical Journal 62: A5053.

Le Grande MR, Jackson AC, Murphy BM, Thomason N. (2016) Relationship between sleep disturbance, depression and anxiety in the 12 months following a cardiac event. Psychology, Health & Medicine 21 :52-9.

Moller AM, Villebro N, Pedersen T, Tønnesen H. (2002) Effect of preoperative smoking intervention on postoperative complications: a randomised clinical trial. Lancet. 359 :114-7.

Myoji Y, Fujita K, Mawatari M, Tabuchi Y. (2015) Changes in sleep–wake rhythms, subjective sleep quality and pain among patients undergoing total hip arthroplasty. Int l J of Nurs Prac 21 :764-70.

Naithani U, Bajaj P, Bhatnagar N, Prasad C. (2011) One year prospective analysis of morbidity and mortality associated with thoracic surgery. Anaesthesia, Pain & Intensive Care 15 :86-92.

Nakagawa M, Tanaka H, Tsukuma H, Kishi Y. (2001) Relationship between the duration of the preoperative smoke-free period and the incidence of postoperative pulmonary complications after pulmonary surgery. Chest. 120:705-10.

Oren B, Kaymak I, Bozkurt G. Investigation of intensive care requirements of thoracic surgery patients. (2015) Journal of Health Sciences and Professions 2 :55-61.

Ozlu ZK, Ozer N. (20017) The effect of enhancing environmental factors on the quality of patients' sleep in a cardiac surgical intensive care unit. Biological Rhythm Research 48:85-98.

Pedoto A, Heerdt PM. Postoperative care after pulmonary resection: postanesthesia care unit versus intensive care unit. (2009) Current Opinion in Anesthesiology 22 :50-5.

Propper J, van Valen R, van Domburg RT, Brunott M, Bogers AJ. (2015) Quality of sleep at the ward after cardiothoracic surgery. Open Journal of Nursing 5 : 529-537.

Williamson A, Hoggart B. Pain: a review of three commonly used pain rating scales. (2005) Journal of Clinical Nursing 14 :798-804.

Yuan R, Wang J. (2016) The affect of sleep deprivation on coronary heart disease. Chinese Medical Sciences Journal 31 :247-253