Central European Journal of Nursing and Midwifery

Cent Eur J Nurs Midw 2022;13(2):657–663
doi: 10.15452/CEJNM.2022.13.0002

ORIGINAL PAPER

THE EFFECT OF PROGRESSIVE MUSCLE RELAXATION TECHNIQUE ON SLEEP QUALITY IN TOTAL HIP ARTHROPLASTY PATIENTS

Funda Çetinkaya[1], Neziha Karabulut[2]

[1]*Department of Surgical Nursing, The Health Sciences Faculty, Aksaray University, Aksaray, Turkey*
[2]*Department of Surgical Nursing, The Nursing Faculty, Atatürk University, Erzurum, Turkey*

Received September 18, 2021; Accepted January 1, 2022. Copyright: This is an open access article under the CC BY-NC-4.0 license.

Abstract

Aim: The aim of this study was to investigate the effect of Progressive Muscle Relaxation Technique on sleep quality in patients with total hip arthroplasty. *Design:* A non-randomized quasi-experimental model was used in this study. *Methods:* Data were collected using a Personal Information Form and the Turkish translation of the Visual Analog Sleep Scale (VAS Scale). The data was analyzed using percentages and t-test. *Results:* In comparison with the mean VAS Scale scores between the experimental and the control groups, no significant difference was found between the mean VAS Scale scores of the patients before the surgery and on the night of surgery ($p > 0.05$). However, a statistically significant difference was found between the mean VAS Scale scores in the first and second postoperative days between groups ($p < 0.05$). *Conclusion:* The study found that progressive relaxation exercises improve the quality of sleep. The routine use of progressive relaxation exercises is recommended for patient care plans.

Keywords: relaxation techniques, sleep quality, total hip arthroplasty.

Introduction

The physical and mental health of an individual depends on the fulfillment of basic needs such as breathing, nutrition, excretion, shelter, and sleep (Birol, 2004). Sleep is one of the basic requirements of life and is vital in maintaining an individual's physical and psychological well-being. Sleep is a type of rest that causes body renewal and changes in mental status (Bergamasco & Cruz, 2007; Senol et al., 2012; Yılmaz et al., 2008). Sleep is affected by health status and external environmental factors of individuals (Potter & Perry, 2010; Yılmaz et al., 2008). Health impairment and changing environmental factors affect sleep patterns negatively (Önler & Yılmaz, 2008). As a constantly changing environment, hospitals are unfamiliar places that lead to stress in patients, negatively affecting sleep patterns (Hoey et al., 2014; Karagözoğlu et al., 2007; Ye et al., 2013). Sleep disruption in the acute hospital setting has been widely reported in the literature (Missildine et al., 2010; Yılmaz et al., 2008). Clinics also affect the sleep patterns of patients at various levels (Önler & Yılmaz, 2008; Yılmaz et al., 2008). Tranmer et al. (2003) reported that patients in surgical clinics (hip and knee replacement) experience more sleep disturbances than patients in medical clinics (patients treated for dialysis or acute myocardial infarction). In addition, sleep problems of patients vary depending on environmental factors, symptoms, and symptom management (Hultman et al., 2012). Lane and Anne East (2008) showed in their study that surgical patients experience sleep problems due to environmental noise, pain, and anxiety. Yilmaz et al. (2008) stated in their study conducted in medical and surgical clinics that patients hospitalized in orthopedic clinics mostly had sleep problems. Previous studies have reported that patients who have undergone total hip arthroplasty (THA) complain of sleep problems (Krenk et al., 2012; Wylde et al., 2011). Poor quality of sleep can cause physiological and psychological changes in individuals. Sleep can also have an effect on the blood pressure levels. It has been shown that an individual who is sleepless for one night has a higher systolic blood pressure value than an individual who slept normally (Lane & Anne East, 2008). Sleep problems can cause fatigue, decreased concentration, depression, irritability, pain, muscle tremors, and constipation in patients (Lee et al., 2015). Early detection of sleep problems of patients and resolution of sleep problems prevent such problems from occurring (Hoey et al., 2014). It is

Corresponding author: Neziha Karabulut, Department of Surgical Nursing, The Nursing Faculty, Atatürk University, Hemşirelik Fakültesi, 25240 Erzurum/Türkiye, Turkey; email: nezihekarabulut@hotmail.com

important, therefore, that nurses possess the ability to identify nightly sleep disorders in patients in orthopedic and trauma clinics and perform the actions necessary to influence the healing process positively (Yılmaz et al., 2008). Nurses use both pharmacological treatments and non-pharmacological methods to reduce or eliminate sleep problems in patients (Missildine et al., 2010). Pharmacological methods involve prescription sleeping pills. Side effects such as mood disorder and anxiety may be seen in patients taking medication for sleep disorders. For this reason, nurses should recommend non-pharmacological methods to patients and educate patients on this issue (Valente, 2015). Non-pharmacological methods used by nurses include massage, music, aromatherapy, and relaxation exercises to relieve patients' sleep problems (Taylor et al., 2001). Robinson et al. (2005) stated that massages, aromatherapy, warm drinks, and relaxation exercises are helpful for patients who have trouble sleeping in hospital. Non-pharmacological nursing interventions such as relaxation exercises, massage, and cold / hot compress applications applied to patients after surgery help reduce the individual's fear, anxiety, and pain (Büyükyılmaz & Aştı, 2013). Progressive muscle relaxation technique (PMRT), which is often used as a non-pharmacological method, was first described by Jacobson in 1920. PMRT involves contraction and relaxation of the main muscle groups with regular breathing techniques. It is stated in the literature that in order to provide PMRT benefits, it is necessary to practice PMRT systematically, regularly, and for at least one week (Baltaş & Baltaş, 2005). However, PMRT is an easy-to-learn and non-invasive method in the clinical setting (Eti Aslan, 2014). There were studies in the literature that indicate alleviation in skeletal muscle tension and contraction in patients in surgical clinics with PMRT (Büyükyılmaz & Aştı, 2013; Pellino et al., 2005; Seers et al., 2008; Topcu & Fındık, 2012). It has been suggested in nursing practice literature that progressive relaxation exercises can help improve sleep (Akgün & Dayapoğlu et al., 2015; Akıncı & Olgun, 2011; Dehghan-nayeri & Adib-Hajbaghery, 2011; Kanji et al., 2006; Kumar & Raje, 2014). Nurses should understand the nature of sleep and carefully evaluate the sleep quality of hospitalized patients, since the structure and function of sleep depend on nursing practices (Lane & Anne East, 2008).

Aim

This study was designed to determine the effects of PMRT on the sleep quality of patients undergoing THA.

Methods

Design

In this study, a non-randomized pretest-posttest controlled quasi-experimental design was used in order to determine the effects of PMRT on the sleep quality of patients undergoing THA. The study was performed between February 2012 and October 2012 in the orthopedic clinics of a state hospital in Turkey. The minimum sample size was calculated to be 66 for repetitive measurements, with effect size of f = 0.35, α-type error probability of 0.05, and strength of 0.95.

Sample

The target population consisted of 78 THA patients registered in the two orthopedics units. The patients were recruited into an experimental or a control group. The inclusion criteria of the study were: being 18 years old or above, no verbal / audio-visual communication difficulties or mental disabilities that prevent understanding of the information provided or ability to express sleep conditions, no psychological disorder causing insomnia, no use of sleep medication, no complications during the study, use of the same type of anesthesia in surgery, use of the same pain reliever for postoperative pain control. The 75 THA patients (38 in the experimental group and 37 in the control group) who met the research criteria were included in the study. During the study, three subjects in the experimental group were withdrawn (in two cases, due to complications developed during the research, and in one case, due to impossibility of performing PMRT on the second postoperative day).

In addition, two participants in the control group were dropped from the study because they could not respond to the questionnaire on the second postoperative day due to pain and intensive care. Therefore, a total of 70 patients finished the study (35 patients in the intervention group, and 35 in the control group).

Data collection

The data were collected using 1) a Personal Information Form; 2) The Visual Analog Sleep Scale for evaluating sleep quality.

The Patient Information Form was prepared in line with the literature to determine the demographic characteristics and sleep status of the patients. The form contains a total of ten questions on age, gender, marital status, surgical history, previous hospital experience, chronic illness, and sleep patterns of patients (sleeping habits, the presence of chronic sleep disorders, methods of coping with sleeping problems, and conditions that disturb nightly

sleep) (Önler & Yılmaz, 2008; Verran & Snyder-Halpern, 1988; Yılmaz et al., 2008).

The Visual Analog Sleep Scale was developed by Verran and Snyder-Halpern in 1988. Cronbach's Alpha values of the three-dimensional scale developed by Verran and Snyder-Halpern were found to be 0.82, 0.72 and 0.73 for discomfort, effectiveness and reinforcement, respectively. The validity of the Turkish scale was confirmed by Çetinkaya and Karabulut in 2016. The Turkish form consists of ten items and one dimension. Each item in the scale is evaluated with a visual analog technique consisting of a scale chart ranging from 0 (left side) to 100 mm (right side). The total score of the scale is obtained by totaling the scores for each item. Scores on the sleep quality scale range from 0 to 1,000. Increasing scores on the VAS scale indicate lower sleep quality. The Cronbach's Alpha value of the VAS scale is 0.94.

Intervention

After explaining the purpose of the research, data were collected by conducting face-to-face interviews with individuals who agreed to participate in the research. In order to prevent interference and control group interactions, first the control group data were collected and then the intervention group data were collected. The "Personal Information Form" was given to the control group on admission to the hospital. The VAS Scale was administered the next morning. The VAS scale was evaluated for three days postoperatively. In order to allow the patients in the control group to benefit from PMRT, training was provided to the control group on the third day after their operation. The exercises were performed with the patients in the afternoon and the evening of the third day.

The "Personal Information Form" was given to the experimental group patients on admission to the hospital. The VAS Scale was administered after patients had spent a night in hospital. During the first post-operative day, the VAS Scale was again administered. After completing the data collection forms, patients who are admitted to hospital one day before THA in the experimental group were verbally trained on how to practice PMRT using the "Relaxation Exercises CD" prepared by the Turkish Psychological Association. The CD consists of three sections. The first ten-minute section of the CD reviews practices that should be performed. The second 30 minutes consists of verbal instructions set to relaxation music, and the third 30 minutes contains only relaxation music (Boyacıoğlu & Kabakçı, 2011) Researchers provided patients with a quiet environment for PMRT (outside of visiting hours and nursing interventions). One-on-one training was given to the patients in line with the commands on the CD. During the relaxation exercises, which continue for 28 minutes on the CD, patients first contract and relax the muscle groups in the hands, arms, neck, shoulders, face, chest, abdomen, hips, and toes. After training, each patient in the experimental group performed PMRT in the afternoon (17.00) and evening (20.00) in the first and second post-operative days. PMRT was performed in the patient's room on a portable MP3 player using earphones, with the sound level adjusted according to the preferences of the patient. Before the exercise, it was ensured that the patient was alone, the curtains / curtains around the patient's bed were closed, the need for evacuation was attended to, and the room was quiet so that the interventions (relaxation techniques) could be applied in a comfortable environment. The VAS scale was evaluated three days postoperatively after PMRT.

Data analysis

Data were evaluated using the Statistical Package for the Social Sciences for Windows (SPSS), version 18.0. The study used descriptive statistics (including numbers and percentages, and mean and standard deviation) and the Chi-square and t-test to assess differences between groups. An independent samples t-test was used to compare VAS Scale mean score. To compare the average of repeated measurements for the control and experiment group, a t-test for paired samples was applied.

Results

In the study, the descriptive characteristics of the patients in the experimental and control groups were similar and there was no statistically significant difference (Table 1).

The comparison of the mean scores of the VAS Scale is shown in Table 2. There was no statistically significant difference between the experimental and control group VAS Scale mean scores on the night before ($t = 0.393$; $p = 0.696$) and on the day of surgery ($t = 0.768$; $p = 0.445$) ($p > 0.05$). However, there was a statistically significant difference on the first ($t = 12.411$; $p = 0.000$) and second ($t = 8.976$; $p = 0.000$) postoperative days (Table 2; Figure 1).

There was no statistically significant difference between the mean scores of the VAS Scale on the night before and on the day of surgery ($p = 0.262$) and the first postoperative day and the second postoperative day ($p = 0.080$) in the intra-group comparison of the patients in the experimental group. Comparisons of VAS Scale mean scores

Table 1 Comparison of the descriptive characteristics of the experimental and control groups

Characteristics		Experimental (n = 35)		Control (n = 35)		χ2; p-value
		n	%	n	%	
Gender	female	26	74.3	27	77.1	$\chi^2 = 0.07$
	male	9	25.7	8	22.9	p = 0.50
Marital status	married	24	68.6	24	68.6	$\chi^2 = 0.00$
	single	11	31.4	11	31.4	p = 0.60
Education level	illiterate	25	71.4	30	85.7	$\chi^2 = 2.12$
	literate	10	28.6	5	14.3	p = 0.12
Previous surgery experience	yes	24	68.6	27	77.1	$\chi^2 = 0.65$
	no	11	31.4	8	22.9	p = 0.29
Chronic sleep disorders	yes	19	54.3	20	57.1	$\chi^2 = 0.05$
	no	16	45.7	15	42.9	p = 0.50

χ2 – chi square test statistic; p < 0.05 level of significance

Table 2 Comparison of the preoperative and postoperative mean VAS Scale scores of the experimental and control groups

VAS Scale assessment time	Group	mean	SD	t-test	p-value
Preoperative night	experimental	534.94	47.67	0.393	0.696
	control	529.31	70.05		
Night of surgery	experimental	545.71	52.97	0.768	0.445
	control	534.69	66.36		
The first postoperative day	experimental	389.46	24.11	12.411	0.000
	control	505.54	49.81		
The second postoperative day	experimental	396.26	15.79	8.976	0.000
	control	503.26	68.73		

SD – standard deviation; p < 0.05 level of significance

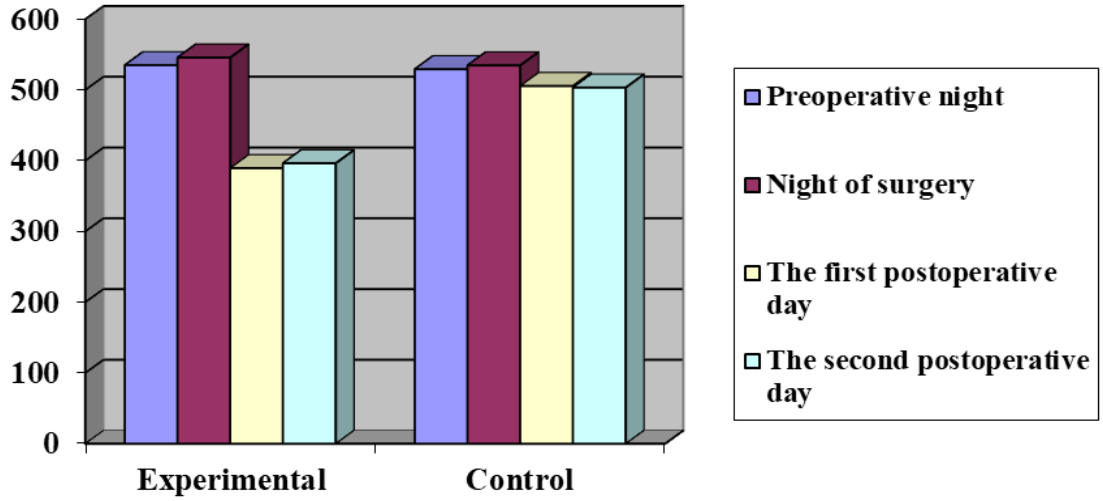

Figure 1 Comparison of the preoperative and postoperative mean VAS Scale scores of the experimental and control groups

on the night before the operation day and the night of the operation day (p = 0.000) and the night before the operation and the second day after the operation (p = 0.000) were found to be statistically significant (Table 3).

When the in-group VAS Scale mean scores of the control group were compared, the night before and the first postoperative day were found to be statistically significant (p = 0.032) (Table 4).

Table 3 Comparison of the preoperative and postoperative mean VAS Scale scores of the experimental group

VAS Scale assessment time	n	mean	SD	t-test	p-value
Preoperative night	35	534.94	47.67	-1.141	0.262
Night of surgery	35	545.71	52.97		
Night of surgery	35	545.71	52.97	14.854	0.000
The first postoperative day	35	389.46	24.11		
The first postoperative day	35	389.46	24.11	-1.802	0.080
The second postoperative day	35	396.24	15.79		
Preoperative night	35	534.94	47.67	14.867	0.000
The second postoperative day	35	396.24	15.79		

SD – standard deviation; p < 0.05 level of significance

Table 4 Comparison of the preoperative and postoperative mean VAS Scale scores of the control group

VAS Scale assessment time	n	mean	SD	t-test	p-value
Preoperative night	35	529.31	70.05	-0.385	0.702
Night of surgery	35	534.69	66.36		
Night of surgery	35	534.69	66.36	2.242	0.032
The first postoperative day	35	505.54	49.81		
The first postoperative day	35	505.54	49.81	0.182	0.857
The second postoperative day	35	503.26	68.73		
Preoperative night	35	529.31	70.05	1.459	0.154
The second postoperative day	35	503.26	68.73		

SD – standard deviation; p < 0.05 level of significance

Discussion

The aim of this study was to assess the effect of PMRT on the sleep quality of patients after THA. In the evaluation of the VAS Scale scores on the night before the surgery and on the night of the surgery, it was found that the mean scores of the experimental and control groups were similar. Both groups had similar experiences with sleep disorders, and the difference between them was not statistically significant. However, in the first and second postoperative days, the mean VAS Scale scores of the experimental and control groups were different, and this difference was statistically significant.

This study demonstrated a decrease in the mean VAS Scale score in the experimental group, which applied PMRT, indicating a high quality of sleep. PMRT is safe and inexpensive, in comparison to drugs or other treatments (Akgün & Dayapoğlu, 2015).

In the literature, it has been reported that mental and physical relaxation approaches have had positive effects on sleep quality in surgical patients who experience temporary or short-term sleep disorders (Floyd et al., 2002). Other studies have also compared the effects of PMRT in patients with insomnia and found time spent awake was lower and quality of sleep was significantly higher in patients who performed the exercises (Means et al., 2000; Simeit et al., 2004; Wright et al., 2002). Akgün and Dayapoğlu (2015) found that chronic obstructive lung disease patients had increased quality of sleep after PMRT. Related literature also suggests that progressive relaxation exercises improve quality of sleep (Baltaş & Baltaş, 2005; Kaynak, 2007). The findings of this study are consistent with the literature and the results of these previous studies. The higher mean VAS Scale scores before the surgery and on the night of the surgery indicate low quality of sleep in patients. The mean VAS Scale score of the experimental group decreased in the first and second postoperative days. The lower mean VAS Scale scores in the first and second postoperative days indicate that quality of sleep improved after progressive relaxation exercises. Previous studies have reported that patients after THA experience sleep problems on the first night after surgery, and the results of this study supports these reports (Krenk et al., 2012; Wylde et al., 2011). Studies on various patient groups indicate that the effects of relaxation training on sleep quality means in PMRT and control groups are comparable (Dayapoğlu & Tan, 2012; Demiralp et al., 2010).

The difference between the mean VAS Scale score on the night of the surgery and on the first postoperative night was found to be statistically significant in the control group ($p < 0.05$). Surgical patients stated that they had sleep problems due to anxiety, pain, and position restriction (Önler & Yılmaz, 2008). In studies evaluating the sleep quality of patients after major surgery using the Visual Analog Sleep Scale, Pittsburg Sleep Quality, and Oguri-Shirakawa-Azumi Sleep Scale it has been found that sleep quality is worse in the postoperative

period than in the preoperative period (Gögenur et al., 2009; Tabuchi & Koitabashi, 2006).

Previous studies have indicated that patients experience more sleep problems during the day of surgery, but that sleep problems decrease by the third postoperative day, through control of the stimuli (Robinson et al., 2005; Wylde et al., 2011). The findings of the present study are consistent with the results of previous studies.

Conclusion

In this study, the effect of PMRT on sleep quality was evaluated in THA patients. PMRT significantly improved patients' sleep quality. In addition, relaxation techniques are safe and inexpensive to use. PMRT may be regarded as a time-consuming intervention in initial education but may not necessarily be time-consuming when offered in clinical practice with preoperative training within the scope of routine nursing care. These effective interventions should continue to be used in the relief of sleep problems, in research of nursing management, and in the application of nursing practices.

Ethical aspects and conflict of interest

Ethical consent was obtained from the Ethics Committee of Atatürk University, Faculty of Health Sciences (References No: 2011.3.1/6) before the study began. Before data collection, informed written consent of patients was obtained. The authors declare that they have no conflict of interest.

Funding

This study was supported by (2011/314) Scientific Research Project Unit of Atatürk University.

Author contributions

Conception and design (NK, FÇ), data analysis and interpretation (NK, FÇ), manuscript draft (NK, FÇ), critical revision of the manuscript (NK, FÇ), final approval of the manuscript (NK).

References

Akgün, Ş. Z., & Dayapoğlu, N. (2015). Effect of progressive relaxation exercises on fatigue and sleep quality in patients with chronic obstructive lung disease (COPD). *Complementary Therapies in Clinical Practice*, *21*(4), 277–281. https://doi.org/10.1016/j.ctcp.2015.10.002

Akıncı, A. C., & Olgun, N. (2011). The effectiveness of nurse-led, home-based pulmonary rehabilitation in patients with COPD in Turkey. *Rehabilitation Nursing*, *36*(4), 159–165. https://doi.org/10.1002/j.2048-7940.2011.tb00084.x

Baltaş, A., & Baltaş, Z. (2005). *Stress and coping ways* (19th Ed.). Remzi Bookstore.

Bergamasco, E. C. & Cruz, D. A. L. M. (2007). Adaptation of the visual analog sleep scales to Portuguese. *Revista Latino-Americana de Enfermagem*, *15*(5), 998–1004. https://doi.org/10.1590/S0104-11692007000500018

Birol, L. (2004). *Nursing process* (6th Ed.). Impact Printing.

Boyacıoğlu, G., & Kabakçı, E. (2010). *Relaxation exercises*. Ankara: Association of Turkish Psychologists. Retrieved June 12, 2011 from www.psikolog.org.tr

Büyükyılmaz, F. E., & Aştı, T. (2013). The effect of relaxation techniques and back massage on pain and anxiety in Turkish total hip or knee arthroplasty patients. *Pain Management Nursing*, *14*(3), 143–154. https://doi.org/10.1016/j.pmn.2010.11.001

Çetinkaya, F., & Karabulut, N. (2016). Validity and reliability of the Turkish version of the Visual Analog Sleep Scale. *Kontakt*, *18*(2), 84–89. https://doi.org/10.1016/j.kontakt.2016.05.003

Dayapoğlu, N., & Tan, M. (2012). Evaluation of the effect of progressive relaxation exercises on fatigue and sleep quality in patients with multiple sclerosis. *The Journal of Alternative and Complementary Medicine*, *18*(10), 983–987. https://doi.org/10.1089/acm.2011.0390

Dehghan-nayeri, N., & Adib-Hajbaghery, M. (2011). Effects of progressive relaxation on anxiety and quality of life in female students: a non-randomized controlled trial. *Complementary Therapies in Medicine*, *19*(4), 194–200. https://doi.org/10.1016/j.ctim.2011.06.002

Demiralp, M., Oflaz, F., & Komurcu, S. (2010). Effects of relaxation training on sleep quality and fatigue in patients with breast cancer undergoing adjuvant chemotherapy. *Journal of Clinical Nursing*, *19*(7–8), 1073–1083. https://doi.org/10.1111/j.1365-2702.2009.03037.x

Eti Aslan, F. (2014). *Pain nature and control* (2th Ed.). Istanbul Avrupa Medicine Bookstore.

Floyd, J. A. (2002). Sleep and ageing. *Nursing Clinics of North America*, *37*(4), 719–731. https://doi.org/10.1016/s0029-6465(02)00034-8

Gögenur, I., Bisgaard, T., Burgdorf, S., Van Someren, E., & Rosenberg, J. (2009). Disturbances in the circadian pattern of activity and sleep after laparoscopic versus open abdominal surgery. *Surgical Endoscopy*, *23*(5), 1026–1031. https://doi.org/10.1007/s00464-008-0112-9

Hoey, L. M., Fulbrook, P., & Douglas, J. A. (2014). Sleep assessment of hospitalised patients: a literature review. *International Journal of Nursing Studies*, *51*(9), 1281–1288. https://doi.org/10.1016/j.ijnurstu.2014.02.001

Hultman, T., Coakley, A. B., Annese, C. D., & Bouvier, S. (2012). Exploring the sleep experience of hospitalized adult patients. *Creative Nursing*, *18*(3), 135–139. https://doi.org/10.1891/1078-4535.18.3.135

Kanji, N., White, A., & Ernst, E. (2006). Autogenic training to reduce anxiety in nursing students: randomized controlled trial. *Journal of Advanced Nursing*, *53*(6), 729–735. https://doi.org/10.1111/j.1365-2648.2006.03779.x

Karagözoğlu, Ş., Çabuk, S., Tahta, Y., & Temel F. (2007). Some factors influencing the sleep of hospitalized adult patients. *Journal of Thoracic*, *8*(4), 234–240.

Kaynak, H. (2007). International Classification of Sleep Disorders (ICSD-2). *Turkiye Klinikleri Journal of Internal Medical Sciences*, *3*(26), 4–7.

Krenk, L., Jennum, P., & Kehlet, H. (2012). Sleep disturbances after fast-track hip and knee arthroplasty.

British Journal of Anaesthesia, *109*(5), 769–775. https://doi.org/10.1093/bja/aes252

Kumar, S., & Raje, A. (2014). Effect of progressive muscular relaxation exercises versus transcutaneous electrical nerve stimulation on tension headache: a comparative study. *Hong Kong Physiotherapy Journal*, *32*(2), 86–91. https://doi.org/10.1016/j.hkpj.2014.06.002

Lane, T., & Anne East, L. (2008). Sleep disruption experienced by surgical patients in an acute hospital. *British Journal of Nursing*, *17*(12), 766–771. https://doi.org/10.12968/bjon.2008.17.12.30306

Lee, S. A., Han, S. H., & Uk Ryu, H. (2015). Anxiety and its relationship to quality of life independent of depression in patients with obstructive sleep apnea. *Journal of Psychosomatic Research*, *79*(1), 32–36. https://doi.org/10.1016/j.jpsychores.2015.01.012

Means, M. K., Lichstein, K. L., Epperson, M. T., & Johnson, C. T. (2000). Relaxation therapy for insomnia: night-time and daytime effects. *Behaviour Research and Therapy*, *38*(7), 665–678. https://doi.org/10.1016/s0005-7967(99)00091-1

Missildine, K., Bergstrom, N., Meininger, J., Richards, K., & Foreman, M. D. (2010). Sleep in hospitalized elders: a pilot study. *Geriatric Nursing*, *31*(4), 263–272. https://doi.org/10.1016/j.gerinurse.2010.02.013

Önler, E., & Yılmaz, A. (2008). The sleep quality of the patients in surgical units. *Florence Nightingale Journal of Nursing*, *1*6, 114–121.

Pellino, A. T., Gordon, D. B., Engelke, Z. K., Busse, K. L., Collins, M. A., Silver, E. C., & Norcross, N. J. (2005). Use of nonpharmacological interventions for pain and anxiety after total hip and total knee arthroplasty. *Orthopedic Nursing*, *24*(3), 182–190. https://doi.org/10.1097/00006416-200505000-00005

Potter, P. A., & Perry, A. G. (2010). *Sleep in fundamentals of nursing* (4 th Ed.). Canada, Mosby.

Robinson, S., Weitzel, T, & Henderson, L. (2005). The Sh-h-h-h project: nonpharmacological interventions. *Holistic Nursing Practice*, *19*(6), 263–266. https://doi.org/10.1097/00004650-200511000-00006

Seers, K., Crichton, N., Tutton, L., Smith, L., & Saunders, T. (2008). Effectiveness of relaxation for postoperative pain and anxiety: randomized controlled trial. *Journal of Advanced Nursing*, *62*(6), 681–688. https://doi.org/10.1111/j.1365-2648.2008.04642.x

Senol, V., Soyuer, F., Pekşen Akça, R., & Argün, M. (2012). The sleep quality in adolescents and the factors that affect it. *Kocatepe Medical Journal*, *13*(2), 93–104.

Simeit, R., Deck, R., & Conta Marx, B. (2004). Sleep management training for cancer patients with insomnia. *Support Care Cancer*, *12*, 176–183. https://doi.org/10.1007/s00520-004-0594-5

Tabuchi, S., & Koitabashi, K. (2006). Study of the sleep patterns of patients before and after surgery: evaluation by an actigram and an OSA sleep survey sheet (MA edition). *Japanese Journal of Nursing Art and Science*, *5*(1), 58–68. https://doi.org/10.18892/jsnas.5.1_58

Taylor, C., Lillis, C., & Prisecilla, L. M. (2001). *Fundamentals of the nursing* (4th Ed.). Philadelphia JB Lippincott Company.

Topcu, Y. S., & Fındık, Y. U. (2012). Effect of relaxation exercises on controlling postoperative pain. *Pain Management Nursing*, *13*(1), 11–17. https://doi.org/10.1016/j.pmn.2010.07.006

Tranmer, J. E., Minard, J., Fox, L. A., & Rebelo, L. (2003). The sleep experience of medical and surgical patients. *Clinical Nursing Research*, *12*(2), 159–173. https://doi.org/10.1177/1054773803012002004

Valente, S. (2015). Evaluating and managing insomnia: non-pharmacological treatments. *Journal of Sleep Disorder & Therapy*, *4*, 189. https://doi.org/10.4172/2167-0277.1000189

Verran, J. A., & Snyder-Halpern, R. (1988). Do patients sleep in the hospital? *Applied Nursing Research*, *1*(2), 95. https://doi.org/10.1016/s0897-1897(88)80010-7

Wright, S., Courtney, U., & Crowther, D. (2002). A qualitative pilot study of the perceived benefits of autogenic training for a group of people with cancer. *European Journal of Cancer Care*, *11*(2), 122–130. https://doi.org/10.1046/j.1365-2354.2002.00307.x

Wylde, V., Rooker, J., Halliday, L., & Blom, A. (2011). Acute postoperative pain at rest after hip and knee arthroplasty: severity, sensory qualities and impact on sleep. *Orthopaedics and Traumatology: Surgery and Research*, *97*(2), 139–144. https://doi.org/10.1016/j.otsr.2010.12.003

Ye, L., Keane, K., Johnson, S. H., & Dykes, P. C. (2013). How do clinicians assess, communicate about, and manage patient sleep in the hospital? *Journal of Nursing Administration*, *43*(6), 342–347. https://doi.org/10.1097/NNA.0b013e3182942c8a

Yılmaz, E., Kutlu, A. K., & Çeçen, D. (2008). The factors those affect sleeping status of the patients hospitalized in surgical clinics. *New Journal of Medicine*, *25*(3), 149–156.

© 2022 Central European Journal of Nursing and Midwifery