

Review Article

Usage of Non-Pharmacologic Methods on Postoperative Pain Management by Nurses: Sample of Turkey

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Abstract

Background: At the postoperative period, postoperative pain one of the most important patient complains is an acute pain starting with surgical trauma, lessening gradually and ending by the tissue recovery. The essential aim in nursing care of postoperative pain is to do patient assessment with nursing approachess. Furthermore pharmacologic and non-pharmacologic nursing interventions that included individual plan are to implementation and evaluation.

Purpose: The purpose of this literature review which non-pharmacological methods can be used by nurses to cope with post-operative pain in Turkey.

Method: The databases of Turkish Medical Index, Google Akademik, YOK Thesis Search, Pubmed, Google Scholar, EBSCO Host, Web of Science were scanned to reach the studies. It was determined that 35 studies were in conformity with the inclusion criteria.

Findings: In postoperative pain control, nonpharmacologic pain control methods can be used to increase the effect of analgesics, in case of insufficient effect of analgesics, or when analgesics cannot be used. Among nonpharmacologic postoperative pain control methods, transcutaneous nerve stimulation, application of hot and/or cold compresses, relaxation exercises, music therapy, massage, reflexology, aromatherapy rarely used in postoperative pain control but hypnosis, reiki, yoga and acupuncture can not be implemented by nurses in Turkey.

Conclusion: It is seen that majority of the studies conducted on nonpharmacologic methods in Turkey were masters or doctoral theses. These methods can not be performed by nurses working at the hospitals in Turkey. The reasons non-pharmacological methods were practiced less frequently by nurses were insufficient number of nurses, patients' reluctance about pain control, lack of time, and lack of information about pain control. In accordance with these results it is recommended to give more space for teaching the non-pharmacological methods that can be applied for pain management and legal regulations can be improved.

Keywords: Postoperative pain, nonpharmacologic methods, nursing.

Background

Pain is a protective response that informs you about any actual or potential tissue damage, that tries to alert you to the body's destroyed defense line and support is needed, that sends an individual to action to escape from the tissue-damaging stimulus. According to the definition made by the Taxonomy Committee of the International Association for the Study of Pain (IASP), pain is "an emotional, effective, unpleasant sensation associated with the patient's

past experiences with actual or potential tissue damage from any part of the body" (Erdine, 2003; Sahin, 2013; Tel, 2010). Postoperative pain is an acute pain that starts with surgical trauma, gradually diminishes and ends with tissue healing.

Despite the developments in the pathophysiology and treatment of pain, the in-depth current knowledge, the use of new drugs and complex drug delivery systems, unfortunately, many patients still continue to receive inadequate

treatment for post-operative pain, and it remains to be a medical and social predicament even with all development of pain in medicine (Erdine, 2002; Erdine, 2003; Rawal, 2000).

Even when no patient should suffer from pain after the operation with the current pain control methods, almost all of the patients suffer from postoperative pain due to lack of knowledge and interest of both physicians and other health personnel (Erdine, 2003).

Pain in surgical patients is one of the most serious complaints in the postoperative period, and if not controlled, it increases the healing process by causing respiratory, excretion, circulatory, and other systemic complications. As a result, some patients die, life quality and patient satisfaction decrease, the length of hospital stay increases, and the care cost increases (Aslan, 2010).

It may not be possible to reduce the pain completely and control it. However, the important thing is to reduce the pain to the extent that the patient feels comfortable. For this reason, nurses have a great responsibility in this regard.

The nurses should be involved actively in the treatment of pain, diagnose the patient in the direction of a nursing model/theory, use the pharmacological and nonpharmacologic methods specially designed for the patient, evaluate the results and prevent the problems that may arise by keeping the pain within the livable limits (Buyukyılmaz & Aşti, 2009; Pirbudak-Cocelli, Bacaksız & Ovayolu, 2008).

Although analgesics are indispensable in the management of post-operative pain, they cannot always adequately relieve the pain of the patient and have many undesirable side effects. For this reason, it is reported that nurses use non-pharmacological methods in addition to pharmacological methods to ease the pain patients experience after surgery, increasing the effectiveness of pharmacological methods (Ettrich et al., 2007).

The application of nonpharmacologic methods, known as pain controlling methods other than drugs, alone or in combination with pharmacologic methods is effective in decreasing the severity of pain, reducing the number of analgesics to be used, and decreasing the complication caused by strong analgesics such as opioids.

Nonpharmacologic Methods for Alleviating Postoperative Pain

Nonpharmacologic methods that can be used to relieve or alleviate pain can be described as follows:

- **Menthol application to the skin:** Provides external analgesia by local application of the menthol containing ingredients (Bolat, 2015).
- **Vibration:** It's a kind of electric massage. Especially with moderate pressure, it reduces pain by generating numbness, paresthesia, and anesthesia in the painful area (Babadag, 2014).
- **Aromatherapy:** Essential oils are used to prevent and reduce pain by massage, inhalation, steam or bath (Babadag, 2014).
- **Therapeutic touch:** It is an energy therapy that provides harmony between the body, mind, and spirit by touching with hands (Babadag, 2014).
- **Exercise:** Increased blood circulation with exercise is effective in reducing pain. Exercise relieves pain by preventing muscle tension and contractures. It includes Active-passive movements, movements in the bed, and walking (Babadag, 2014; Bolat 2015).
- **Positioning:** Staying in the bed for a long time in the same position causes the patient pressure, discomfort, and pain. Position change reduces the pressure in the painful area, increases blood circulation, prevents muscle contraction, helps the patient's comfort, and prevents pain (Bolat, 2015).
- **Music therapy:** It is used to provide relaxation and distract the patient. Music therapy stimulates endorphin secretion, relaxing the individual and increasing the pain tolerance (Bolat, 2015).
- **Reflexology:** Reflexology is the technique of hand massage applied to the feet, hands, and head, which corresponds to various parts of the internal organs and body (Babadag, 2014).
- **Hypnosis:** Hypnosis is a complex method, which includes emotion change, psychological condition, and minimal motor function, allowing to focus on a specific subject (Bolat, 2015).

- **Prayer:** The method of praying is used for the patient's desire to be relieved of pain and for the forgiveness of sins. It can be applied by the individual, relatives, religious officials, or healthcare professionals (Bolat, 2015).
 - **Yoga:** These techniques include physical movements integrated with mental focus and deep breathing, and they try to maintain and improve the balance of the body.
 - **Transcutaneous electrical nerve stimulation (TENS):** It includes the stimulation of the nerve fibers with electrodes applied on the skin and the control of pain. Its effectiveness has been observed in various musculoskeletal system pain, malignancies, fractures, chronic pain, back pain, delivery pain, postoperative pain, and neuropathic pain (Aslan & Yıldız, 2017; Ozyalcın, 2003)
 - **Hot application:** Heat is effective in pain caused by muscle spasm, local anesthesia secondary complaints, joint involvement, peristalsis and gastric acidity decrease, and vasoconstriction. It leads to vasodilatation, reducing blood viscosity and muscle tension, increasing tissue metabolism and eliminating metabolic wastes (Ozyalcın, 2003; Tel, 2010)
 - **Cold application:** Cold reliefs pain with the effects such as the decrease in edema by vasoconstriction as a result of sympathetic fiber activation, suppression of inflammatory reactions, decrease in muscle spasm and contraction (Bolat, 2015; Ozyalcın, 2003)
 - **Imagination:** Imagination is a creative sensory experience that can reduce pain. In imagination, the individual reveals the inner world of his experiences and depicts the events, dreams, fantasies, and inner experiences of his memory. Imagination helps to change perceptions about diagnosis, treatment, healing ability, and thus reduces pain, tension and stress (Tel, 2010).
 - **Massage:** Manually or mechanically applied massage is applying pressure to the body with rhythmic movements. Proper massage doesn't only block the pain impulses also reduces muscle spasm and tension. It regresses hypoxia by dissolving muscle spasm and also stimulates the nervous system causing endorphins and serotonin secretion, so pain threshold increases, and the patient feels less pain (Aslan & Yıldız, 2017; Ozyalcın, 2003; Tel, 2010)
 - **Acupuncture:** Technic is an attempt made by pricking needles made of certain minerals into specific spots related to the pain throughout the body or painful areas (Aslan & Yıldız, 2017; Bolat 2015; Ozyalcın, 2003).
 - **Acupressure:** It is a type of acupuncture performed by applying pressure to a specific point without needles. It is thought that the regions where the pressure is applied will activate/strengthen the healing powers in the body (Ozyalcın, 2003).
 - **Relaxation:** Relaxation techniques are a method that contributes to postoperative pain control by providing relief from mental and physical stress, by relieving anxiety and related muscle tension, and thus also acting on muscle spasms that are caused by surgical intervention. The use of relaxation techniques in the postoperative period will reduce the use of analgesics in the patient, reduce the side effects associated with these drugs, and ensure that the patient has the highest level of nursing satisfaction (Topcu, 2008).
- Various techniques are applied for this purpose. The main examples of these techniques,
- ***Passive relaxation:** relaxation by concentrating on one's body and seizing the heat sensation,
 - ***Progressive muscle relaxation:** It involves deliberately contracting muscles and relaxing completely in turn. The aim is to allow to patient comprehend the tension in the muscles and reduce it voluntarily.
 - ***Meditation:** The individual is asked to focus on his / her own breathing, visually on an object, on a picture, or on the thoughts of the applicator. With this focus, attention is directed on something else instead of pain, and it leads to anxiety reduction and relaxation of the individual.
 - ***Biofeedback:** An application based on informing the patient for the purpose of controlling a physiological function or relaxation.
 - ***Hypnosis:** A deep relaxation state in which the cognitive awareness decreases as the patient receives the suggestions more readily (Babadag, 2014; Ozyalcın, 2003).
 - ***Distraction:** The technique of distraction relies on focusing on a different direction other than

pain so that the attention of the individual is distracted from the pain.

Pain tolerance increases because awareness of pain is reduced. With this technique, the individual can be directed towards different stimuli such as praying, listening to music, watching television, painting, meeting with friends or family members, repeating positive thoughts such as "can be managed" (Babadag, 2014; Ozyalcin, 2003).

With the "Regulations on Traditional and Complementary Medicine" enacted in 2014 in Turkey, the education and the authorization of the people who will use these methods, the health institution which the methods will be implemented, and who will practice these methods are determined. According to this directive, many complementary practices need to be implemented by a physician with a certificate for the subject or other health professionals under his supervision. However, it is also a fact that these practices are applied by a large number of people without special certification (Ilgaz & Gozum, 2016).

In this context, even if they are not legally enforceable in the current conditions, nurses need to be more knowledgeable and equipped about the benefits, side effects, administration methods and contraindications of nonpharmacologic treatment approaches that may be appropriate in the light of evidence to provide better care and guide them. Instead of rejecting nonpharmacological methods directly, health professionals should interrogate them in the scientific context and integrate proven practices that can contribute to the patient into their clinical practice. Since they are most in contact with patients, nursing education, conferences / course, and in-service training programs should include these topics for nurses to apply these practices correctly, effectively, and reliably.

Purpose

The aim of this study by examining the works on postoperative pain management done by nurses in Turkey is to exhibit the current situation and draw attention to this field by examining the use of nonpharmacological pain relief methods and contribute to future work.

Methods

Literature review method was used in the study. The databases of Turkish Medical Index, Google

Akademik, YOK Thesis Search, Pubmed, Google Scholar, EBSCO Host, Web of Science were scanned to reach the studies. While scanning, keywords containing practices including nonpharmacological methods such as "postoperative pain", "nurse", "nonpharmacological method", "massage", "acupuncture", "music" were searched in Turkish and English. As a result of the review, it was determined that 35 studies were in conformity with the inclusion criteria (Table 1).

The ethical aspect of the work

The literature does not have an impact directly on humans or animals since the literature screening model is used. For this reason, there is no need for research ethics committee approval.

Limitations of the study

This literature review has some limitations. One of these is that literature review only covers work published in the online database. Another limitation is that full texts weren't available for some studies.

Findings

35 studies were included in this study. 13 of these studies were master's thesis and 11 of these were doctoral thesis and research articles (Table 1). The most research was done in 2016 and 2017 (Table 2).

In many studies carried out in Turkey, the followings are amongst the findings that have been found in the studies; postoperative pain management is inadequate, nurses have never used or have used little or no pharmacological methods in pain management, they mostly try pharmacological pain management with analgesics which are mostly in physician control in pain management, they prioritize drugs, they are reluctant to apply nonpharmacological practices, they lack knowledge and experiences about nonpharmacological methods and they don't give any information to patients in these matters, newly developed pain control methods/practices are not widely used, the multidisciplinary team approach to pain management has not been adopted, many patients considered the postoperative pain as a natural consequence of surgery, and even severe pain that wouldn't let patient sleep aren't reported (Ay & Alpar, 2010; Bacaksız et al., 2008; Kav, Hanoglu & Algier, 2008; Yılmaz & Gurler, 2011).

Table 1: Characteristics of studies types'

Type of Study	n	%
Master's Thesis	13	37.14
Doctoral Thesis	11	31.42
Research article	11	31.42
Total	35	100

Table 2: Distribution of studies by years

Year of The Study	n	%
1999	1	2.85
2001	1	2.85
2006	1	2.85
2008	1	2.85
2009	3	8.57
2010	1	2.85
2011	1	2.85
2012	3	8.57
2013	1	2.85
2014	2	5.71
2015	5	14.28
2016	7	20.00
2017	7	20.00
2018	1	2.85
Total	35	100

In Turkey, while TENS, music, massage, relaxation exercises, skin stimulation, reflexology, aromatherapy, cold applications for postoperative pain can be exercised by nurses, it is not possible to come across studies with nonpharmacological methods such as hypnosis, reiki, acupuncture, yoga and so on (Table3). Nonpharmacologic methods can be done by doctors and dentists with application certificate and nurses can only help them within" The Regulation of Traditional and Complementary Medical Applications" on October 10, 2014. On the other hand nurses can perform only hot and/or cold compresses, massage, therapy with music, play and art, acupressure, therapeutic touch, imagery, draw attention away and

relaxation techniques independently as stated in the "Nursing Regulation" published on April 19, 2011.

Conclusion and Suggestions

Pain management, which is considered as the fifth vital sign today, constitutes an important area of health care and nursing care. Especially postoperative pain requires multidimensional management because it affects the life quality and the healing process of the patient. Postoperative pain can lead to physiological and psychological problems for the patient when not actively managed. Controlling the pain is necessary in terms of relaxing the individual, increasing the life quality, reducing

complications, and shortening the length of hospitalization. For that, it is necessary to evaluate the knowledge, attitudes, and behaviors of nurses about pain management (Bas et al., 2016; Ozveren, 2011)

Health professionals often perform dependent functions such as drug application in pain management rather than independent functions such as distraction, relaxation, meditation, imagination, therapeutic touch. For this reason, it is very essential for health professionals to focus on nonpharmacologic methods and transfer them into practice in pain management (Cevik & Ozpınar, 2014).

Pain management requires a multidisciplinary approach (physician, nurse, pharmacist, physiotherapist, anesthesiologist). A nurse is an indispensable part and a member of the health care team who is facing the patient with pain and who often suffers from being unable to fully relieve their pain. Nursing is a profession that provides services directly to people based on resolving patient's problems and relaxing them besides protecting and improving the health of the healthy individual (Aslan & Badır, 2005). For this reason, in basic nursing education, the teaching of nonpharmacological methods which can be applied in the control of pain should be given more place, and proper repetition should be done. Training such as courses and seminars specific to pain, pain control and non-drug pain management methods in cooperation with hospitals and universities are required to ensure that nurses have adequate knowledge on these issues. More nurses should be given the opportunity to apply these practices by benefitting from the knowledge and experience of established nurses in this subject.

Nurses in the team included in the team with legal regulations should be authorized to perform practices such as acupressure, massage, reflexology, therapeutic touch, reiki, and aromatherapy, and the limitations for the application areas should be determined (Pirbudak-Cocelli, Bacaksız, & Ovayolu, 2008)

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Table 3: The characteristics of nursing studies related to non-pharmacological methods used for postoperative pain management in Turkey.

Authors/ Year	Aim	Type of study/ method	Sample	Results
Babacan, 1999 <i>Comparative study of effectiveness on pain management without drugs after cesarean section in the two different methods (massage/touch and music/relaxation)</i>	To measure and comparative two effectiveness of non –pharmacological procedures	Doctoral Thesis/ Experimental study	45 pregnant women -mas. and touch: 15 -music and relx: 15 -control: 15	Nurses used “massage and touching” and “music and relaxation” methods to control pain in women after cesarean births, and found that they could be beneficial in reducing frequency and severity of pain, anxiety levels and drug use.
Ozer & Bolukbas, 2001 <i>Investigation of the definition pain by the patients in the postoperative period and the attitudes of nurses towards the patients with pain</i>	To investigate the definition of pain by the patients in the postoperative period and the attitudes of nurses towards the patients with pain	Research article/ Descriptive study	-300 patients - 52 nurses	Of the nurses 96.23% did not always believe patients complaining of pain, 67.31 % applied techniques without medicaments 54.28 % of these using psychological support.
Degirmen, 2006 <i>The effectiveness of the hand and foot massages on pain management after postcesarean operation</i>	To determine the effectiveness of the hand and foot massages on pain management after postcesarean operation	Master’s thesis/ Experimental study	75 women -25 control group, -25 foot massage -25 hand massage	Hand and foot massages were found to be effective in the control of postoperative pain, and massage applied to the hand and foot reduced pain severity more than foot massage.
Topcu, 2008 <i>The effect of relaxation techniques that taught by the nurses on pain control in patients with upper abdominal surgery</i>	To evaluate the efficiency of the relaxation exercises for pain control in patients, who had upper abdominal surgery.	Master’s thesis/ Descriptive and cross sectional study	60 patients	It has been determined that, for patients, who have upper abdominal surgery, relaxation exercises have an important effect on pain control
Buyukyilmaz, 2009 <i>The effect of relaxation techniques and back massage on pain and anxiety in turkish total hip or knee arthroplasty patients</i>	To determine the effect of relaxation techniques and back massage on pain and anxiety in turkish total hip or knee arthroplasty patients	Doctoral Thesis/ Experimental study	60 patients -30 control -30 experimental	Relaxation and back massage were effective in reducing postoperative pain severity and anxiety in the patients
Ucuza, 2009 <i>The effect of foot massage on postoperative pain in breast surgery patients</i>	To determine the effect of foot massage on pain after breast surgery, and provide guidance for nurses in nonpharmacologic interventions for pain relief.	Doctoral Thesis/ Quasi experimental study	70 patients -35 experimental -35 control	The data obtained showed that foot massage in breast surgery patients was effective in postoperative pain management.
Karakoc , 2009 <i>Study of the contribution of pain control with classical analgesics after open heart surgery, by collating alternative (TENS) methods, to nurse</i>	To examine the efficiency of TENS upon the pain in the patients who developed the sternotomi after the open heart surgery.	Master’s Thesis/ Quasi-experimental study	90 patients	The patients that TENS is used on, are needed less analgesics and nursing approaches less controlling in the postoperative period and they also declared less problems that the others.

<i>follow-up and control</i>				
Ay & Alpar, 2010. <i>Approaches taken by nurses in treating postoperative pain</i>	To determine the effects of various actions taken by nurses for the purpose of pain management.	Research article/ Descriptive study	189 nurses	The results showed that 146 of 189 nurses (77.2%) administered analgesic medication more often than the other applications included patient-controlled analgesia (PCA), massage, visual analog scale (VAS), and teaching relaxation techniques, helping with mobilization, and assessing vital signs
Yilmaz & Gurler, 2011 <i>Nursing approaches toward postoperative pain in patients: patients' opinions</i>	To determine patients' opinions about nursing practices with respect to their postoperative pain and their satisfaction with these practices.	Research article/ Descriptive study	360 patients	The patients stated that nurses did not use a pain scale, provide information about how pain could be relieved, demonstrate what they needed to do during the activities that caused pain, assist the patients to reposition to relieve the pain, or use any non-pharmacological interventions.
Topcu & Findik, 2012 <i>Effect of relaxation exercises on controlling postoperative pain</i>	To evaluate the efficiency of the relaxation exercises for pain control in patients, who had upper abdominal surgery.	Master theses / Cross-sectional and crossover study	60 patients	Relaxation exercises, a nonpharmacologic method, are effective in reducing postoperative pain.
Tasdemir, 2012 <i>The effect of relaxation technique, aromatherapy practice and their combination on postoperative pain</i>	To examine the efficacy of relaxation, aromatherapy and their combination on postoperative pain relief	Doctoral Thesis/ Experimental Study	50 patients -25 control -25 experimental	The aromatherapy, relaxation and its combination reduces analgesic requirement doses in postoperative pain.
Arıoğlu, 2012 <i>The effect of progressive muscle relaxation exercise on pain before the removal of the chest tube</i>	To investigate the effect of progressive muscle relaxation exercise, one of the non-pharmacological pain control methods, on the level of pain in adult patients who are in Thoracic surgery service	Master Thesis / Randomized, single-blind and controlled experimental study	94 patients	Progressive muscle relaxation exercise which is one of the non-pharmacological methods is suggested to be used as a complementary treatment in chest removal application together with the pharmacological methods.
Yuceer, 2013 <i>Effect of transcutaneous electrical nerve stimulation (TENS) on pain after thoracotomy</i>	To investigate the effect of transcutaneous nerve stimulation (TENS) implementation on pain and analgesics consumption of patients undergoing posterolateral thoracotomy as a randomly controlled basis	Doctoral Thesis/ Quasi Experimental Study	40 patients -20 control -20 experimental	The implementation of TENS on patients undergoing posterolateral thoracotomy has decreased the level of pain and the consumption of analgesics.
Ozturk et al., 2014 <i>Postoperative pain and determination of patients opinions with respect to nursing approaches toward</i>	To determine patients' opinions with respect to nursing approaches with respect to their postoperative pain.	Research article/ Descriptive study	107 patients	It is determined that most of the nurses gave analgesics to patients who had pain and didn't use any non-pharmacological methods for postoperative pain.

<i>postoperative pain</i>				
Karaaslan , 2014 <i>The impact of music on postoperative pain</i>	To examine the effect of music on pain in the postoperative stage.	Master's thesis/ Quasi Experimental study	180 patients -90 test, -90 control	Music therapy was effective in reducing postoperative pain
Avci, 2015 <i>The effect of reflexology for decreasing postoperative pain and anxiety after total abdominal hysterectomy</i>	To determine the effect of reflexology for decreasing postoperative pain and anxiety after total abdominal hysterectomy	Doctoral Thesis/ Randomized trial	180 patients -54 intervention - 46 control	Reflexology are the result to be effective in reducing anxiety and pain.
Bolat, 2015 <i>Determination of the knowledge and practices of nurses for surgical pain management</i>	To determine the nurses knowledge and practices' related to postoperative pain in the surgical units.	Master's Thesis/ Descriptive study	170 nurses	Hot/cold applications, rest cure, distraction, praying, helping into suitable position, relaxation were taught by nurses. Only giving information, doing massage, listening to music and TENS were performed by nurses.
Rızalar et al., 2015 <i>Investigation of post-operative pain levels and nursing interventions following gynecologic surgery</i>	To determine to pain levels of the patients after gynecologic surgery and nursing interventions.	Research article/ Descriptive study	221 patients	The most common applied nursing pain management intervention were preparing a comfortable and quiet environment and giving information about effects of the disease and drugs.
Ayhan, 2015 <i>Experience of pain in patients undergoing abdominal surgery and nursing approaches to pain control</i>	To determine post-operative experience of pain among patients undergoing abdominal surgery and to identify nursing approaches to pain control.	Master Thesis / Descriptive study	103 patients	Patients reported that a calm and silent environment was provided, they were helped into a suitable position, hot/cold applications were administered, while no other non-pharmalogical procedures were performed.
Zencir, 2015 <i>Effects on pain and breathing exercises of cold therapy in median sternotomy patients</i>	To investigate the effects on pain and breathing exercises of cold therapy intervention for cardiac surgery (CABG, valve replasman) patients	Doctoral Thesis/ Randomised crossover clinical	34 patients	Cold therapy should be encouraged management of pain for post cardiac surgery.
Karabulut et al., 2016 <i>Non-pharmacological interventions for pain management used by nursing students in Turkey</i>	To examine the types of pain experienced by nursing students and the non-pharmacological methods they used to relieve them in Eastern Turkey.	Research article/ Descriptive study	388 students	The non-pharmacological methods most frequently used were heat application, resting in a dark room, massage, drinking hot herbal beverages, and cold application.
Ozlu et al., 2016 <i>The effect of music therapy on pain in cholecystectomy patients</i>	To determine the effect of music therapy on pain in patients who underwent laparoscopic cholecystectomy.	Research article/ Quasi- experimental study	60 patients	Music therapy is cost-effective, easy and has positive effects in reducing the pain.
Unver et al., 2016	To determine the postoperative pain	Research article/	73 second-year	All students repositioned their patients and

<i>Determining the postoperative pain management interventions of nursing students</i>	management interventions of nursing students	Descriptive study	students' nursing care plans	55.5% of the students tried to distract patients by having them watch television or read something.
Bas et al., 2016 <i>Postoperative pain management: nursing practices</i>	To evaluate the interventions of the nurses working in a state hospital for postoperative pain	Research article/ Descriptive study	99 nurses	Analgesic administration, informing the physician, and giving position were mostly preferred pain management methods
Ceylan, 2016 <i>Determine the effect of local cold gel application and relaxation exercise on pain level during chest tube removal undergoing open heart surgery</i>	To determine the effect of local cold gel application and relaxation exercise on pain level when chest tube removal in patients undergoing open heart surgery.	Master's Thesis/ Experimental study	90 individuals	The application of cold gel and relaxation exercise during the pulling of chest tube procedure decreased the pain level and the results were found to be statistically significant.
Tanrıverdi, 2016 <i>The effect of acupressure on postoperative pain of lumbar disc hernia</i>	To determine the effect of acupressure on postoperative pain of lumbar disc hernia	Master's Thesis/ Quasi-experimental research	112 patients -56 test, -56 control	The research result showed that owing to the effect of acupressure the pain level of the experimental group decreased from 7.75 ± 1.67 to 2.58 ± 1.18 .
Kunter, 2016 <i>The effect of cold application applied on median sternotomy before deep breathing and coughing exercise on the sternotomy pain</i>	To determine the effect of cold application applied on median sternotomy before deep breathing and coughing exercise on the sternotomy pain	Master's Thesis/ Quasi-experimental study	20 patients -10 test -10 control	Cold gel package application used in this study reduced the pain that developed based on deep breathing and coughing exercise which was done so as to prevent the respiratory complications following open-heart surgery
Güven, 2017 <i>The effect of reduction in anxiety reflexology and post-operative pain in patients who is having elective cesarean section</i>	To determine the effect of reflexology	Master's Thesis/ Single-blind randomize experimental clinical work	100 women	Reflexology treatments in patients undergoing elective caesarean section was effective in reducing pain and anxiety.
Erden et al., 2017 <i>A review of postoperative pain assessment records of nurses</i>	To examine postoperative pain assessment records of nurses.	Research article/ Retrospective and descriptive study	956 patients (421 folders)	There was not any record related to non-pharmacological pain therapy (massage, hot-cold application, and positioning) in the nurse observation forms
Celik, 2017 <i>The effect of cold application on pain induced by respiration and cough exercises after open heart surgery</i>	To determine the effect of cold application on pain induced by deep breathing and cough exercises after open heart surgery.	Doctoral Thesis/ Experimental study	57 patients -29 experimental -28 control	Cold application decreased the pain induced by deep breathing and cough exercises after open heart surgery.
Tekin, 2017 <i>Evaluation of the effects of different</i>	To determine the effect of the cold application which is performed at	Doctoral Thesis/ Randomized	60 patients -30 experimental	Long-term and short-term cold application after rhinoplasty acting similar effects. Short-term

<i>cold application periods on pain, eyelid edema and ecchymosis after rhinoplasty</i>	different times after rhinoplasty on the eyelid edema, periorbital ecchymosis and pain	controlled study	-30 control	cold application may be preferred in order to reduce edema, ecchymosis and pain.
Yilmazer & Bilgili, 2017 <i>Expectations that patients have of nurses regarding pain management during the post-operative period and interventions of nurses for patients in pain</i>	To determine the expectations that patients staying in surgery clinics have of nurses regarding pain management and interventions of nurses for patients in pain	Research article/ Descriptive study	-63 nurses -315 patients	The main interventions by nurses for pain management were pharmacological interventions requested by doctors and positioning the patients correctly. Other frequently used interventions were hot/cold compresses, active-passive exercises, relaxation exercises and massages
Arac, 2017 <i>The effect of massage on vital finding, pain and comfort level in patients after liver transplantation</i>	To determine the effect of massage on vital finding, pain and comfort level in patients after liver transplantation	Doctoral Thesis/ Half test model with pretest and posttest control group	84 patients -42 experimental -42 control	Back massage in liver transplantation patients were effective in postoperative pain severity and comfort levels.
Golluce, 2017 <i>The effect of hand massage after pulmonary operation on pain and life findings</i>	To determine the effects of hand massage to patients who had lung surgery on postoperative pain and life signs	Master's Thesis/ Quasi-experimental design	68 patients -34 experiment -34 control	It was found that hand massage decreased post-operative severity of pain
Koras, 2018 <i>The effect of foot massage on postoperative pain and anxiety level in laparoscopic cholecystectomy surgery</i>	To determine the effect of foot massage on postoperative pain and anxiety level in patients with laparoscopic cholecystectomy surgery	Doctoral Thesis/ Randomized controlled experimental study	167 patients -85 experimental -82 control	The analgesic needs of the patients in the experimental group, which foot massage was performed, decreased significantly