

Nurses' responsibilities in postoperative pain management following total hip arthroplasty

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<p>Description</p> <p>Total hip arthroplasty is the replacement of a hip joint that has been severely damaged. The operation is recommended if other treatments have not responded adequately. As the nurses are the professionals who spend the most time with patients after the surgery, they play an important role in the patient's pain management. The aim of the thesis is to define the nurse's responsibilities in the care of total hip arthroplasty. The purpose of the thesis is to analyze existing research, which may support nurses involved or interested in postoperative pain management.</p> <p>The method used in this thesis was a literature review. Data used in the study was retrieved from databases CINAHL, EBSCO and PubMed. The six articles found were analysed by using content analysis as a method. The analysis of the reviewed articles revealed three categories: nursing assessment and intervention, patient interaction and effective pain management. It was found that nurses have a vital role and responsibility in pain management. Although knowledge of anatomy, physiology and pharmacology are key in proper patient pain management, communication with the patient is also necessary to obtain the best results.</p>		
<p>Keywords</p> <p>Postoperative pain, pain management, total hip arthroplasty/replacement, nurses' responsibilities</p>		
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1 Introduction

In total hip arthroplasty (THA), pain is unavoidable during the postoperative stage; therefore, controlling and minimizing the pain of surgical patients has always been one of the top priorities for healthcare organizations. However, poor pain management for acute postoperative pain is among the causes for some medical complications. Common examples are pneumonia, thrombosis, infection, chronic pain, and depression. Furthermore, it also prolongs the time of hospitalization after surgery. (Meissner, Coluzzi, Fletcher, Huygen, Morlion, Neugebauer, Montes, Pergolizzi & Pergolizzi 2015, 2131.)

Nurses are the professionals who spend the most time with the patients in the ward after the surgery. Their responsibilities in pain assessment include applicable planning and implementing sufficient medical treatments. Additionally, nurses are required to perform patient-orientation and counseling during postoperative care in order to improve pain management before the patient is discharged. Besides implementing pharmacological and nonpharmacological pain management methods, nurses are also responsible for documenting the recovering process of patients, the side effects they experience, the effectiveness of the treatments, and discuss with doctors the possibility of suggesting another method if the current treatment is proved to be inefficient in relieving pain. (Abdalrahim 2009, 15.) Inadequately treated postoperative pain is considered to be one of the main problems in health care services. One of the causes of delayed discharge of surgical patients is insufficient knowledge of pain management and underestimation of patients' pain. (Meissner et al. 2015, 2135.)

The aim of the thesis is to define the nurses' responsibilities in the care of total hip arthroplasty. The purpose of the thesis is to analyze existing research, which may support nurses involved or interested in postoperative pain management. Different methods are suggested to nurses using scientific and academic studies, which can be used as references to strengthen the current knowledge of nurses as well as support their careers.

2 Total hip arthroplasty

2.1. The anatomy of hip joint

The hip joint is one of the largest and most vital joints in the human body. Generally, this joint has a wide range of movement and good stability. (Temple 2004, 44; Magee 2014, 689). Thus, the main function of the hip joint is present when a person is either standing, running or walking, as the joint supports the body weight. In fact, the functions of the hip include flexion, extension, abduction, adduction, circumduction and lateral rotation. (Walker 2010, 51.)

The hip is composed of two components that are able to move: the head of the femur and the acetabulum of the pelvis (Walker 2010, 51). Figure 1 illustrates the hip joint, of which the femoral head is concatenated with the acetabulum, which is the concave surface of the pelvis (Mortazavi & Freedman 2013, 19). The surface is called a ball-and-socket synovial joint, thus the rounded head of one bone is adapted to the cup-like cavity of another bone (Temple 2004, 44). A layer of articular cartilage covers the bone on the surface of the ball and socket. This cartilage softens the end of the bones and allows them to move efficiently. The synovial membrane is a thin tissue covering the hip joint,

which produces a tiny amount of fluid that protects the hip from abrasion during hip movement, and lubricates the cartilage. And lastly, ligaments connect the socket and the ball and give stability to the joint. (American Academy of Orthopaedic Surgeons 2015, 1.)

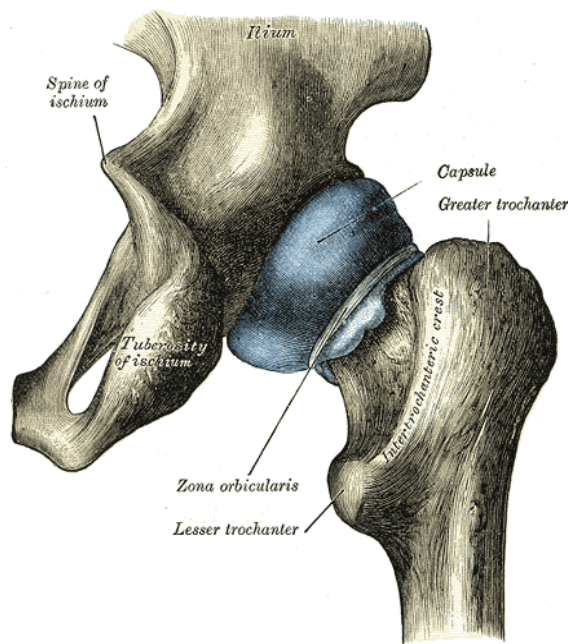


Figure 1. Hip joint capsule (Schmidler 2017)

2.2. Total hip arthroplasty

Total hip arthroplasty (THA) or total hip replacement is the replacement of a critically injured hip with an artificial joint. (Hinkle & Cheever 2014, 1118) It is an orthopedic procedure which aims to improve the management of diseases of the hip joint that have not responded well to conventional medical treatment or lifestyle changes. Non-surgical treatment includes pain medication, weight loss, stretching or reducing strain. (Mäkelä 2007, 15.) Total arthroplasty of the hip is considered when permanent damage has occurred to

the joint. The damage often results in dysfunction and pain, therefore reducing the quality of life. (Walker 2010, 1.)

THA is recommended for patients suffering, for example, from osteoarthritis, rheumatoid arthritis or femoral neck fractures. Other indications for THA include failure of previous reconstructive surgeries such as a failed prosthesis or an osteotomy, as well as conditions resulting from developmental dysplasia or Legg-Calvé-Perthes disease. (Hinkle & Cheever 2014, 1118; Mäkelä 2007, 14.)

In total hip arthroplasty, both the diseased femoral head and the acetabulum are replaced by fixed prosthetic devices. THA is required if the disease has progressed and is affecting both sides of the original joint. (Miller 2012, 3802.) The artificial components that may be required in hip joint replacement are a metallic or ceramic ball in the place of the femoral head, a cup replacing the hip socket, and a metallic stem (See Figure 2). Fixation between the components and the bone can be accomplished by cementless or cemented fixation. (Pluot, Davis, Revell, Davies & James 2009, 955-956; Hinkle & Cheever 2014, 1118.) To ensure the best optimal outcome in hip arthroplasty, the careful sizing and placement of the prosthesis is crucial (Schwarzkopf 2014, 9).

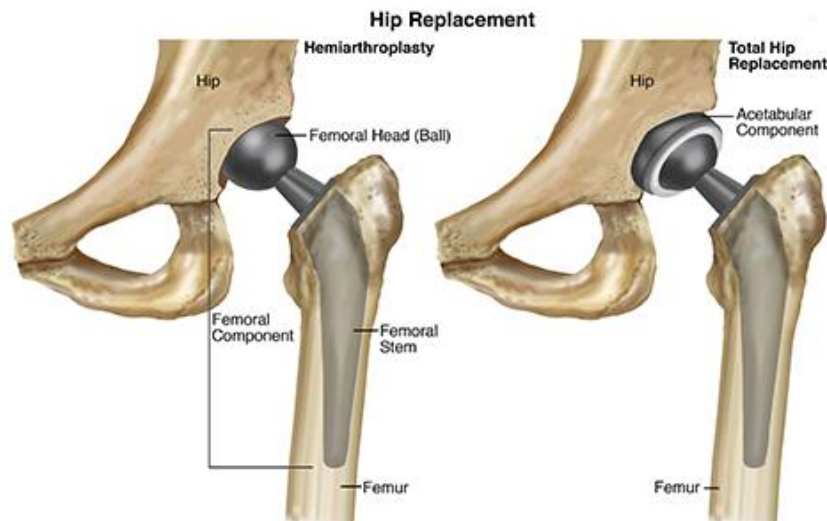


Figure 2. Hip replacement (Sathe 2013)

3 Postoperative pain management

3.1. Postoperative pain

Pain, according to the International Association for the Study of Pain, is defined as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage” (IASP 2012). Acute pain can be defined as “the normal, predicted physiological response to an adverse chemical, thermal or mechanical stimulus... associated with surgery, trauma and acute illness” (Carr & Goudas 1999, 2051). Untreated or undertreated, acute pain can lead to unwanted effects, which reduce the quality of life of the people experiencing it. Unwanted physical consequences include cardiovascular, respiratory or gastrointestinal complications, and a sensitization of the central nervous system to pain, possibly leading to chronic pain. Psychologically, undertreated acute pain can be a cause of anxiety, feelings of helplessness,

and sleeping problems, which can, in turn, increase the pain and cause long-term psychological damage. (Macintyre & Schug 2014, 3.)

Acute postoperative pain is unavoidable for most patients who undergo surgeries, regardless of the conditions or diseases they have. There have been significant researches and scientific proofs on the importance of postoperative pain management for patients. Evidence shows that decent postoperative pain management helps patients to avoid negative effects on recovering process, post-surgical complications, normal activities, anatomic function, and the risk of future chronic pain. A well-organized pain management plan is recommended in the early stage of preoperative preparation up until after discharge to control the pain effectively. (Chou, Gordon, Leon-Casasola, Rosenberg, Bickler, Brennan, Carter, Cassidy, Chittenden, Degenhardt, Griffith, Manworren, McCarberg, Montgomery, Murphy, Perkal, Suresh, Sluka, Strassels, Thirlby, Viscusi, Walco, Warner, Weisman, & Wu 2016, 132.)

3.2. Pain assessment

Customarily, nurses are the professionals in charge of pain assessment. (Lippincott Williams & Wilkins 2009, 643) Pain assessment consists in determining many characteristics of the pain: when and where does it start, the type of pain, its intensity, and how long it lasts. But nurses should also inquire about other symptoms resulting from the pain, and if pharmacological and nonpharmacological treatments have already been performed, with what outcomes. (Timby 2008, 439.)

To this day, there is no laboratory test or device which can measure pain. Nurses have to rely foremost on the patient's own description of their pain. (ibid. 439.) Because the patient's description is by nature subjective, nurses should also utilize objective tools to reach a better overall assessment. (Lippincott Williams & Wilkins 2009, 643) No tool is better than another, but the numeric scale is the most frequently used to measure pain intensity. (Timby 2008, 439) For adults who can speak and count, it is the scale of choice, because it is uncomplicated and it makes it easy to establish objectives in pain relief. (Pasero & McCaffery, 16)

3.3. Pain management

3.3.1. Pharmacological methods

In consideration of reducing postoperative pain experience, anesthetists discuss with patients before the operation to determine what constitutes sufficient analgesia, depending on the patient's health conditions and allergies. Clinical research has been conducted and found that pre-administered analgesia prevents or reduces significantly aftermath pain or analgesic requirement. Moreover, the usage of pharmacological agents in anesthesia is common as a way to block or reduce pain receptor activation. Results from clinical research showed that a preemptive local anesthetic helps to decrease analgesic consumption, but the postoperative pain score remains unaffected. On the other hand, patients who receive preemptive epidural analgesia experience a decrease in both analgesic consumption and pain score in the postoperative stage. In the end, preemptive analgesia offers short-term pain relief and significant support in postoperative pain management. (Garimella & Cellini 2013, 191.)

After years of advances in pain management, the main family of analgesics in postoperative pain management remains opioids. They react with the human body by binding with receptor in the central nervous system and peripheral tissues and adjust the outcome of nociceptors. Opioids can be administered via oral, transdermal, parenteral, neuraxial, and rectal routes. (Corbett, Henderson, McKnight, & Paterson 2006, 153.) The most common and standard choices of opioids for postoperative pain management are morphine, hydromorphone, and fentanyl. However, opioids have serious side effects that limit their use in pain relief. One possible side effect is respiratory depression, which can lead to hypoxia and respiratory arrest. Furthermore, flu-like symptoms can occur as side effects and may affect the patient's recovery. Long-term use of opioids can result in addictions and dependence. Therefore, opioids are chosen for acute short-term pain relief and require regular monitoring by nurses and anesthetists. (Garimella & Cellini 2013, 192.)

Non-steroidal anti-inflammatory drugs (NSAIDs) along with paracetamol are two of the first-choice non-opioid medications. NSAIDs are known for their analgesic, antipyretic and anti-inflammatory effects via restriction of prostaglandin production. Moreover, NSAIDs block the production of prostaglandins both in the spinal cord and at the periphery, and abate the hyperalgesia of postoperative trauma. Thus, NSAIDs are often the only analgesics used in pain management for minor surgeries. They have a moderate analgesic effect and are therefore the preferred alternatives to opioids in most major surgeries. However, NSAIDs may cause gastrointestinal side effects and others similar to those of opioids, for example respiratory depression, nausea and vomiting, sedation, urinary bladder

dysfunction and sleep disturbances. (Sivrikaya, 2012, 185-186.) In particular, NSAIDs are not recommended for elderly patients with gastrointestinal problems. Furthermore, when using NSAIDs, the medical condition, age and weight of patients need to be considered to avoid serious toxicity and side effects. (World Health Organization, 2012, 40.)

Paracetamol is an old and well-known non-opioid analgesic that is used for mild to moderate pain. It is the first choice in symptomatic treatment for pain management, especially when NSAIDs, for example, ibuprofen, are contraindicated. Paracetamol has an analgesic effect but no anti-inflammatory activity. Compared to NSAIDs, it does not cause gastrointestinal complications when taken as prescribed. However, the suppression of prostaglandin production is the same as with NSAIDs. (Jozwiak-Bebenista & Nowak, 2014, 11-13.)

Cyclooxygenase (COX-2) inhibitors were only introduced and implemented in the medical field during the 1970s. COX-2 inhibitors have the same chemical reaction as NSAIDs in anti-inflammatory activity. However, researchers found that when combined with paracetamol, COX-2 inhibitors also show analgesic and antipyretic effects. It results in more effective pain relief and anti-inflammatory activity with less complications during postoperative pain management. (ibid. 13-14.)

In fast-track THA surgery, which is commonly performed nowadays, one of the essential criteria for a successful process is an effective and well-recorded pain treatment. It is organized to limit the use of opioids to the minimum during the postoperative pain management. Paracetamol and COX-2

inhibitors have a synergistic effect that is similar to the effect of other acute pain management methods. Furthermore, they allow for a variety of administration routes and for a lower cost of analgesia. (Husted, 2012, 10.)

3.3.2. Nonpharmacological methods

Non-pharmacological treatment is a term that defines invasive and non-invasive treatments that are not recognized as conventional medicine. It aims to cure the affective, cognitive, behavioral and socio-cultural aspects of pain. Common nonpharmacological treatments for THA patients include transcutaneous electrical nerve stimulation (TENS), acupuncture, and hot-cold treatment. (Yurdanur, 2012, 485 - 486.)

Transcutaneous electrical nerve stimulation (TENS)

TENS is the application of electrical stimulation to the skin in order to control pain. It is performed in addition to pharmacological treatment in acute pain management. In past research, it was suggested that TENS stimulated analgesic action based on the peripheral and central nervous system mechanisms. By applying electrical stimulation onto the skin of the painful area, TENS triggers endogenous inhibitory mechanisms, which are opioid receptors in the spinal cord and brainstem, and this in turn reduces central neuron sensitization. (Rakel, Zimmerman, Geasland, Embree, Clark, Noiseux, Callaghan, Herr, Walsh & Sluka, 2014, 2600.) The treatment should be conducted under the supervision of a doctor and only on the areas where pain can be found. (Yurdanur 2012, 488)

Acupuncture and acupressure

Among invasive methods, acupuncture is the most well-known and most effective nonpharmacological treatment to be used in pain control. It has been demonstrated to be able to restrict the activity of pain receptors and the pain transmission to the brain, and it promotes the secretion of natural opioids of the body such as endorphin, serotonin and acetylcholine. (Yurdanur 2012, 486.) Acupuncture uses needles to stimulate nerves on the body to release natural hormones and enzymes, in order to activate the analgesic response more effectively. Moreover, the metabolism of the body occurs more smoothly, accelerating the recovery process for postoperative patients.

Acupressure is a non-invasive method performed by hands and fingers with the same mechanism as acupuncture. Both are traditional Chinese medicine practices that have a long history in pain management, and as such, are accepted as scientific non-pharmacological therapies in the Western healthcare system. (ibid. 489 – 490.)

Hot-cold treatment

Hot treatment is the act of applying heat either deeply or directly onto the pain area, which later inhibits the pain reflex by the effect of vasodilation.

Application to the surface can be performed with hot compresses, warm baths and paraffine usage. Deep applications are accomplished by using ultrasound to increase the temperature of the tissues, with a maximum depth of five centimeters. Cold treatment on the other hand consists of applying a cooling material or device to the body. Cold gel and ice packages used in the application should be separated from the skin surface by towels or gauze so that the patient can withstand the extreme cold. Cold treatment is done for 15-

30 minutes, 20 minutes at minimum for an ice pack, until the anesthetic effect occurs on the surface. Both are cheap and easy-to-use treatments with minimum side effects when used multiple times. Therefore, they are recommended and used commonly in nonpharmacological therapies for pain management. (Yurdanur 2012, 489.)

3.3.3. Counseling

During the postoperative stage, the priority of patient-orientation and counseling is to minimize the postoperative complications. One of the most common condition that THA patients experience is constipation and dehydration. Therefore, they are recommended to drink lots of fluids because side effects of analgesia often include constipation. Nurses follow instructions given by physical therapists and surgeons to assist patients during their daily activities and rehabilitation exercises. (National Association of Orthopaedic Nurses, 2016, 11.) During the recovery, experiencing stress and discomfort is common for any surgical patient. Therefore, it is recommended to have discussions with nurses to set goals for the recovery in order to reduce the discomfort. The type of supportive equipment for physical exercise and rehabilitation can be decided upon during the discussion based on the patient's health condition and personal preference. Furthermore, intimacy and sexual activities are restricted during the first few weeks after the surgery. The position of the hips and legs needs to be cautiously discussed to prevent future hip dislocation. (ibid. 12.)

There are important hip precautions that need to be taught to patients during their hospital stay and before the discharge. It is advised not to bend forward

more than 90 degrees, either while sitting or standing. Lifting the knees higher than the operated hip, and crossing or spreading legs while sitting are prohibited. It is suggested to always keep a straight posture while standing without twisting the torso, especially the hip area. While lying down on the side, the patient should place two pillows between the knees and avoid lying on the operated side. Moreover, weight loss is unavoidable after the surgery. Hence, appropriate diet is advised for patients who will need to regain weight. (ibid. 13-15.)

4 Aim and purpose, research questions

The aim of the thesis is to find out the postoperative pain management methods and define the nurse's responsibilities in the care of total hip arthroplasty. The purpose of the thesis is to analyze existing research, which may support nurses involved or interested in postoperative pain management.

Research questions:

What are the nurses' responsibilities in postoperative pain management following total hip arthroplasty?

5 Methodology

5.1. Literature review

A research literature review is an organized, accurate and consistent method that utilizes the existing completed and recorded work of researchers, practitioners and scholars (Fink 2005, 3). In a literature review, studies found

in the literature that relate to the topic of interest are compiled (Boote & Beile 2005). It is not an essay of the writer's own opinions and ideas, or just series of quotes from other people's work. The literature review gives an opportunity for a critical discussion on the chosen topic while pointing out similarities and differences in existing relevant literature. (Coughlan, Cronin & Ryan 2013, 2.)

According to Coughlan et al. (2013, 2), a well-organized literature review has an introduction, the main body that critiques the findings of previous work, emphasizing both empirical and theoretical literature, a discussion and a conclusion. A literature review is divided into several tasks. These tasks begin with deciding research questions that guide the review. When research questions are selected, it is time to choose the article databases. The next task is to select search terms, which are words and phrases used to find suitable articles, books, and reports. From here the literature review process continues by implementing practical screening criteria. The practical screening criteria are essential because only a few of the many articles will be relevant for the study. After the practical screening criteria, the methodological criteria must be applied. This consists of evaluating the sufficiency of a study's scientific quality and coverage. The final tasks of the literature review are doing the review and synthesizing the results. (Fink 2005, 3-5.) The stages of this literature review are implemented accordingly.

The aim of a literature review is to allow identification of the gaps in the existing research, as well as establish an overview of the progress made on the subject. This study was also carried out to make it possible for future researchers to know where to bring their focus in order to complement the already available knowledge with new information. (Mongan-Rallis 2014.)

Through a literature review, we are also able to support our aim for this thesis, which is to analyze research on the topic, and make the results available to nurses involved or interested in postoperative pain management.

5.2. Literature search

A literature search is an extensive and methodical search on a given topic. In health care research, it can allow researchers to find answers and evidence for their questions, to describe the state of the art or evolutions in current practices, and to find areas or issues which could benefit from additional research. (Czaplewski 2012, 20.)

The first step of the literature search consists in doing a first evaluation of the literature, a quick search which aims at finding out the overall availability of research on the topic. Based on the results, modifications on the research question and inclusion/exclusion criteria will be made. After enough of these initial searches have been performed, and once the research question has been clearly formulated, the literature search aims at finding sources of information. The literature search should be wide enough in order to not miss material from different sources, nor miss sources which use different research methods. (Van de Voorde & Léonard 2007, 5-6.)

The literature search has to be documented properly so that it can be replicated with the information listed by the authors. The documentation should include the databases searched, the time range selected, and other criteria, like the language or the area of research. (Van de Voorde & Léonard 2007, 9.)

Table 1. Inclusion and Exclusion criteria

Inclusion criteria	Exclusion criteria
Articles in English	Articles in other languages
Articles available in full text	Only partial text available
Articles from 2007 onwards	Articles from 2006 and earlier
Articles about postoperative pain management for total hip arthroplasty patients	Articles about only part of the topic or not relevant to the topic at all
Articles that answer our research question.	Articles that do not contribute towards answering the research question
Adult patients	Patients under 18 years old
Evidence-based research	Non-evidence based research
Articles from Europe and North American countries	Articles from other countries

The objective of this search was to gather relevant articles which described the nursing responsibilities in total hip arthroplasty postoperative pain management. The search was done on the three databases CINAHL, EBSCO and PubMed, and it resulted in a selection of 6 articles (Table 2.) Keywords were organized into three main categories: total hip arthroplasty, nursing responsibilities, and postoperative pain management. For example: “Total hip arthroplasty” OR “Total hip replacement” plus “AND” plus “nursing responsibilities” OR “nursing care” plus “AND” plus “postoperative pain

management". The research was done independently by the three writers of the thesis, following the same predefined process, which is as follows. Out of all the results in the database searches, articles were first considered based on their title. This selection was then trimmed down after reading the abstracts, if available. Once this was done, inclusion and exclusion criteria were applied to the articles, and the articles which were deemed acceptable were selected. The final step was a cross-examination of each other's selected articles, and a common discussion on which articles were answering our research question and followed our inclusion criteria. The most relevant articles were thus chosen together after group deliberation.

Table 2. Article selection

Stages of search	Implementation	Number of articles	Databases
Stage 1	Obtaining the relevant articles through databases with the keywords "total hip arthroplasty/replacement", "postoperative pain management", and "nursing responsibilities/care"	220	CINAHL EBSCO PUBMED
Stage 2	Analyzing articles that are related to the thesis' purposes and research questions by reading the titles and abstracts	59	
Stage 3	Applying all the inclusions and exclusions	12	
Stage 4	Determining the most relevant articles	6	

5.3. Data analysis

A content analysis is a method used for identifying core consistencies and meanings emerging from the qualitative data (Patton 2002, 453). It is a research method through which the systematic classification process of coding and identifying patterns or categories aims to interpret the content of text data (Hsieh & Shannon 2005, 1278). Content analysis aims to study meanings and themes that appear in a particular text, rather than only counting words (Zhang & Wildemuth 2009, 1). Content analysis typically applies either an inductive or deductive approach to analysis. An inductive analysis is a method, in which the data is explored without applying it to the pre-existing framework. The deductive approach, on the contrary, is an approach where the theoretical interest of the researcher directs the analysis. (Patton 2002, 453.) This study uses the inductive approach of content analysis to examine the selected 6 articles.

In health and social science research, themes within data are generally identified by using an inductive approach. In an inductive content analysis, analysis categories are formed from the data. The approach aims to summarize data into a brief format and to form clear links between the summary findings obtained from the data and the research objectives. (Thomas 2003, 2; Patton 2002, 453.)

The inductive analysis process includes three main phases: preparation, organizing and reporting. The first phase, preparation, begins by deciding the unit of analysis, that is, what to analyze (Elo & Kyngäs 2007, 109.) In this research the unit of analysis is all the selected articles. The second phase in

inductive content analysis is to organize the qualitative data. This step consists of open coding, forming categories or themes and abstraction. Open coding refers to re-reading and making notes about the content. From these notes, categories can then be formed and grouped under headings. Researcher must then make decisions through interpretation, choosing which things to put in the same category. The final step of organizing is abstraction, which means generating categories that connect with the research topic. These categories are named by using words that characterize the content. Subcategories and main categories are grouped separately. The third phase consists of reporting the analysis process and introducing the results. (ibid, 109-111.) The analysis process is presented in Figure 3 below.

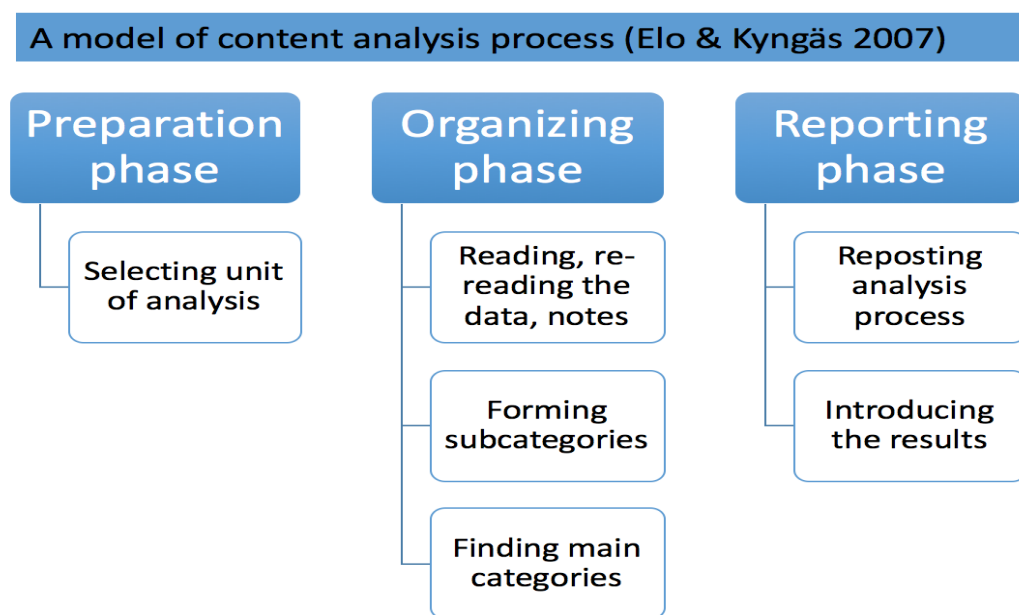


Figure 3. Inductive content analysis process.

The analysis process of this study began by reading the selected data carefully several times. After re-reading the data was organized into segments, which

meant dividing the data into discrete units by the content. All the segments that had the similar themes were grouped as subcategories. (Holloway & Wheeler 2013, 292.) (See appendix 2).

The next stage of the analysis was to forming main categories from the existing subcategories. This was done by identifying relevant units in several categories and finding relationships between them (Holloway & Wheeler 2013, 293). The links between the subcategories were discussed between researchers, and finally, the main categories were formed. Furthermore, the main categories were named after the characteristics of the certain subcategories. The three categories aim to answer the research question. The final stage of the analysis is reporting the results that are introduced in the results section in more depth.

5.4. Results

The main categories found in this study are *Nursing assessment and intervention*, *Patient interaction* and *Effective pain management* (see Figure 4). The results are divided into three sections by the main categories found in the analysis process. The sections are named after the main categories: *Nursing assessment and intervention*, *Patient interaction* and *Effective pain management*. Overall, it was found that the responsibilities of a nurse in postoperative pain management consist of various practices that nurses need to perform. Patients must be taken into account by educating them, but also by being aware of complication risks, patient's pain intensity, as well as acknowledging the fear that the patient is experiencing. In conclusion, the nurses have a great responsibility in postoperative pain management following THA.

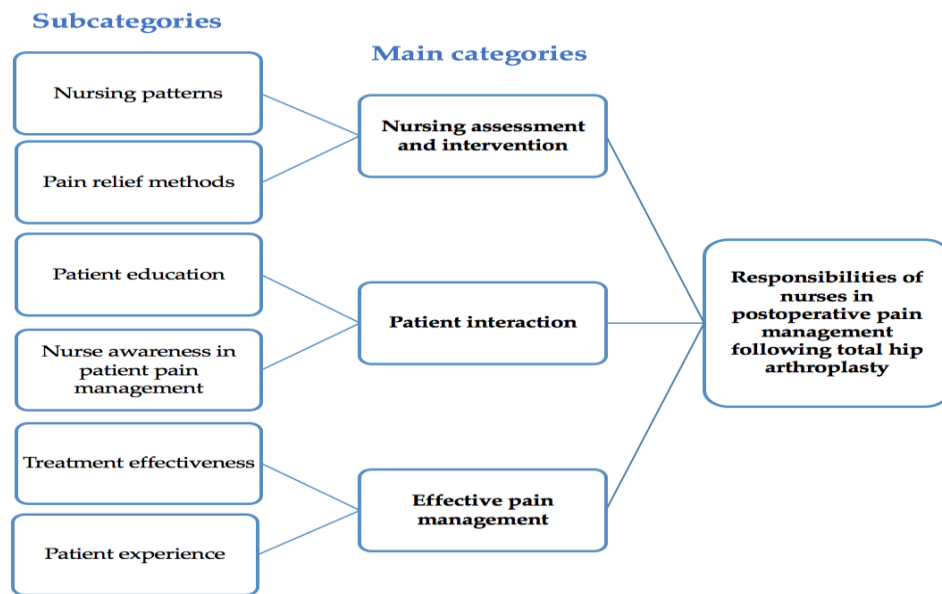


Figure 4. Research categories.

Nursing assessment and intervention

Lucas' article (2008) introduces the nursing management for THA patients in the first week of recovery up to one year. The first priority of post-operative care is regular vital sign monitoring, carried out by nurses (Lucas, 2008, 1412). Nurses need to monitor blood pressure, heart and respiratory rate, oxygen saturation and temperature consistently during the recovery. Moreover, signs of dehydration, shock or increased levels of pain should be monitored. Nurses should check the surgical wound regularly to prevent haemorrhage or infection. Continuous assessment of fluid balance is also to be documented. Observation and documentation are continued by nurses until the condition of patients is stable. (Walker 2012, 17-18.) Lee and Moorhead (2014, 154) list all of these continuous interventions over the patient's stay at the hospital, which include for example wound care, orthotics management, fall intervention, oral

medication, teaching/emotional support, elimination care, care plan, nutrition care, mobility care and IV administration.

Lucas (2008) divides the recovery period into two stages, immediate recovery period and long term recovery period. During the immediate recovery period, lasting approximately one week, the criteria needed to be considered in priority are anesthetic recovery, pain relief, wound care, mobility after surgery, venous thromboembolism prophylaxis and preparation for discharge. Patient's satisfaction is important for the recovery to proceed smoothly. Therefore, nurses should monitor patients' pain as it can hinder their recovery progress during their rehabilitation exercises. Nurses should encourage patients to make use of the available analgesia sources when they are needed, in order to maintain their comfort and satisfaction during the recovery period. (Lucas 2008, 1412–1413.) The postoperative care and discharge plans should be discussed in advance of the surgery with nurses (Walker 2012; Parisien, Valentine, Hoffman, Penzero 2012, 323). The plans include a discussion with a nurse on what should be the objectives of the pain management following the surgery (Parisien et al. 2012, 323). Nurses should also check that post-discharge needs can be met, and coordinate their actions with appropriate professionals. (Walker 2012, 16.)

Sufficient pain management is a vital form of good nursing care (Lucas 2008, 1410). Effective pain management is crucial, and not only because it is a key component of nursing, but also because THA patients whose pain is well-managed benefit from a faster and easier recovery, as well as improved mobilization (Walker 2012, 18; Lucas 2008, 1410). Furthermore, nurses need to know the different types of analgesia, the side-effects, and benefits of pain

relief (Lucas 2008, 1410). In the study conducted by Joelsson, Olsson & Jakobsson (2010, 2835), the patients highlighted the importance of effective pain relief after THA. Pharmacological pain relief was described by patients as 'effective' and 'sufficient'. In addition, patients were satisfied as their wishes concerning pharmacological pain relief were heard. (ibid.) THA patients receive considerably more pain management and intramuscular or subcutaneous administration on the first two days after surgery. IV administration takes most of the nursing time during the first two days after THA. (Lee & Moorhead 2014, 154.)

As a part of the responsibilities in postoperative pain management after THA, nurses need to be aware of risks of postoperative complications, and knowing the relevant anatomy and physiology surrounding the procedure. (Lucas 2008, 1410; Walker 2012, 20). This allows the nurses to understand the difficulties that patients go through, and the need for analgesia after surgery (Walker 2012, 20). Adequate pain relief facilitates earlier mobilization, which in turn reduces the risk of complications, for example deep vein thrombosis, or pulmonary infections (ibid, 18). One of the most important tools for nurses to provide effective pain relief is to ask patients to rate their pain on a scale. Reassessing pain helps to ensure that the pain of the patient is managed. Furthermore, it is important to identify patient's baseline pain and include the patient in discussions concerning their pain management. (Parisien et al. 2012, 323.) Walker (2012, 18) points out that any findings and actions concerning patient pain management should be documented on the pain assessment chart. Nurses are responsible for checking and monitoring the patient-controlled analgesia as well ensuring sufficient delivery of the medication

(ibid). Joelsson et al. (2010, 2837) state that giving more attention to patients during the initial postoperative phase is possibly the key to effective practice.

Patient interaction

Lee, Moorhead and Clancy (2014, 831) grouped in their study the direct interventions performed by nurses into categories, and surveyed the occurrence of each intervention. Out of 24 general categories, “Teaching/Emotional Support” comes as the fourth rank of most performed intervention. Relatively, it is not very time consuming: 14 minutes of teaching and emotional support were spent on average for each THA patient per day. In comparison, 56 minutes (per THA patient and per day) were spent on interventions related to “Care plan”, 52 minutes for “Mobility care” and 30 minutes for “Nutritional Care”. (ibid.) Nurses have a wide range of education topics to cover during their interaction with patients. Pain management is one of them, but also other activities which directly or indirectly influence the pain of the patient, such as positioning, or how to move following surgery. (Parisien et al. 2012, 323.) Nurses should be fully able to give instructions and help the patients to perform the exercises recommended by the physiotherapists, as well as give information on what movements and activities are to be avoided (Walker 2012, 28).

In the description of the care of patients undergoing THA, Parisien et al. (2008, 323) state that the perioperative nurse discusses the objectives of the pain management with the patient before the surgery so that the patient education starts early and continues throughout the postoperative care. When the patient returns to the ward after undergoing surgery, the nurse discusses right away with the patient to decide how to implement an appropriate pain

management procedure, by evaluating the pain and the patient's feedback (ibid).

Regarding patient interaction in regards to pain management, nurses should be aware that patients can find it difficult to ask nurses for help when they are in pain or are reluctant to do so because they wish to manage on their own. However, when it comes to discussing pain management, patients feel that they are able to influence how much and what kind of medication they receive, through their feedback to the nurses (Joelsson 2010, 2835). Nurses have to be able to educate the patient on advantages and side effects of the different medications (Lucas 2008, 1410). Nurses should make use of therapeutic communication, which aims at improving patient's trust, safety and well-being (Parisien 2008, 323). It is also important that nurses are aware of patient's fear and pain intensity. Joelsson et al. (2010) emphasize the importance of sufficient pain management during the first days after the operation, as the combination of fear and pain often follows the patients after THA surgery. (2835- 2836.)

Effective pain management

THA patients experience pain throughout their recovery period. The most severe pain was found to be immediately after the surgery. It was described as 'terrible' and 'burning' by the patients interviewed in the research. Patients reported that analgesia given during the surgery did not help to reduce the pain, and extra pain relief was required in order to ease patients' suffering. The following days during the recovery, patients experienced fear of mistakes when they performed rehabilitation activities such as lifting the leg up and moving outwards. The pain on the hip was still felt whenever they moved the

leg. Not to mention that patients also were afraid of their hip getting dislocated if they moved the leg too much, causing the rehabilitation to slow down. It is reported that all THA patients felt that the most painful moment during the recovery phase was when they got off the bed and stood on their hips for the first time. The pain was unbearable and excruciating that some patients even fainted. However, through training exercises with physiotherapists, the pain was reduced each time they tried to stand up. Eventually, the pain disappeared and the hip became more stiff and tender as patients familiarized themselves with the exercises and the surgical wound healed well. (Joelsson et al. 2010, 2834-2835.)

In order to give patients a satisfactory experience during their stay in the ward, a positive and helpful attitude from nurses has significant effect. It was reported that patients were more motivated when they felt the support from the nurses, which later on encouraged them to be more active during the training exercises. Furthermore, it is mentioned that the amount of pain relief given to the patients were decided based on their pain rating most of the time. Although it was good to supply THA patients with pharmacological support, it became an issue where side effects of some analgesia affected their well-being and interfered with their recovery process. However, it is suggested that the issue could be solved by communication between patients and nurses. Some patients' anatomy reacted well with one type of analgesia but not with another type of analgesia. Therefore, it is recommended for nurses to support patients by providing them with information about different types of analgesia, studying patients' medical history and listening to their feedback during the recovery. Moreover, nurses could also aid patients with minor matters such as comfortable pillows, security and other needs for a patient to

have a peaceful sleep, which was reported to reduce the pain and helped with the fatigue. (Joelsson et al. 2010, 2835-2836.)

Joelsson et al. (2010) emphasize the importance of postoperative pain management during the early stage of recovery since it is always reported that patients feel most painful during the first few days after the surgery. Untreated postoperative pain can lead to physiological, emotional, mental, and economic consequences. However, it has been found that different patients have different pain tolerances. Patients with history of chronic pain and disability might have a higher tolerance towards pain, resulting in a lesser need of support from pharmacological treatments. Because of this matter, nurses face difficulties in measuring pain levels for each THA patient in order to provide them with essential pain relief and medical support. In addition, in the case of high pain tolerance, enduring high levels of pain so readily might not be beneficial to the patient. (Joelsson et al. 2010, 2836-2837.)

6 Discussion

6.1. Discussion of the results

The aim of the literature review is to identify the nursing responsibilities in pain management following total hip arthroplasty. Pain management responsibilities seem to involve much more than just monitoring and administering medications. There seems to be a wide range of interventions that nurses need to perform to effectively manage patient pain, either directly or indirectly.

The results showed that pain management nursing education should start during the preoperative period, even before patient admission. By doing so, nurses allow the patient to have an idea of what to expect after surgery and discuss the objectives of postoperative pain management in advance, making it possible for patients to be prepared and less anxious about what awaits them in the postoperative stage. (Walker 2012, 17; Parisien et al. 2012, 323.)

The use of scales to allow patients to evaluate their pain is mentioned in the research, but not expansively, perhaps because its use is so wide spread in pain management that it is implicitly considered standard practice. The same can be said for pain management documentation: although a great tool for ensuring the continuity of care, only Walker (2012, 18) mentions the necessity of writing down observations and interventions taken, without expanding on the goal of such documentation. Lee et al. (2014, 827) only talk about documentation to emphasize its necessity when later evaluating the effectiveness of nursing interventions.

Following the surgery, nurses need to monitor basic vital signs. The physiological response to pain tends to result in change of vital signs, such as increased heart rate, blood pressure, and respiratory rate. Nurses might be able to use this as a possible indicator of pain, for example with unconscious or sleeping patients. When analyzing vitals as a sign of pain, nurses have to be cautious, as evaluation of pain from vital sign observation hasn't been clearly established. Nurses should only use vital signs as a clue - and not as evidence - that the patient is in pain (Arbour, Choinière, Topolovec-Vranic, Loiselle & Gélinas 2014, 10). Throughout the recovery, nurses are found to be responsible for tasks directly related to pain management, including planning the care, evaluating pain and administering analgesics. They also have to perform

interventions which are indirectly linked to pain prevention or management, such as detecting and trying to avoid complications or educating the patient on which movements they have to avoid. (Walker 2012, 28.)

THA patients undergo intense pain during recovery after the surgery (Joelsson et al. 2010, 2834-2835). It is important that nurses are aware of the intensity of the pain that patients are experiencing so that effective pain relief can be provided. At worst, postoperative pain can lead to complications that cannot be efficiently prevented (Walker 2012, 18; Mac Lellan 2004, 184.) Effective pain management is of course a key component of nursing care. Research states that following THA, it also promotes a faster recovery and mobilization (Walker 2012, 18; Joelsson et al. 2010, 2837). Nurses should properly manage patient pain because it hinders patient mobility and recovery, and increases risks of complications (Walker 2012, 18; Eid & Bucknall 2008, 91).

Joelsson et al. (2010, 2835) found that some patients are reluctant to ask for help when they are in pain, which seems to imply that nurses should also actively ask the patient regularly, and not only rely on patient's feedback but use their own assessment and experience as well. From the research articles, only Parisien (2012, 323) mentions that during the postoperative care, nurses should use therapeutic communication with the patients. Therapeutic communication is taught in nursing school, as part of holistic nursing. It covers a range of nursing skills such as educating, listening and being present when interacting with the patient, physical contact and use of open-ended questions, with the objective of creating and maintaining a healthy nurse-patient relationship, with the focus being on the patient instead of the health-

care entity. (Kleier 2013, 110.) One reason why therapeutic communication or other communication tools between nurse and patient are not mentioned more often could be that it is also considered standard practice, and therefore shouldn't need to be spelled out in nursing recommendations. In practice, therapeutic communication also takes more time than basic interaction, and it might not always be possible for nurses to properly implement it. (ibid.)

According to the data, "teaching/emotional support" interventions are performed in numerous short interventions (Lee et al. 2014, 831). While educating the patient, nurses have to cover diverse topics related to pain management. This includes, for example, information about the different types of analgesics with their benefits and side effects, how to rate their pain, positioning of the leg, how to move after surgery, and which activities to avoid (Parisien 2012, 323-324, Walker 2012, 18).

The nursing responsibility in pain management is different depending the country or area of the world. For example, in two studies in Iran and Jordan, nurses see as a barrier that they are barely involved in the decision making process, or even not involved at all (Rejeh, Ahmadi, Mohammadi, Anoosheh, & Kazemnejad, 2008, 471; Shoqirat 2013, 203). It comes to the point where patients realize that the doctor is the one in charge, and patients misunderstand the role of the nurse as that of a passive assistant rather than an active participant in the pain management process, and disregard the nurse's advice altogether (Shoqirat 2013, 203-204). In the United Kingdom, over half the nurses questioned in a study say that they rely on pain specialists in order to manage pain. The nursing responsibility in pain management doesn't go further than pain assessment and giving medication

to the patient. (Subramanian, Allcock, James, & Lathlean 2011, 1257.) On paper, the role of nurses in pain assessment and management is approximately the same in these two different areas of the world. The difference is made at the level of the nurse-doctor relationship, which, if turned into a trusting and respectful relationship, can allow the nurses to transmit their observations and suggestions to the doctors, and makes it possible for the doctors to rely more on nurses than having to do everything personally (Rejeh et al. 2008, 472).

As our results pointed out, assessing and managing pain is an important responsibility of a nurse. In addition, nurses should also educate and inform the patients on pain management. (Mac Lellan 2004, 184.) To achieve effective pain management, communication between the patient and nurse is required. When a patient in pain does not notify the nurses, the pain management is at risk of being inadequate, which results in negative consequences. Patients might sometimes feel that they don't want to disturb nurses or think that the pain is unavoidable, and for that reason might not be communicating with the nurses. (McDonald, McNulty, Erickson & Weiskopf 2000, 70). Yet, it is a responsibility of nurses to educate patients and give them ways to describe the pain. (Mac Lellan 2004, 180.) As our results suggest, nurses must be familiar with the medical history of their patients and be able to discuss the different possibilities in pain management. Some medications might not be suitable for some patients, thus nurses have the responsibility to inform the patient about the different types of analgesia. (Joelsson et al. 2010, 2835-2836.)

6.2. Ethical considerations

This literature review has attempted to follow the research code of conduct as defined by the Finnish Advisory Board on Research Integrity. This includes an open documentation of the search process and data collection, and a responsible communication of the results. Good research conduct also means the recognition of other's work by using correct citation and referencing. (Finnish Advisory Board on Research Integrity 2012, 30.) Plagiarism is the "[use] of somebody else's words, images, data, ideas, or other original creations without acknowledgment or permission and claiming them as your own original work" (Wager & Wiffen 2011, 132). Plagiarism can be done intentionally, or accidentally; and while in some cases it might be done without malicious intent, the outcome remains the same (Tensen 2017, 86). In this review, particular attention has been paid to acknowledge the work and ideas of others and to not appropriate it as our own.

6.3. Validity, reliability and limitations

In addition to respecting ethical considerations, the research is also required to be relevant and verifiable. The researcher must stay as objective as possible and not manipulate the data in any way. In a qualitative research, the investigators are obligated to carefully reflect, deal with and report the possible causes of error and bias. (Patton 2002, 51.) The trustworthiness of research is often measured by validity and reliability. Validity concerns whether findings and conclusions from research can be trusted. Furthermore, validity clarifies if the research measures, without bias or distortion, what it was designed to measure. (Gerrish & Lacey 2013, 48.) Reliability indicates the extent to which findings of the study can be replicated. However, in social

studies, reliability is problematic, as studies based on human behavior cannot be static. (Merriam & Tisdell 2016, 250.)

The analysis method should correspond with the data for research to be considered valid (Saks & Allsop 2007, 180). Moreover, validity is affected by factors such as the methods used in research, findings, and conclusions of the research and the peer review process. In this thesis, the analysis process was conducted by using content analysis, which includes coding and categorizing. The problem with coding and categorizing is the possible loss of important information, as all the information might not be appropriate for code or category. To ensure the validity, the data was analyzed by all of the authors of this literature review. (Saks & Allsop 2007, 306.) In addition, formulation of the codes and categories included a great deal of negotiation to secure the validity. (Silverman 2010, 281.) According to Gerrish and Lacey (2013, 533), a second person should always check each phase of the data analysis to guarantee the reliability. For testing reliability in this literature review, the findings were analyzed and peer-reviewed by all of the authors. Thus, the probability of errors in the process was reduced. (Gerrish and Lacey 2013, 533; Patton 2002, 192.) The articles chosen for the study all are peer-reviewed articles, which increases the accountability of the research (Patton 2002, 192). In addition, the databases used in this literature review research are considered valid library-based sources. The method, data collection and analysis of this research were clearly presented, which allows for reproducibility and adds to the reliability of the research.

Yet, there are some limitations to this study, the first being that only a limited number of relevant articles were found with our research criteria. Only

articles in English and which could be accessed in the selected databases were analysed. In addition, the review articles were written in the UK (2), USA (3) and Sweden (1), a small sample of countries which implies that the results may not cover a global view. Finally, as this literature review was conducted by three novice authors, some errors or inaccuracies in the research process might have occurred consequently.

6.4. Conclusion and recommendations

Knowledge of anatomy, physiology and pharmacology are crucial for nurses to properly manage patient pain. However, communication between nurse and patient seems to also be a key aspect of effective pain management. Effective pain management requires cooperation between the nurses and the patient. Furthermore, the helpfulness and optimistic attitude of nurses have been found to have a considerable effect on how patients experienced the stay in the ward (Joelsson et al. 2010, 2835). Nurses should, therefore, strive to create a positive relationship and open communication with the patient. This thesis gives some insights of what good and efficient pain management can be in the hands of responsible professional nurses.

Research has already proven that adequate pain management is preferred. For the patient, it allows for a smooth recovery, faster mobilization, and reduces risks of complications. For healthcare organizations, it reduces length of stay and contributes towards saving resources. Factors that influence nursing pain management such as nurse's knowledge in anatomy, physiology, pharmacology, patient education and communication are well identified. The authors recommend that more research be conducted to identify the

knowledge gap nurses have as well as their misconceptions regarding these factors, or to determine which of these factors offer the most room for development for nursing practice in pain management following THA.

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Appendices

Appendix 1. Chosen articles

Authors, date and place	Title, authors, year	summary of the results	Key results
Lucas, B. 2008 UK	Total hip and total knee replacement: postoperative nursing management	THA surgeries are successful, yet recovery can be long. Both nurses and patients should be aware of complications, so that symptoms can be identified and managed.	Nurses have a responsibility to do their part in promoting recovery after anesthesia and surgery. Nurses play important role in pain relief, wound care, mobilization after the surgery and patient risk assessment for further complications.
Joelsson, M. Olsson, L-E. Jakobsson, E. 2010 Sweden	Patients' experience of pain and pain relief following hip replacement surgery	Postoperative pain relief is related to professional care features, such as nursing staff, technical aids and medical pain relief.	Postoperative pain management should be developed, especially the pain management during the first few days after surgery. In addition, more attention devoted to the patients during the postoperative phase may help to improve the recovery and make it more effective.

Lee, M. Moorhead, S. Clancy, T. 2014 USA	Determining the cost-effectiveness of hospital nursing interventions for patients undergoing a total hip replacement.	Analysing cost-effectiveness of a large number of hospital nursing interventions without actual cost information of every nursing intervention.	The value of nursing time is explored by categories of care. Timely nursing assessments and appropriate nursing interventions daily after surgery improve patient satisfaction and the effectiveness of the recovery.
Parisien, K. Valentine, D. Hoffman, V. Penzero, J. 2012 USA	Enhancing the Patient's Experience Through the Total Joint Replacement Continuum of Care.	A framework for the clinical care of total joint replacement patients is introduced.	Foremost, nurses have to perform patient pain assessment. By emphasizing to the patients that they should not hesitate to report their pain, they get the patient to play a more active role in their pain management. The nurses are also responsible for discussing the post-operative pain management goals before surgery.
Walker, J. 2012 UK	Care of patients undergoing joint replacement	Pre-operative preparation of the patient undergoing joint arthroplasty and significant post-operative clinical consideration	A discussion of the overall nursing pain management for joint replacement patients.

Lee, M. Moorhead, S. 2014 USA	Nursing Care Patterns for Patients Receiving Total Hip Replacements	Description of nursing interventions for patients who underwent total hip replacement.	The care interventions under nurse's responsibility is enlisted, including interventions related to pain management. In addition, the article details the average time spent for each intervention by the nurses.
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Appendix 2. Research categories.

Nursing patterns	Pain relief methods	Nurse awareness in patient pain management	Patient education	Better pain management outcomes	Treatment effectiveness	Patient experiences
Pain assessment	Awareness of benefits of different types of analgesia to avoid misconceptions	Pain intensity – VAS scale	Standing medication & temporary pain medication	Preoperative education has beneficial effect on patient anxiety	Convenient nursing assessments and appropriate nursing interventions delivered daily after surgery may improve treatment effectiveness and patient satisfaction	Giving patients more attention during the initial postoperative phase
Risk assessment		The effect of friendly and helpful staff	Pharmacological pain alleviation	Therapeutic approach of communication as a tool for patient staying calm and positive		Pain assessment chart, documenting findings and actions
Involving patient in decisions	Awareness of side- effects of different types of analgesia to avoid misconceptions	Patient involved in decisions concerning pain management	Different aids e.g. pillows	Endured pain can affect mobilization and future health negatively → discussion about medication	Patient feedback	Pain reassessment as a key to ensure managing the pain of a patient
Identifying patient's baseline pain		Patients who received adequate pain relief more willingly got out of bed and become active	1 st and 2 nd days of hospital stay patient receiving great deal of pain management and IM/SQ administration			Checking pain assessment and patient controlled analgesia to ensure effective delivery of the medication
Discussion of appropriate pain management	Awareness of patient risks	Pain & fear combined → fear increases pain	IM/SQ administration seen as the most cost- effective nursing intervention		To be able to quantify and compare the effects of nursing contributions to patient care there must be more documentation of nursing interventions and outcomes	
	Awareness of patient's pain intensity					
	Awareness of patient fear (Pain & fear combined → fear increases pain)					
	Knowledge of relevant anatomy and psychology and procedures of surgery in understanding patient's pain and recovery		If symptoms of patient are not alleviated using ordered medications, a pain consult is scheduled			

Appendix 3. Abbreviations

COX-2: Cyclooxygenase (COX-2) inhibitors

NSAIDs: Non-steroidal anti-inflammatory drugs

TENS: Transcutaneous electrical nerve stimulation

THA: Total hip arthroplasty