



Pain management for post-operative nephrectomy in elderly patients

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PAIN MANAGEMENT FOR POSTOPERATIVE NEPHRECTOMY IN ELDERLY PATIENTS: A LITERATURE REVIEW

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Pain Management for Postoperative Nephrectomy in Elderly Patients: A Literature Review

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The purpose of this thesis was to describe the different methods nurses use to manage pain of elderly post-operative nephrectomy patients. It has described what pain, nephrectomy and pain management by nurses for the elderly patients postoperatively are. The research question was; what are the nursing methods are used to manage post-operative nephrectomy pain in elderly patients?

This thesis aimed to discuss the ways nurses use to manage pain in postoperative nephrectomy patients considering physiological changes due to age, pre-existing conditions and pharmacodynamics and pharmacokinetics of the drugs being administered. The method of data collection used was systematic literature review which means conducting a literature search, selecting data relevant to the purpose question, description of data selected and analyzing the data. This review was based on books and previously conducted studies done through current articles, journals and web search.

In the findings, it was reported that pain is individual and nurses should assess each patient individually to achieve proper pain management. Different methods of pain assessment were also discussed based on what pain chart the patient finds more helpful for them. Ways of drug administration with consideration of age and physiological changes were also emphasized. Also how to administer fewer drugs and produce equally good results was discussed.

It is important for nurses to know the different ways to communicate with the patients for better pain assessment and the effects and contraindications of the drug they are administering for the safety of the patient. There is always ongoing research involving pain management in postoperative fields and nurses should always be keen to learn new methods of pain management to help patients who need pain management.

Key words: nursing pain-management, nephrectomy patients, elderly patients

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Tämän opinnäytetyön tarkoituksena oli kuvata erilaisia hoitajien käyttämiä menetelmiä vanhojen ihmisten munuaistenpoistoleikkauksen jälkeisten kipujen hoitamiseen. Opinnäytetyö on kertonut mitä kipu, munuaistenpoistoleikkaus ja vanhojen ihmisten munaistenpoistoleikkauksen jälkeisen kivun hoitaminen ovat. Tutkimuskysymys oli; mitä hoitomenetelmiä käytetään vanhojen potilaiden munuaistenpoistoleikkauksen jälkeisen kivun hoitamiseksi.

Tämän opinnäytetyön tavoittena oli keskustella tavoista, joilla sairaanhoitajat hoitavat potilaiden kipua munuaistenpoistoleikkauksen jälkeen ottaen huomioon iän aiheuttamat fysiologiset muutokset, perussairaudet sekä annettujen lääkkeiden farmakodynamiikka ja -kinetiikka. Tiedonkeruun menetelmänä oli systemaattinen kirjallisuustutkielma, joka tehdään suorittamalla kirjallisuusetsintä, valitsemalla tutkimuskysymykseen liittyvä tieto, selostamalla valittu tieto ja analysoimalla tieto. Tämä tutkielma perustui kirjoihin ja aiemmin suoritettuihin tutkimuksiin, jotka löydettiin artikkeleista, julkaisuista ja internet-haulla.

Tuloksissa kerrottiin, että kipu on yksilökohtaista ja että sairaanhoitajien pitäisi arvioida jokainen potilas yksitellen kunnollisen kivun hoitamisen aikaansaamiseksi. Kivun hoitamisen eri menetelmistä kerrottiin myös perustuen siihen, minkä kipukartan potilas koki parhaimmaksi. Iän ja fysiologisten muutosten ottamista huomioon lääkkeiden antamisen tavoissa korostettiin. Tuloksissa kerrottiin myös siitä, miten antaa vähemmän lääkkeitä ja aikaansaada yhtä hyvät tulokset.

Sairaanhoitajien on tärkeää tietää eri kommunikointitapoja potilaiden kivun hoitamisen parantamiseksi. Sairaanhoitajien on myös tärkeää tietää annettavien lääkkeiden vaikutukset ja haittavaikutukset potilaan turvallisuuden vuoksi. Leikkausten jälkeisen kivun hoitamista tutkitaan jatkuvasti ja sairaanhoitajien pitäisi aina olla innokkaita oppimaan uusia kivun hoitamisen menetelmiä auttaakseen potilaita, jotka tarvitsevat kivun hoitamista.

Avainsanat: kivun hoitaminen, munuaistenpoistoleikkauspotilaat, vanhat potilaat

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1 Introduction

Pain is a very subjective experience because everybody has a different threshold and different ways of expressing it. According to *the Center for Clinical and Basic Research (CCBR)*, pain is an unpleasant sensation often caused by intense or damaging stimuli. Pain recognition, assessment, and management in older persons, particularly those who may have cognitive impairment and limitations in their ability to communicate pain, have always been challenging. Surgery can be viewed as an intentional injury, whereby particular tissues and organs of the body are cut and reshaped or removed in order to overcome disease or to help the body recover from an accidental injury (Davis 2000 p12). Pain is categorized as, nociceptive, non-nociceptive, somatic, visceral, neuropathic, or sympathetic depending on the type of pain and the cause of the pain.

Nephrectomy is a surgical procedure conducted to remove all or part of a kidney. The procedure is done to treat kidney cancer as well as other kidney diseases and injuries. Nephrectomy is also done to remove a healthy kidney from a donor who can be alive or dead for transplanting (<http://www.kidney.org/>). Pain caused as a result of this surgical procedure is classified as visceral pain which is usually associated with internal organs. Over the past 140 years since the first nephrectomy, it has developed from complete to partial nephrectomy. There has also been a development in the reasons for nephrectomy whereas initially the kidney removal operations were performed due to ureterovaginal fistulas and renal lithiasis (kidney stones), currently it is mainly due to renal tumors or organ donation (Poletajew S, Antoniewicz A .A, Borowka A. Urology Journal 2010 Fall;7(4):215-23). It is suggested that a retroperitoneal approach to nephrectomy may be associated with less pain perhaps due to less peritoneal irritation. Post-operative administration of narcotics and non-steroidal anti-inflammatory drug (NSAID) is commonly used for managing post-operative pain (Smith .A.D et al, 2007, page 390.)

Nursing pain management are the different ways nurses implore to control pain either by use of medical or non-medical means to make the patient's life bearable. The treatment of pain is guided by the history of the pain, its intensity, duration, aggravating and relieving conditions, and structures involved in causing the pain (<http://www.medicinenet.com>).

2 Purpose of study and research question

The purpose of this research is to describe the different methods nurses use to manage pain of elderly post-operative nephrectomy patients.

The research question is:

What are the nursing methods used to manage post-operative nephrectomy pain in elderly patients?

3 Methodology

The method used for collecting data was a systematic literature review which entails literature search, selection of data, description of data and finally data analysis. The systematic literature review was based on books and previously conducted studies done through current articles, journals and web search. The data was gathered from literature search in reference to research question and purpose statement.

According to Tranfield et.al (2003 207-222), systematic literature review is often perceived as complementary evidence based approach because the aim is to provide advice for clinicians and practitioners based on all available evidence .Literature reviews are important because they seek to summarize the literature that is available on any one topic. They make sense of a body of research and present an analysis of the available literature so that the reader does not have to access each individual research report included in the review. This is important because there is an increasing amount of literature available to health and social care professionals (Aveyard, H p6).

3.1 Data search

This study was written on a basis of collected articles, journals and books obtained by conducting a search on the school search base, Metasearch and direct websites listed in the Metasearch search base. The collected data was screened, extracted and analysed from searches such as EBSCO, Elsevier, Ovid (Laurea articles), SCIRUS, Intute, Ebrary and Laurus. In addition to “Metasearch”, the school data base, it was highly recommended by the librarian to go to individual search bases for better results.

When conducted, the search produced a number of articles that were helpful; however, some were unproductive due to errors in the search or lack of full texts. There was also difficulty when narrowing down the number of articles due to a large number in the hits or no hits for certain word combinations. (See table 1 below)

To narrow down the search from potential to non-potential sources, specifications had to be made using the purpose statement and key words. Through the school data search base, Metasearch, the key words were combined in different order using the advanced search using “And” and quotation marks. (See table 2 below)

Using only one word for the search had thousands of results hence the combination of the key words always having the word “nursing” in different order to narrow down the search and get articles with relevance to the thesis topic. Also inclusion of quotation marks and a question mark produced better results whereas selecting certain fields in the advanced tab modified the search. There were also articles taken directly from the search engine’s different website directly due to more direct and relevant topics. To get to the websites, all the nursing involved websites were selected and individually searched for to get the articles needed.

Below is a table illustrating how data was retrieved from Metasearch

Table1. Metasearch article retrieval

Search Word	Elsevier Science Direct	Ebsco Academic Search Elite	BioMed Central via SCIRUS	Ebrary	Laurus - Laurea	SAGE	Pubmed	Helka
Nephrectomy “Pain management” And “Nursing”	0	0	3	140	0	0	0	0
“Nursing Pain Management” And “Elderly Patients”	2	1	0	1	0	0	0	0
“Nephrectomy” And “Nursing” Pain management”	-	1	3	57	0	0	1	0
”Nephrectomy patients” “Nursing” And ”Pain management”	13	5	0	1	0	0	1	0

The table 1 above shows the keywords and the combinations used in the search for the articles. It shows how many hits were obtained with what combination for example “Nephrectomy” And “Nursing” pain management” shows - in Elsevier Science Direct, meaning inconclusive results according to the search site, 1 in Ebsco Academic Search Elite, 3 in BioMed Central via SCIRUS, 57 in Ebrary, Pubmed 1, Laurus, SAGE and Helka had 0.

The table below is a summary of how the chosen articles were selected to be the final articles used in the thesis.

Table2. Summary of the articles collected

Stage 1	Identifying relevant studies through searching Metasearch, always using the word “nursing”	229
Stage 2	Scrutinize articles in accordance to the thesis’ purpose statement and research question.	109
Stage 3	Applying inclusion and exclusion criteria.(see table 3 below)	26
Stage 4	Critically appraise studies for quality.	8 articles and 2 books

3.2 Data screening

Screening of data is important so as to narrow down the articles obtained to the relevance of the research question. Some of the data collected may have some useful information but the final articles being used must have complete relevance and this is done by using the inclusion and exclusion criteria. According to Burns and Grove (2001), the inclusion criteria refers to the characteristics an article has to meet in order to be used for the study, whereas the exclusion criteria is the characteristics of an article that make it unsuitable for the purpose of the study. The criteria used to determine what data is useful were language, how long ago the article was published, relevance to the research question, studies based on actual evidence and empirical research. The table below illustrates the inclusion and exclusion criteria for data screening.

Table 3. Inclusion and Exclusion criteria

INCLUSION	EXCLUSION
Articles in English	Articles not in English
Articles published after 2000	Articles published before 2000
Articles that support the purpose statement and research question	Articles that supported neither the research question nor the purpose statement
Studies based on actual evidence and empirical research.	Studies not based on actual evidence and empirical research
Articles with full text and opened	Articles that did not have full text or did not open
Articles with a nursing background	Articles that did not have a nursing background

3.2.1 Data extraction

Data extraction refers to the critical assessment of articles to obtain evidence that complies with the review of studies in accordance with the screening criteria. A technique was developed to support the process of analyzing, synthesizing and reporting review findings. Extraction of data was based mainly on the purpose statement of the thesis and the research question so as to obtain the relevant data and to have proper guidance as to what needs to be in the thesis. Extraction of the data to be used was obtained from the abstract, findings and discussions of the selected articles. The articles considered as being relevant to the study were listed and described in depth on the appendices (see appendix pg. 30). The selected articles were listed alphabetically beginning with the authors of the articles, the year it was published, name of the article, purpose of the article as intended by the author, findings and its relevance to the thesis. Each of the data extracted was used as key topics to review and analyze data.

The data collected was well in context with the purpose statement and the research question formulated for the thesis. Most of them focused on nursing pain management post- surgically while others focused on nurses' knowledge of how to manage pain in different situations. The data collected was in form of articles from previous research and books written on post-operative pain management.

3.3 Data analysis

In this systematic literature review, the data was analyzed based on the contents of the medical articles that were selected (content analysis). Content analysis according to LoBiondo-Wood & Haber (2006 page 559-575) is a research technique which can be used for objective, systematic and qualitative description of documentary evidence. Data analysis requires complete understanding of the data collected to be able to categorize the data into suitable categories. This is done in order for it to be easier and more precise to group the different themes into their respective categories.

The analyzing process consisted of reading through the 8 articles and the chapters of the 2 books which were in relation to the thesis topic systematically and thoroughly. Then, color coding relevant information to the research study and writing a short description of the articles on the margin which became the content areas. This was done to help in finding what the phenomenon the underlined phrases was related to. Secondly, the underlined phrases were grouped into phrases with similar content areas and giving it a title that described what was in that group (See pages 14-16). The final step involved further synthesis of the allocated titles into main categorized themes namely Drug therapy for management of postoperative elderly patients' pain, Postoperative pain assessment for pain-management in elderly Patients and Physiological changes in elderly patients and drug efficiency.

An illustration of the analysis process, the concept of pain-management and its subtitles were chosen in the following way: when a group of articles contained the words Pain Controlled Analgesics (PCA), different types of analgesics, NSAIDs, Opioids and Morphine this was put into a similar area content with the heading Drug Therapy. The same was done for article phrases with the words Visual Analogue Scale (VAS), Numeric Rating Scale (NRS), Verbal Descriptor Scale (VDS), Facial Pain Scale (FPS), and Dolopus (in France) which also goes by the name Pain Assessment Checklist for seniors with Limited Ability to Communicate (PACSLAC). These were classified on area content and given the heading related to Pain Assessment.

4 Findings

In this chapter, the body of evidence that was gathered from the reviewed literature in relation to the research question was discussed in depth. Phases involving how nurses can management pain in elderly patients and words related to the topic were sought throughout the thesis and regrouped to form for sub-topic and main topics (pages 12-14) which were then discussed in depth.

- ◆ The number of tissues present in a given tissue and affinity of those receptors for neurotransmitters is said to decrease with aging making elderly patients more sensitive to the effects of benzodiazepines and opioids.
- ◆ Pharmacodynamics
- ◆ Pharmacokinetics
- ◆ Vast majority of patients have a pre-existing condition that requires medication
- ◆ Elderly patients should be advised to bring all medication and prescriptions with them to the hospital
- ◆ For improved pain relief and better results, the nurse should administer drugs taking into account the age and pre-existing conditions of the patient
- ◆ Polypharmacy
- ◆ Avoid drug accumulation or prophylactically for induced pain
- ◆ Using titration for pain management should always begin with small doses
- ◆ Anticipation and management of adverse effects of pain medication
- ◆ Avoiding i.m injections if possible
- ◆ Assess and manage pain effectively
- ◆ Being up to date with technology involving pain management and drug therapy
- ◆ Being aware of verbal and non- verbal communication of pain
- ◆ Verbalization of painful experiences
- ◆ Supervise and assist patients in pain and management of pain
- ◆ Involving patients in their own care
- ◆ Using set guidelines for pain assessment and evaluation
- ◆ Hindrances to pain assessment
- ◆ Elderly patients see aging as a normal part of aging
- ◆ Elderly patients have lower pain intensity than younger patients
- ◆ Visual Analog Scale (VAS)
- ◆ Numeric Rating Scale (NRS)
- ◆ Facial Pain Scale (FPS)
- ◆ Pain Assessment Checklist for Seniors with Limited Ability to Communicate (PACSLAC)
- ◆ Familiarizing with pain scales

- ◆ Knowing patients history, age, pre-existing conditions, allergies, previous surgeries and pain scale used to manage pain
- ◆ Normal organ function
- ◆ Postoperative cognitive dysfunction
- ◆ Opioids
- ◆ Elimination half-life
- ◆ Increased cerebral sensitivity
- ◆ Delayed release drugs
- ◆ Pain Controlled Analgesics (PCA)
- ◆ Fentanyl
- ◆ Electromotive Drug Administration(EMDA)
- ◆ Obstructive apnea is thought to be partly related to opioid use
- ◆ Tramal
- ◆ Paracetamol
- ◆ Non- selective NSAIDs
- ◆ Selective NSAIDs
- ◆ Aggressive pain management is needed in older adults to decrease later adversities

These phrases were shortened further to find subtopics and color-coded to show the various subtopics they belonged to:

- ◆ Neurotransmitter receptors in elderly patients and benzodiazepine and opioid effects
- ◆ Pharmacodynamics and Pharmacokinetics' role in drug reception and distribution
- ◆ Considering pre-existing conditions when administering drugs
- ◆ Elderly patients should be asked their prescriptions and drugs with them to the hospital
- ◆ Polypharmacy interferes with proper evaluation
- ◆ Avoid drug accumulation or prophylactically for induced pain
- ◆ Using titration for pain management should always begin with small doses
- ◆ Anticipation and management of adverse effects of pain medication
- ◆ Avoiding i.m injections if possible
- ◆ Assess and manage pain effectively
- ◆ Being up to date with technology involving pain management and drug therapy
- ◆ Being aware of verbal and non- verbal communication of pain
- ◆ Verbalization of painful experiences
- ◆ Supervise and assist patients in pain and management of pain
- ◆ Involving patients in their own care
- ◆ Using set guidelines for pain assessment and evaluation
- ◆ Hindrances to pain assessment

- ◆ Elderly patients see aging as a normal part of aging thus may cause evaluation difficulty and undermedication
- ◆ Elderly patients have lower pain intensity than younger patients
- ◆ Use of Visual Analog Scale (VAS)
- ◆ Use of Numeric Rating Scale (NRS)
- ◆ Use of Facial Pain Scale (FPS)
- ◆ Use of Pain Assessment Checklist for Seniors with Limited Ability to Communicate (PACSLAC)
- ◆ Familiarizing with pain scales
- ◆ Determining which are normal organ functions and which aren't
- ◆ Postoperative cognitive dysfunction
- ◆ Opioids
- ◆ Elimination half-life calculation
- ◆ Increased cerebral sensitivity affects drug absorption
- ◆ Delayed release drugs affects pain evaluation
- ◆ Pain Controlled Analgesics (PCA)
- ◆ Fentanyl
- ◆ Electromotive Drug Administration (EMDA)
- ◆ Obstructive apnea is thought to be partly related to opioid use
- ◆ Tramal
- ◆ Paracetamol
- ◆ Non-selective NSAIDs
- ◆ Selective NSAIDs
- ◆ Aggressive pain management is needed in older adults to decrease later adversities
- ◆ Transcutaneous electrical nerve stimulation, massage, cold therapy, heat, relaxation therapy and music

Raw data	Extracted expressions	Subcategories	Main categories	Connecting categories
Neurotransmitter receptors in elderly patients and benzodiazepine and opioid effects	Neurotransmitter receptors and benzodiazepine and opioid effects	Physiological changes	Studying physiological changes and drug distribution	Nursing evaluation of drug reception
Pharmacodynamics and Pharmacokinetics' role in drug reception and distribution	Pharmacodynamics and Pharmacokinetics' role	Drug reception	Studying drug intake and distribution	Nursing evaluation of drug reception
Considering pre-existing conditions when administering drugs	Considering pre-existing conditions	Physiological changes and drug efficiency	Assessment of the client	Nursing methods to manage pain
Elderly patients should be asked their prescriptions and drugs with them to the hospital	Asked about prescriptions	Knowledge of pain medications used	Assessment of the client	Nursing methods to manage pain
Avoid drug accumulation or prophylactically for induced pain	Avoid drug accumulation	Drug reception and distribution	Studying drug intake and distribution	Nursing methods to manage pain
Using titration for pain management should always begin with small doses	Titration should always begin with small doses	Knowledge of drug administration	Drug administration	Nursing methods to manage pain
Being aware of verbal and non- verbal communication of pain	Verbal and non-verbal communication of pain	Knowledge of pain assessment	Assessment of the client	Nursing methods of pain assessment
Anticipation and management of adverse effects of pain medication	Anticipate and manage medication adverse effects	Knowledge of pain medication being used	Assessment of the client	Nursing evaluation of drug reception
Avoiding i.m injections if possible	Avoiding i.m	Knowledge of pain medication being used	Studying drug administration	Nursing methods of pain management
Assess and manage pain effectively	Assess and manage pain	Knowledge of pain assessment	Assessment of the client	Nursing methods of pain management
Being up to date with technology involving pain management and drug therapy	Technology involving pain management and drug therapy	Knowledge of pain management		Nursing methods of pain management, nursing methods of pain assessment
Verbalization of painful experiences	Verbalization of painful experiences	Knowledge of pain assessment	Assessment of the client	Nursing methods of pain management
Supervise and assist patients in pain and management of pain	Supervise and assist patients in pain management	Knowledge of pain assessment and management	Assessment of the client	Nursing methods of pain assessment
Involving patients in their own care	Involving patients	Knowledge of pain assessment	Assessment of the client	Nursing methods of pain management

Using set guidelines for pain assessment and evaluation	Set guidelines for pain assessment and evaluation	Knowledge of pain assessment	Assessment of the client	Nursing methods of pain management
Hindrances to pain assessment	Pain assessment	Knowledge of pain assessment	assessment of the client	Nursing methods of pain management
Elderly patients see aging as a normal part of aging thus may cause evaluation difficulty and undermedication	Seeing aging as a normal part of life may cause evaluation difficulty	Physiological changes and pain assessment	Assessment of the client	Relating nursing intervention methods with physiological changes
Elderly patients have lower pain intensity than younger patients	Lower pain intensity	Physiological changes	Assessment of the client	Nursing methods to manage pain
Use of Visual Analog Scale (VAS)	Visual Analog Scale (VAS)	Knowledge of pain assessment	Assessment of the client	Nursing methods of pain assessment
Use of Numeric Rating Scale (NRS)	Numeric Rating Scale (NRS)	Knowledge of pain assessment	Assessment of the client	Nursing methods of pain assessment
Use of Facial Pain Scale (FPS)	Facial Pain Scale (FPS)	Knowledge of pain assessment	Assessment of the client	Nursing methods of pain assessment
Use of Pain Assessment Checklist for Seniors with Limited Ability to Communicate (PACSLAC)	Pain Assessment Checklist for Seniors with Limited Ability to Communicate (PACSLAC)	Knowledge of pain assessment	Assessment of the client	Nursing methods of pain assessment
Familiarizing with pain scales	Pain scales	Knowledge of pain assessment	Assessment of the client	Nursing methods of pain assessment
Determining which are normal organ functions and which aren't for better evaluation	Determining which are normal organ functions	Physiological changes	Assessment of the client	Relating nursing intervention methods with physiological changes
Recognizing patients Postoperative cognitive dysfunction	Recognizing Postoperative cognitive dysfunction	Physiological changes	Assessment of the client	Relating nursing intervention methods with physiological changes
Opioids	Opioids	Drug therapy	Studying drug distribution	Nursing methods of pain management
Elimination half-life calculation	Elimination half-life calculation	Drug therapy	Studying drug distribution	Nursing methods of pain management
Increased cerebral sensitivity affects drug absorption	Increased cerebral sensitivity	Physiological changes	Studying drug distribution	Relating nursing intervention methods with physiological changes
Delayed release drugs affects pain evaluation	Delayed release drugs	Nursing methods of pain management	Studying drug distribution	Nursing methods of pain management, nursing methods of pain assessment
Pain Controlled Analgesics (PCA)	Pain Controlled Analgesics (PCA)	Drug therapy	Studying drug distribution	Nursing methods of pain management

Fentanyl	Fentanyl	Drug therapy	Studying drug distribution	Nursing methods of pain management
Use of Electromotive Drug Administration(EMDA)	Electromotive Drug Administration(EMDA)	Drug therapy	Studying drug distribution	Nursing methods of pain management
Obstructive apnea is thought to be partly related to opioid use	Avoid obstructive apnea	Drug therapy	Studying drug distribution with relation to age	Nursing methods of pain management
Tramal	Tramal	Drug therapy	Studying drug distribution	Nursing methods of pain management
Paracetamol	Paracetamol	Drug therapy	Studying drug distribution	Nursing methods of pain management
Non- selective NSAIDs	Non- selective NSAIDs	Drug therapy	Studying drug distribution	Nursing methods of pain management
Selective NSAIDs	Selective NSAIDs	Drug therapy	Studying drug distribution	Nursing methods of pain management
Aggressive pain management is needed in older adults to decrease later adversities	Aggressive pain management	Nursing methods of pain management	Studying drug distribution and administration	Nursing methods of pain management
Transcutaneous electrical nerve stimulation, massage, cold therapy, heat, relaxation therapy and music	Non-drug methods of pain management	Knowledge of pain management	Studying non-drug methods of pain management	Nursing methods of pain management

Table 4: how the raw data, extracted phases and subcategories were intergreted into the main categories

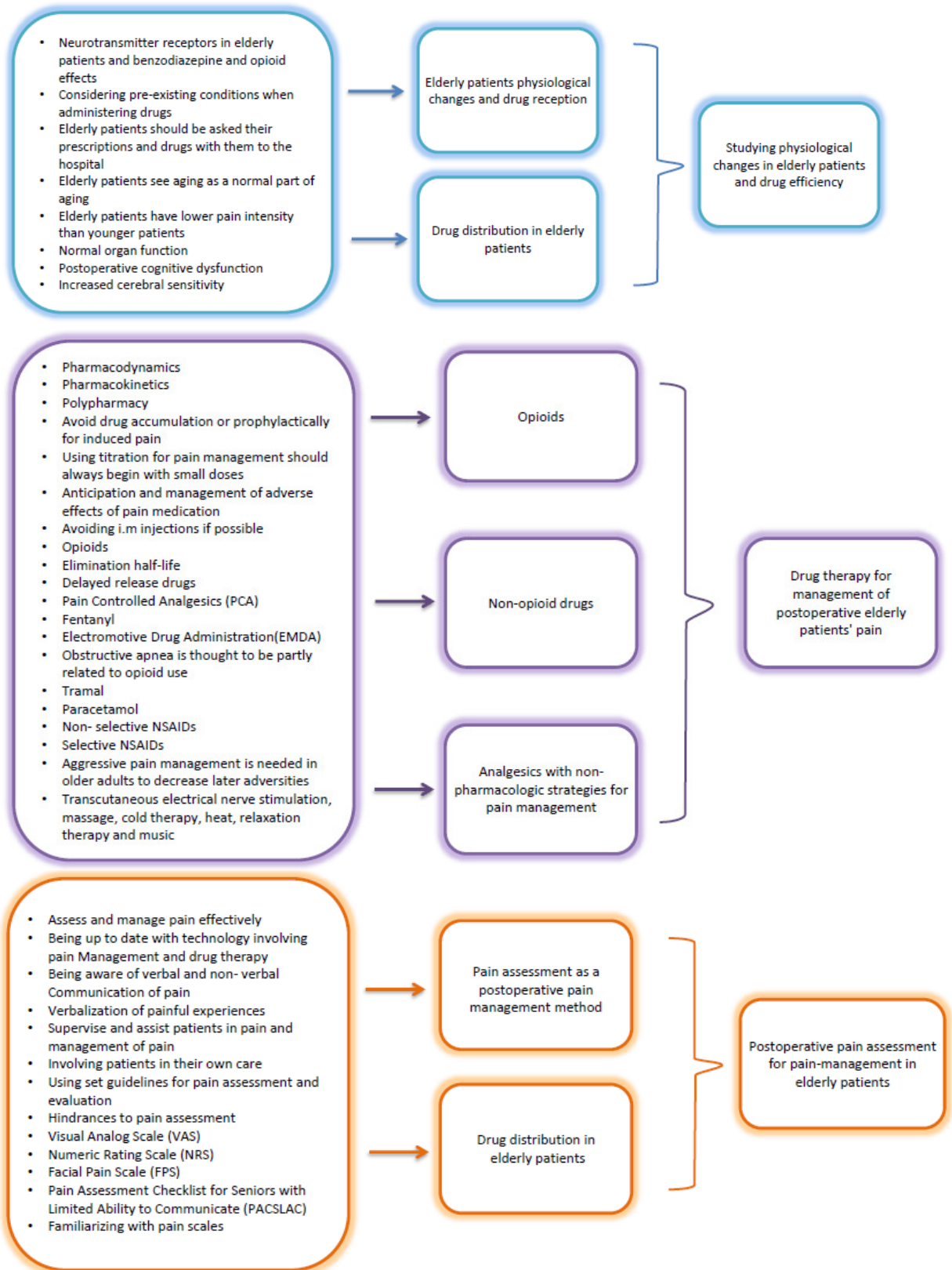


Figure 1. An illustration of the data analysis process

4.1 Studying of physiological changes by nurses in elderly patients and drug efficiency

There has been a trend in the increase in the number of elderly patients undergoing surgery especially in the developed nations. They elderly patients according to research undergo surgery four times more than any other age group and because of the diminishment in functional status and chronic diseases it is very important to be aware of how medication affects them compared to healthy people. Although there have been incidences of perioperative anesthesia related incidents and complications with increase in age, vulnerability, multisystem dysregulation and ASA score, the elderly patients have to anesthetized so as to avoid too much pain post-operatively and improve their comfort and satisfaction.

4.1.1 Elderly patients physiological changes and drug reception

In an article written by Aubrun F, the number of receptors present in a given tissue and the affinity of these receptors for neurotransmitters is said to decrease with aging making the elderly patients more sensitive to the effects of benzodiazepines and opioids.

Research has also shown that aging is accompanied by a progressive reduction in renal blood plasma flow approximately 10% per decade. Renal blood flow is usually accompanied by a decrease in the glomerular filtration rate (GFR) which then explains why clearance of certain medication and metabolites takes a longer time with increase in age. Creatinine is a chemical waste molecule that is generated from muscle metabolism and is produced from creatine, a molecule of major importance for energy production in muscles is eliminated by the kidneys. However, the decrease in GFR in the elderly patients is not matched by an elevation in serum creatinine. Since creatinine levels are based on catabolism of muscles, the serum creatinine concentration is therefore not a sensitive measure for renal function.

Finally, in the hepatic and digestive functions, there isn't usually a large change in the normal functionality with age. However, it is good to note that research has shown that there is a 1% decline in the cardiac output from the age of 30 which induces a 0.5-1% decrease in hepatic blood flow which reduces drug clearance and the liver mass by 1% annually. These changes induce a reduction in hepatic metabolism for drugs with a high hepatic extraction ratio. Thus nurses should consider the age of a patient when administering drugs for pain.

4.1.2 Drug distribution in elderly patients

Pharmacokinetics is currently defined as the study of the time course of drug distribution, absorption, metabolism and excretion from the time it gets into the patient's body. Pharmacodynamics is the relationship between drug concentration at the site of action and the resulting effect, including the time course and intensity of therapeutic and adverse effects. Selection of appropriate drug therapy requires an understanding of age-related pharmacokinetic and pharmacodynamic changes and should take into account any pre-existing diseases and other medication. The vast majority of elderly patients have a pre-existing condition meaning they take medication at home. Therefore, before elderly patients go to hospital for an operation, they should be asked to bring all medication and prescriptions with them.

For improved pain relief and better results a nurse should administer drugs taking into consideration the age of the patient and pre-existing conditions. Research done by the Department of Anesthesiology and Critical care states that is important to practice the following points when dealing with the elderly patients: polypharmacy occurs in elderly patients and as nurses, it is important to question the patient about their medication. Analgesics should be prescribed only if it is necessary to avoid drug accumulation or prophylactically for induced pain. When using titration for pain management, it is always recommended to start with small doses and slowly (to avoid over compensation and anaphylaxis). Lastly, anticipation and management of adverse effects of strong and weak opioids, NSAIDs and non-opioid drugs and avoiding intramuscular injections are key points for nurses to remember whenever a drug has to be given.

4.2 Postoperative pain assessment by nurses for pain-management in elderly Patients

Approximately 50%-75% of elderly patients report inadequate postoperative pain relief according to an article by Aubrun F. For pain management to be effective, it is necessary that nurses assess and manage pain effectively by administering analgesics effectively and being up to date with new technologies involving pain management and drug therapy. Within this framework, the assessment of pain would then depend on: how well the nurse can recognize and communicate with the patients about their pain, being aware of verbal and non-verbal communication of pain and verbalization of a painful experience.

4.2.1 Nurses' pain assessment as a method of postoperative pain management

Poorly managed pain may interfere with wound healing, cause patient suffering and prolong recovery. Nurses are in a unique position to supervise and assist patients in pain and managing it due to the extensive amount of time they spend with the patients in comparison to other health care professionals. Assessment of pain is vital when aiming at achieving efficient postoperative pain relief. By assessing the pain appropriately, all the healthcare professionals caring for the patient will know what pain management method the patient needs and if there is need to reduce or increase the dosage. Involving the patient in their own assessment makes them feel a part of their pain management therapy hence a more functional patient who can freely and comfortably communicate their opinions.

The Swedish Society of Medicine recommended guidelines for postoperative pain management which included: giving the patients detailed information about postoperative pain management, proper assessment and documentation of pain postoperatively, defining the highest acceptable Visual Analog Scale (VAS), evaluation pre and post- analgesic administration, documenting the patients' pain intensity, effects and side effects of medication and integrating pain as part of postoperative care.

Using set guidelines for pain assessment and pain management evaluation have been proven to be very helpful and successful in majority of the postoperative patients. However, there have been problems arising from differences in reporting of pain, cognitive impairment, difficulty in measurement, anxiety, depression, visual or hearing impairment and social or family isolation that may be associated with aging writes Aubrun F. Elderly patients may see pain as a normal part of aging and several studies have shown that elderly patients report lower pain intensity than younger patients. Research has suggested that patients with a mental disorder such as dementia have been unable to communicate how they feel when it comes to pain resulting in less pain medication. Due to these, research has come up with different ways to analyze pain in different patients and conditions.

Research shows that the *Visual Analog Scale (VAS)* is considered the gold standard for assessment of chronic pain. The VAS is a paper containing a series of facial expressions from happy/ fine to extreme pain. The VAS mostly produces good results in children because children relate more to diagrams and are unable to describe the type of pain sensation. However, it has not been so successful in the elderly patients. The elderly report that the VAS is more difficult to complete and is a poorer description of pain than scales made up of verbal descriptors.

The Numeric Rating Scale (NRS) and the Verbal Descriptor Scale (VDS) are more favorable tools of pain assessment measurement in the elderly according to Aubrun F& Marmion F. The NRS which is the preferred tool in the Post Anesthesia Care Unit (PACU), is used to rate pain from 0 to 10; 0 indicating no pain and 10 indicating the most imaginable pain. In the VDS, pain is rated from 0 to 5 with 0 being No pain, 1 being Mild pain, 2 being Discomforting, 3 being Distressing, 4 is Intense and 5 being Unbearable pain.

In non-verbal patients, communication of the pain felt may be affected by memory impairment or limited communication skills. These patients manifest their pain in other ways for instance facial expressions, restlessness, agitation, hostility, aggression, body movements, postures, gestures and vocalizations. For older adults who have mild to moderate cognitive impairment, observation of the latter mentioned symptoms can be used to rate their pain. The scale that is used in such situations is known as the *Facial Pain Scale (FPS)*.

In patients with severe cognitive impairment for instance dementia, behavioral scales can be used. Postoperatively, a nurse in addition to using pictures of different facial expressions may assess patients also by sleeping disturbance, somatic complaint, psychomotor and psychosocial impact. In France, during the postoperative period, the medical personnel use a behavioral scale in the elderly called *Dolopus*. Currently, there is a revised version consisting 60 items covering four sub-scales. *The Pain Assessment Checklist for Senior with Limited Ability to Communicate (PACSLAC)* assesses: facial expressions, activity/body movement, social/personal mood and psychological state/eating pattern/sleeping pattern/vocalization.

Nurses should familiarize themselves with all these pain scales to effectively assess and manage pain. All patients are different and despite the fact that results show that some pain scales are better with certain age groups, it is good to use whatever the nurse thinks will get the best results.

4.3 Drug therapy by nurses for management of postoperative elderly patients' pain

Proper postoperative pain assessment and management consists knowing the patient's history well, the age, pre-existing conditions, allergies, any surgical procedures done and if any what was the pain score. In majority of the hospitals, the doctors write the prescriptions however it is the nurses that administer them in accordance to the patient's pain and the nurse's assessment. When considering drug therapy for elderly patients, consideration has to be put on the normal organ function. Postoperative cognitive dysfunction is a common complication after major surgery in the elderly patients. According to Fredric Aubrun, delirium occurs in 5%-45% of all operative cases with age, cognitive impairment, preexisting brain diseases,

depression, postoperative complications, use of psychopharmacologic drugs and narcotic drugs being the main predisposing factors.

4.3.1 Opioids

Opioids analgesics work by suppressing perception of pain and calming the emotional response to pain by reducing the number of pain signals sent by the nervous system and the brain's reaction to those pain signals. There are many types of opioids some strong and some weaker and some drugs have opioid like effects.

According to research carried out, the main elimination half-life for morphine is 4.5 hours in older patients, significantly longer than 2.9 hours in younger patients. Elderly patients have increased cerebral sensitivity to the effects of opioids. They tend to be more sensitive to same doses and blood levels of opioids receiving greater and longer pain relief. Therefore, doses of opioids administered must be reduced to take into account the pharmacological specifications linked with age. In elderly patients with impaired renal function, accumulation of morphine and morphine-6 glucuronide, (the major metabolite of morphine), increase the risk of opioid-related adverse effects.

Delayed release opioid agents like oxycodone may be used postoperatively but care must be taken to prevent drug accumulation. Sedation should be monitored in the elderly because this is probably the best indicator of early respiration disorder writes Aubrun F.

For an epidural opioid to be effective and safe for use there is consideration on the toxicity, amount and number of added preservatives, serious adverse effects, rapid onset, reliable effect and high epidural potency gain. Morphine, fentanyl, sufentanil and hydromorphone are the four most used opioids for epidural analgesia according to a research done by Sinatra et al. and they produce the best results.

Pain Controlled Analgesia (PCA) can be fine-tuned to produce a certain dose over a period of time, usually an hour or to be administered by the patient when needed. In elderly patient, it is difficult to assess their pain and they are normally reluctant to request for analgesia. During nephrectomy procedures, epidural pumps are placed before the procedure but do not usually have any opioid. At the end of the procedure, a finely tuned, continuous titration of an opioid, usually morphine is set. Age-related increases in the analgesic efficacy of morphine have been consistently reported in the postoperative period. Morphine is the preferred drug for PCA because of its efficiency and it doesn't cost a lot. It is however not recommended for patients with a history of renal failure and in such cases fentanyl might be a preferred choice

for PCA. PCA has several advantages like fewer incidences of confusion and pulmonary complication, improved analgesia without an increase in sedation, earlier mobilization of the patient after surgery and does not cause anxiety or alterations of psychological parameters says Aubrun F.

Fentanyl which is considered to have 50-100 times more potency than morphine is usually the drug of choice which when combined with PCA intravenous or transdermal systems using Electromotive Drug Administration (EMDA) may provide postoperative pain control similar to that of standard i.v PCA with morphine. The advantage of fentanyl as an analgesic is that PCA fentanyl seems to produce less impairment of postoperative cognitive function compared with PCA morphine among elderly patients. However, research has shown that fentanyl accumulates in skeletal muscle and fat and then is slowly released into the blood. Another disadvantage is that clearance is delayed in elderly.

Obstructive apnea rather than a decrease in the respiratory rate is thought to be at least partly related to opioid use. Opioids have also been proven to cause ileus, constipation and urine retention especially in cases where the patient has had prostatic hypertrophy or those patients undergoing spinal anesthesia and the elderly patients.

4.3.2 Non-opioids

Tramadol has been said to be a centrally acting synthetic analgesic with opioid -like effects, acts through binding to the opioid receptor and inhibition of noradrenalin (norepinephrine) and serotonin reuptake. (The advantage over standard opioids in the elderly is reduced respiratory depression at analgesic dosages. Dose reduction and increased interval between doses may be required after age 75 years. Tramadol has been researched to be as effective as morphine is with the added advantage of better tolerance and more rapid psychomotor recovery.

Paracetamol also known as *acetaminophen* is a non-inflammatory drug works by blocking the production of prostaglandins, making the body less aware of the pain or injury. Statistics show that paracetamol induces an 18%-46% morphine sparing effect but doesn't decrease the incidence of morphine related adverse effects during the first 24 hours after the operation. The most adverse effect of paracetamol over usage is that it causes a patient to be dependent on paracetamol while destroying parenchyma in the liver.

Non-selective NSAIDs, another type of drug therapy for postoperative pain management have been researched to reduce pain and inflammation by diminishing peripheral and central

prostaglandin production. They are commonly used to treat postoperative pain individually or in combination with another drug. Non-selective NSAIDs cannot typically be used on their own to relieve pain after a major surgery due to its weak ability to bind to receptors. They should be combined with opioids or other non-opioid analgesics to enhance pain relief without having to increase on the amount of opioids used.

Selective NSAIDs (Cyclooxygenase-2 Inhibitors) are the newest class of NSAIDs known to have as much analgesia as conventional NSAIDs with less hemostatic side effects and less gastric irritability. Selective NSAIDs just like non-selective have been proven to affect renal function and should be used with caution in elderly patients with renal impairment, dehydration, elderly patients during or after hemorrhagic surgery. NSAIDs are also contraindicated in patients taking certain medication specifically aminoglycosides, vancomycin, diuretics and angiotensin converting enzyme inhibitors. It has been proven that use of selective NSAIDs affects the formation of human bones.

NSAIDs should be used carefully with the elderly patients because they can affect the gastric and renal functions negatively. In the elderly patients, research shows that the risk of having NSAID- related gastric injuries is high notably in 70 year olds and above. The incidence of gastrointestinal bleeding in the elderly patients has been reported to be twice as high compared to younger patients. In addition, non-selective NSAIDs have been noted to have a higher risk of serious complications of peptic-ulcer disease specifically hemorrhage and perforation which is more likely in women.

4.3.3 Analgesics with non-pharmacologic strategies for pain management

Aggressive pain management is needed in older adults to decrease the later adversities of trying to calm the pain when it has escalated. Pain management approaches that combine analgesics and supplement with non-pharmacologic strategies like transcutaneous electrical nerve stimulation, massage, cold therapy, heat, relaxation therapy and music, may be quite helpful. Pain assessed regularly and carefully can produce the best of results in terms of what works for which patient and adjustments in delivery methods and analgesic doses can work in favor of even the frailest of elderly patients according to Rakel, B et al 2004.

Nurses play a very important role despite the fact that they do not prescribe the medication, they get to be with the patient longer and observe them. Postoperative period is one of the most delicate times of the patient and as much as managing pain is a priority, the patients' vital signs and wellbeing must always be monitored.

5 Discussion

This chapter describes the ethical aspects that were applied during the research and the credibility and reliability of the findings. An in-depth discussion of findings, the strengths and limitations of the review, the conclusion and recommendations of the research were also reviewed in this chapter.

5.1 Discussion of findings

The research sought to describe the different ways nurses can manage pain postoperatively in elderly patients. Both the elderly patients and the younger ones suffer the same levels of pain and trauma however, majority of the studies suggest that pain threshold perception increases with age and research according to Gibson S J & Farrell M A (Aubrun F 2005 p 364) the briefer the stimuli the less pain is incurred. A lot of research has shown that the elderly patients report fewer cases of pain as compared to the younger ones.

According to the findings of the thesis, there were three reasons established as to why there are fewer cases. The first reason could be that the physiological changes in their peripheral and central nervous system specifically a decline in the number of the neurotransmitter receptor sites with age has an influence on the pain threshold. Also with age comes delayed transmission of nociceptive stimuli (Aubrun F, 2005 p364). The second reason as to why the elderly report less pain would be that they may feel that pain is a normal part of aging and may choose to persevere rather than ask for pain medication (Aubrun F, 2005 p366). The third reason could be because cognitive impairment increases with age. The inability to communicate the pain may be a cause of less reported pain incidences in the elderly and more so in patients with dementia or other mental ailments (Aubrun F et al. 2007 p 115).

To avoid under dosing of patients who are unable to communicate their pain well, pain scores were designed in accordance to the patient's physical and mental ability. In a research done by Rakel B & Herr K (2005), the family of the patients can assist the nurses when it comes to assessing pain because they have been with the patients longer and may be of assistance. The nurse is able to assess pain better with the help of the patient, a relative if need be and a pain measuring scale. The different measurement scales discussed include Visual Analog Scale (VAS), Numeric Rating Scale (NRS), Facial Pain Scale (FPS) and Dolopus/ Pain Assessment Checklist for Senior with Limited Ability to Communicate (PACSLAC). By using any of these pain scales it is possible to assess the pain and manage it successfully.

When managing the pain, it has been found that polypharmacy has occurred in some cases and this may cause adverse reactions which may be fatal. When a nurse administers a drug, they should do so with care and attention, start slow and in small doses. Reaction of some drugs may take a while longer in elderly patients as they would in a young and healthy adult for instance morphine. As discussed before, aging plays a very important role in the physiological changes that happen to the elderly people. Decreased volume of distribution, reduction in clearing of the drugs and a reduction of protein binding may be one of the reasons that elderly people receive prolonged and greater pain relief.

Opioids and opioid like drugs should always be administered with care when it comes to the elderly people because of the increased cerebral sensitivity. Opioids have been researched to have adverse effects like delirium, sleep apnea and impairment of postoperative cognitive function. Although most of the above mentioned may apply mostly to the elderly patients, it affects the younger ones in the same manner. A lot of people may have concerns about addiction and it is necessary for the nurse to distinguish to the patient the difference between physiological dependence, tolerance and addiction. According to Rakel B & Herr K, use of words like “narcotic “ and “drug” may make the elderly skeptical about the pain alleviation method. Hence, we should strive to use more delicate words like pain medication or pain killers.

Paracetamol has very few contraindications and is usually very well tolerated. In patients who have had liver disease or alcohol problems, the dose should be reduced by half or 75% to avoid further damage (Aubrun F et al 2007 p120). Other than that, there has been no evidence in the articles used in the thesis to suggest that paracetamol poses a health threat to the elderly.

NSAIDs are good drugs to use for postoperative patients because they relieve pain and reduce inflammation without the opioid effect. The major problem with NSAIDs is gastric injuries especially in 70 year olds and above. NSAIDs cause gastrointestinal bleeding in the elderly patients and increase the risk of serious complications of peptic-ulcer disease specifically hemorrhage and perforation which is more likely in women.

PCA is researched to be one of the best methods of pain management in the elderly with the least number of incidences reported. Another advantage with PCA is that it can be used with different types of opioids according to what works best for the patient.

Other methods nurses can use for managing pain although not used very commonly are Transcutaneous Electrical Nerve Stimulation (TENS), massage, cold therapy, heat, relaxation therapy and music (Rakel, B et al., 2005 p202-205). Some research has been done on the

effectiveness of these methods but there is still more to be done if these non-pharmacologic methods of managing pain are to be used.

5.2 Ethical considerations

There are several ethical issues which must always be considered when planning any type of data collection. Ethical action depends, in part, on the ability of people to recognize that a moral issue exists in a given situation knowing how to take appropriate ethical action if and when required, and on personal commitment and a genuine to desire to achieve moral outcomes (Fry, S and Johnstone, M. J 2002).

The thesis topic was based on previous knowledge and observation from my previous placement at Meilahden Sairaalan leikkausosasto (Operating theatre). Upon the presentation of the topic to my tutors at Laurea University of Applied sciences, the topic was approved of. This thesis was conducted through systematic literature review meaning no interviews, questionnaires or observations were applied as part of methodology. There was no personal contact with the patients nor the writers of the articles in the data collection process and thus no need for privacy and confidentiality of names and identities . Ethical considerations were taken into account while collecting and analyzing data; articles used were accurately reported to avoid any untruth. Direct quotations were accurately noted and accounted for by using correct referencing according to Laurea's thesis guidelines.

The thesis will be of benefit to nurses aspiring to work on the post-operative unit and those who are already working there mainly dealing with elderly nephrectomy patients and to some extent lower abdominal patients both in Finland and outside the country. It will also be of benefit to nurses specializing in pain management and how to develop the knowledge they already have to make it better.

5.3 Trustworthiness of the review

Truth value asks whether the researcher has established confidence in the truth of the findings for the subjects or informants and the context in which the study was under-taken (Lincoln & Guba, 1985). This literature research was based on documented articles and viable sources based on pain management of post-operative elderly nephrectomy patients from various databases. Since data used in this thesis was collected through a systematic literature review, to the best of the authors' knowledge, the findings and associated discussion can be trusted because the primary data is rendered valid having been critiqued, reviewed and

published in medical journals.

5.3.1 Strengths of the review

The data collected was screened and selected according to its trustworthiness before being published. There were also a lot of articles in English and their sources were listed in detail according to the authors' name, publication and year. The school search engine, "Nelli", was of great help when it came to narrowing down the search using the thesis' key words which not only gave a wide selection of articles but also trustworthy articles. Using the search engine eliminated any biasness because of using different websites provided and getting different opinions from different authors (see table 2 pg. 11).

The literature research will be of great use not only to students seeking to work with elderly patients post operatively and pain management nurses but it has also been of great help to the author of the thesis. There has been a lot of information related to analgesia and how age affects the pharmacodynamic and pharmacokinetic process. Hopefully nurses will be able to gain more knowledge on how to assess and manage pain in matters pertaining to postoperative nephrectomy and any other surgery in the elderly patients from the thesis.

5.3.2 Limitations

There were limitations to the research carried out; this includes inconclusive results from some of the search databases in Metasearch, language barrier when obtaining articles. Some of the articles read during the research were of great benefit but did not contain full text articles hence could not be included in the collected data (See table 1 pg. 10). Using certain combination of key words would produce too many hits or very few and it was quite time consuming and difficult to strike the correct balance between was is too many articles and the required amount. Another limitation is that some articles were written based on a certain country or a certain way of lifestyle hence the tendency to generalize for example Wickström E. K et.al in The Swedish Society of Medicine journal give advice on how long of a sick leave a person requires after surgery based on support by the family in doing house chores and funding by the government which prompts people to want to work rather than stay home and heal well.

The imitational factor of websites to search from was a problem due to either website malfunction or language barrier. A lot of literature was sometimes found but with very little relevance if any to the search words. The research was therefore limited to certain websites

and if more information was needed, the researcher had to go to the direct website for instance SciVi to get more results which then is time consuming.

Finally, due to the newness of some of the types of nephrectomy procedures, there was almost no useful material to write about the procedures in detail hence the need to search through individual websites in Nelliportal which is time consuming and at times produces results with little to no relevance to the thesis.

6 Conclusion

Pain is an individual feeling and the nurse cannot treat pain but help in managing it. All pain assessment strategies should be explored to determine which one works for the patient so as to have a better hand while managing pain in the elderly patients. Different pain management techniques should be applied with the patient as an active participant to achieve the best possible results giving the patient a sense of security in their treatment while at it. There has been a lot of research done concerning pain in the elderly and more and more authors are putting emphasis on the growing number of the elderly. Development of new drugs for postoperative pain treatment is an on-going research and it is necessary for nurses dealing with patients postoperatively to be at par with the new studies. It is also important for nurses to know the different ways to communicate with the patients and the effects and contraindications of the drug they are administering for the safety of both the patient and the nurse's ethics.

References

- Andersen M. H, Mathisen L, Øyen O, Edwin B, Digernes R., Kvarstein G. , Tønnessen T. I. , Wahl A. K. , Hanestad B. R. and Fosse E. Postoperative Pain and Convalescence in Living Kidney Donors—Laparoscopic Versus Open Donor Nephrectomy: A Randomized Study. *American Journal of Transplantation* 2006; 6: 1438-1443 Blackwell Munksgaard
- Aubrun F, M.D. Management of Postoperative Analgesia in Elderly Patients. *Regional Anesthesia and Pain Medicine*, Vol 30, No 4 (July-August), 2005: pp 363-379
- Aubrun M.D, F, Marmion F.M.D. The elderly patient and postoperative pain treatment. *Best Practice & Research Clinical Anesthesiology* Vol. 21, No. 1, pp. 109-127, 2007
- Aveyard, H. (2007). *Doing a literature review in health and social care*. Open University Press.
- Burns, N. & Grove, S.K. 2001. *The practice of Nursing Research: Conduct, Critique & utilization*, 4th Edition, Elsevier Saunders. St.Louis
- Carr E (Editor), Layzell M (Editor), Christensen, Martin (Editor). *Advancing Nursing Practice in Pain Management*. Hoboken, NJ, USA: Wiley-Blackwell, 2009. Copyright © 2009.
- Davis B D. *Routledge Essentials for Nurses, Caring for People in Pain*. Routledge 2000. p 12
- Fry, S. & Johnstone, M.J. 2002. *Ethics in Nursing practice, a guide to ethical decision making* 2nd edition, Blackwell Publishing Company. United Kingdom
- Gorevski E ,Wead S, Tevar A, Succop P ,Volek P and Martin-Boone J. Retrospective evaluation of donor pain and pain Management after Laparoscopic Nephrectomy. *Transplantation Proceedings*, 43, 2487-2491 (2011) 2487
- Guba E.G. (1981). Criteria for assessing the trustworthiness of naturalistic inquiries. *Educational Resources Information Center Annual Review Paper* 29, p75-91
- Lincoln, Y S. & Guba, E G. *Naturalistic Inquiry*. SAGE Publications Inc Copyright 1985.
- LoBiondo-Wood, G. & Haber, J. 2006. *Nursing Research. Methods and Critical Appraisal for Evidence-Based Practice*. St.Louis, USA, Mosby Elsevier, 559-575
- McArthur-Rouse, F(Editor); Prosser, S (Editor). *Assessing and Managing the Acutely Ill Adult Surgical Patient*. Copyright © 2008. Wiley-Blackwell. All rights reserved.
- Owena M, Lorgelly P, Serpell M. Chronic pain following donor nephrectomy - A study of the incidence, nature and impact of chronic post-nephrectomy pain. *European Journal of Pain* 14 (2010) 732-734
- Poletajew S, Antoniewicz A .A, Borowka A. *Urology Journal* 2010 Fall;7(4):215-23.
- Rakel, B & Herr K 2005. Assessment and Treatment of Postoperative Pain in Older Adults. *Journal of PeriAnesthesia Nursing* Vol 19 No. 3 (June), 2004: pp194-208
- Sinatra, S .R, Levin, S, and Ocampo, C .A, 2000. Neuroaxial Hydromorphone for Control of Postsurgical, Obstetric and Chronic Pain Vol 19 No 2. (108-131)
- Smith, A.D, Badlani, G, Preminger, G.M, Kavoussi, L.R *Smith's Textbook for endourology* Volume One, 3rd edition. 2007, page 390

Tranfield, D., Denyer, D. & Smart, P. 2003. Towards a Methodology for Developing Evidence Informed Management Knowledge by Means of Systematic Review. British Journal of Management, No. 14 (207-222)

Voshall B, Dunn K S and Shelestak D. Knowledge and Attitudes of Pain Management among Nursing Faculty. Pain Management Nursing, Vol -, No - (--), 2012: pp 1-10

Ungbhakorn P, Kongchareonsombat W, Leenanupan C, Kijvikai K, Wisetsingh W, Patcharatrakul S and Jirasiritam S. Comparative Outcomes of Open Nephrectomy, Hand-Assisted Laparoscopic Nephrectomy and Full Laparoscopic Nephrectomy for Living Donors. Transplantation Proceedings, 44, 22-25 (2012)

Wickström E K, Nordberg G, Bergh I, Johansson F G and Sjöström B. Postoperative pain management - the influence of surgical ward nurses. Journal of Clinical Nursing 17, 2042-2050 (2008)

What is pain and how it can be managed

<http://www.cabr.com/patient/en/pain> HYPERLINK "http://www.cabr.com/patient/en/pain" oHYPERLINK "http://www.cabr.com/patient/en/pain" m/patient/en/pain (sited on 06.02.2012)

Kidney transplant and causes of kidney failure

<http://www.kidney.org>

Different types of pain and how to describe the sensation it brings about

<http://www.painclinic.org/aboutpain-paintypes.htm> (sited on 06.02.2012)

Nursing of the elderly patients

<http://www.wisegeek.com/what-is-geriatric-nursing.htm> (sited 01.05.2012)

Opioids for managing chronic pain

<http://www.webmd.com/pain-management/opioid-analgesics-for-chronic-pain> (sited 20.05.2012)

Tramadol- what it is used for and contraindications

<http://www.emedexpert.com/facts/tramadol-facts.shtml> HYPERLINK "http://www.emedexpert.com/facts/tramadol-facts.shtml" (sited 20.05.2012)

Appendix 1. Data analysis articles

Author and year of Publication	Name and Publication of articles	Purpose of article	Method of gathering data	Findings	Significant findings to the thesis
Raymond S. Sinatra, Steven Levin, and Carlos A. Ocampo(2000)	Neuroaxial Hydromorphone for Control of Postsurgical, Obstetric and Chronic Pain. Department of Anaesthesiology Centre for Pain Management, Yale University	To show how opioids are used for effect in post-surgical chronic pain	Quantitative Data analysis	The article found that some drugs were more efficient as epidurals compared the frequently used ones. They authors found that when administering epidural medication, consistency in amount and rate produced better results that administering it in boluses.	The aspects to consider when choosing drugs that efficient in managing pain. Epidural drugs are different and for effectiveness there are certain types that can be used to produce best results and it is more so important in the elderly.
Margaret Owen, Paula Lorgelly , Mick Serpell(2010)	Chronic pain following donor nephrectomy - A study of the incidence, nature and impact of chronic post-nephrectomy pain. Article from Elsevier Ltd	to determine the incidence, severity and nature of chronic pain and its effect on quality of life following donor nephrectomy	Quantitative Data analysis	The study suggests that the incidence of chronic pain in donor nephrectomy patients is similar to other types of thoracic and abdominal surgery hence medical staff should then be able adopt surgical and anesthetic techniques to minimize post-operative pain and initiate prompt diagnosis and treatment	Pre-operative management of pain is just as helpful as post-surgically to reduce amount of medication taken and avoid chronic pain in post-operative nephrectomy patients
Aubrun F and Marmion F 2007	The elderly patient and postoperative pain treatment. Department of Anaesthesiology and Critical Care	Managing post-operative pain in elderly patients considering pre-existing ailments whilst avoiding opioid drug dependency	Literature review	It is quite difficult to manage pain in elderly patients Preoperatively. Sophisticated methods like PCA, PCEA or plexus blocks are not contraindicated but evaluation of treatment efficacy and incidence and severity of adverse events should be monitored.	Having knowledge on peri- and post- operative pain management in elderly patients is necessary before taking in a patient to surgery to avoid chronic pain and unnecessary use if pain medication

Voshall B, Dunn K S and Shelestak D. (2012)	Knowledge and Attitudes of Pain Management among Nursing Faculty . American Society for Pain Management Nursing	To describe correlational design using this study to examine nursing faculty knowledge and attitudes in pain management. Relationships between age, education level, pain management preparation, length of time practicing as a nurse, length of time teaching nursing, time teaching pain management in the classroom, taught pain guidelines in the classroom, and additional continuing education about pain management were explored	Literature review	Emphasis was made on the need for nursing curricula to improve pain management education based on evidence-based practices. The importance of encouraging the use of pain management guidelines was emphasized to provide consistency for nurses entering into clinical practice in all settings and continuous study of pain was recommended.	Give guidelines that should be used by nurses to manage pain following a surgery and how well it can be implemented in current situations.
Aubrun F. (2005)	Management of Postoperative Analgesia in Elderly Patients. American Society of Regional Anaesthesia and Pain Medicine.	To explain pharmacodynamics and kinetics in relation to elderly patients. The article was used to expound on how the different pain management methods affect the elderly patients due to the age factor.	Literature review	There is an increase in the number of elderly patients and because of the underlying factor of age that leads to more ailments. Awareness should be built when dealing with managing post-operative pain concerning elderly clients. Sophisticated analgesic methods are not contraindicated in the elderly, but pain assessment, evaluation of treatment efficacy, and analgesic side effects should be monitored	Pain management is influenced by age and knowledge of how to manage pain following an operation involving the elderly is a great skill to have.
Wickström E K, Nordberg G, Bergh I, Johansson F G and Sjöström B. (2008)	Postoperative pain management - the influence of surgical ward nurses. Journal of Clinical Nursing	To compare pain levels reported by patients with those documented by ward nurses and to find out to what extent the amount of opioids given correlated with the pain level. Secondly, to study if pain management and nurses' approaches to this task had improved during a two-year period, including an educational pain treatment program for ward staff.	Literature review	The nurses' ability to assess pain in accordance with the patients' reports had increased slightly after two years even if and the number of documented pain scores had decreased. Forty per cent of the nurses reported that they did not use visual analogue scale and that they did not assess pain at both rest and activity, neither did one fourth evaluate the effect of given analgesics.	How to manage pain according to renewed research and how nurses can be influential in helping to manage pain.

Ungbhakorn P, Kongchareonso mbat W, Leenanupan C, Kijvikai K, Wisetsingh W, Patcharatrakul S, and Jirasiritam S. (2012)	Comparative Outcomes of Open Nephrectomy, Hand-Assisted Laparoscopic Nephrectomy and Full Laparoscopic Nephrectomy for Living Donors. Transplantation Proceedings Elsevier Inc.	To compare the outcomes of open nephrectomy (ON), hand-assisted laparoscopic nephrectomy (HALN), and full laparoscopic nephrectomy (FLN)	Literature review and Qualitative analysis	Kidney transplantation is considered the standard treatment option for renal replacement therapy. Compared with hemodialysis, kidney transplantation is more cost-effective and allows patients to resume a normal lifestyle and have a better quality of life. All 3 types of nephrectomy procedures have their pros and cons however, it has been favored that laparoscopic nephrectomy has better outcome compared to open nephrectomy	Depending on what type of surgery) open or laparoscopic) a patient chooses, the amount of analgesics needed and the pain incurred varies. This article will help in guiding of what pain method should be used to manage it.
Barbara Raket, PhD, RN Keela Herr, PhD, RN, FAAN (2004)	Assessment and Treatment of Postoperative Pain in Older Adults. American Society of Peri-Anesthesia Nursing	Assess and treat pain in older adults postoperatively using both pharmacologic and non-pharmacologic methods focusing on the challenges associated with mental and physical impairments experienced by elderly people.	Literature Research	Aggressive pain management is needed for older postoperative patients to decrease the adverse effects associated with high pain intensities such as impaired cognitive performance and chronic pain conditions. If pain is Regularly and consistently assessed it can be managed effectively.	Find out what nursing methods have been researched and what the effect on the patients is and how it may be of use to other nurses researching on different ways of managing postoperative pain.
McArthur-Rouse F(Editor) and Prosser, S (Editor)2008	Assessing and Managing the Acutely Ill Adult Surgical Patient. Wiley-Blackwell	The aim of this book is to provide a source of information for adult nursing and operating department practitioner (ODP) students and newly qualified nurses working in acute surgical environments.	Literature review	Traditionally nurses have not been well equipped to assess and manage these patients, missing early warning signs of deterioration, leading to the phenomenon that has become known as 'sub-optimal care'. Therefore, several strategies for reducing the occurrence of sub-optimal care have been implemented including the Critical Care Outreach Initiative (DoH, 2000, 2005) and the use of early warning scoring systems.	Because the book seeks to support the use of early warning scoring systems by emphasizing the importance of thorough assessment and interpretation of clinical data, it provides underpinning knowledge to help nurses make sense of their findings and articulate them effectively to the appropriate personnel. The book is important especially to hinder excessive pain postoperatively.

Carr E (Editor), Layzell M (Editor), Christensen, Martin (Editor), 2009.	Advancing Nursing Practice in Pain Management. Hoboken, NJ, USA: Wiley-Blackwell	To showcase the development and evaluation of innovative examples of pain management initiatives which have been led by nurses. This book aims to provide a more considered platform as well as synthesize their advanced practice contributions across the different arenas in which the authors work and have experienced pain management.	Literature review	Advancing practice in pain management is encapsulated as being a developmental process.	Helps in showing how to manage acute pain in postoperative patients and showcasing how nurses can develop the skills that are already in use.
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