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Eeva-Riitta Ylinen

Patients' Pain Assessment and Management during Medication-free Colonoscopy

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EEVA-RIITTA YLINEN

Patients' pain assessment and Management during Medication- free Colonoscopy

Doctoral dissertation

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Department of Nursing Science
Faculty of Health Sciences
University of Eastern Finland
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Kuopio University Hospital

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Fax: +358 17 163 410

Series Editors: Professor Veli-Matti Kosma, Ph.D.
Faculty of Health Sciences
Institute of Clinical Medicine, Pathology

Professor Hannele Turunen, Ph.D.
Faculty of Health Sciences
Department of Nursing Science

Author´s address: University of Eastern Finland
Faculty of Health Sciences
Department of Nursing Science
PL 1627
FI-70211 KUOPIO
Tel: +358 40 355 2274
Fax: +358 17 162 632

Supervisors: Professor Katri Vehviläinen-Julkunen, Ph.D.
Faculty of Health Sciences
Department of Nursing Science
University of Eastern Finland, Finland

Professor Anna-Maija Pietilä, Ph.D.
Faculty of Health Sciences
Department of Nursing Science
University of Eastern Finland, Finland

Reviewers: Professor Huda Abu-Saad Huijer, PhD.
Hariri School of Nursing
American University of Beirut

Adjuct Professor Tarja Pölkki, PhD.
Department of Health Science
University of Oulu, Finland

Opponent: Professor Sanna Salanterä, Ph.D.
Department of Nursing Science
University of Turku, Finland

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ABSTRACT

Purpose of the study was to describe nurses' expertise in colonoscopy patients' pain management and pain assessment during colonoscopy. In addition, the purpose was to describe factors affecting patients' pain experience and its' management during medication-free colonoscopy from the viewpoints of nurses, patients and endoscopists. The study was conducted in three parts. The data were collected during 2002-2006 from colonoscopy patients, nurses and endoscopists using quantitative descriptive cross-sectional questionnaire surveys and the panel of experts. The data were analysed with statistical methods and quantitative and qualitative content analysis.

Nurses used non-drug interventions of managing pain. They had practice-based knowledge of pain management during colonoscopy but failed to use pain scales. Over three-quarters of patients reported mild pain or no pain at all. Both nurses and endoscopists slightly underestimated the intensity of patients' pain. Women were more anxious before colonoscopy and experience more pain and discomfort than men. The high state anxiety level decreased patients' ability to tolerate colonoscopy. Patients' nervousness was a risk factor for experiencing pain during colonoscopy. Non-drug interventions helped both anxious and non-anxious patients to ease the pain.

The study provided new knowledge of nurses' expertise in patients' pain management and pain assessment during the procedure as well as factors affecting colonoscopy patients' pain experience. To improve colonoscopy patients' pain alleviation, endoscopists and nurses should participate systematically in pain education and employ use of pain scales. Awareness and understanding of the effects of previous pain experiences and anxiety levels in patients, particularly for females, should be taken into account. Before the procedure nurses must devote time to discover patients that are at risk of having a painful colonoscopy in order to present them for medication. Colonoscopy patients' clinical education and counseling should be developed towards more individual manner. Furthermore nurses should use the non-drug interventions as an essential element of pain management for colonoscopy patients.

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Medical Subject Headings(MeSH): Pain; Colonoscopy; Nurse's Role

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TIIVISTELMÄ

Tutkimuksen tarkoituksena oli kuvata hoitajien asiantuntemusta kolonoskopiapotilaan kivun hoidossa ja arvioinnissa. Tarkoituksena oli myös kuvata hoitajan, potilaan ja tähystävän lääkärin näkökulmista tekijöitä, jotka ovat yhteydessä kolonoskopiapotilaan kivun kokemukseen ja sen hoitoon lääkkeettömän kolonoskopian aikana. Aineisto kerättiin kolmessa vaiheessa vuosina 2002-2006 kolonoskopiapotilailta, toimenpiteessä avustavilta hoitajilta sekä tähystäviltä lääkäreiltä käyttäen määrällistä, kuvailevaa kyselytutkimusasetelmaa sekä asiantuntijapaneelia. Aineisto analysoitiin tilastollisilla menetelmillä ja sisällön analyysillä.

Hoitajat käyttivät lääkkeettömiä kivunhoidon menetelmiä työssään. Heillä oli käytäntöön perustuvaa tietoa kivun hoidosta kolonoskopian aikana, mutta kipumittarien käyttö oli puutteellista. Valtaosa potilaista ilmoitti kolonoskopian aiheuttaman kivun olevan lievää tai sitä ei ollut. Sekä hoitajat että tähystävät lääkärit aliarvioivat jonkin verran potilaan kivun voimakkuutta. Naiset olivat ahdistuneempia ennen kolonoskopiaa kuin miehet ja naiset kokivat myös tutkimuksen miehiä kivuliaampana ja epämiellyttävämpänä. Korkea tilanneahdistuneisuuden taso vähensi potilaan kykyä sietää tutkimus. Potilaan hermostuneisuus oli kivuliaan kolonoskopian riskitekijä. Hoitajien käyttämät lääkkeettömät kivunhoidon menetelmät auttoivat helpottamaan sekä ahdistuneiden että ahdistumattomien potilaiden kipua.

Tutkimus tuotti uutta tietoa hoitajien asiantuntemuksesta hoitaa kolonoskopiapotilaan kipua, kivun arvioinnista sekä potilaan kipukokemukseen liittyvistä tekijöistä. Potilaan kivunhoidon parantamiseksi hoitohenkilökunta ja lääkärit tarvitsevat säännöllistä kipukoulutusta ja tukea kipumittareiden käyttöön omassa työssään. Potilaiden, erityisesti naisten, aikaisempien kipukokemusten ja ahdistuneisuuden vaikutuksen tiedostaminen ja ymmärtäminen on tärkeää ja ne tulee ottaa huomioon hoidossa. Ennen toimenpidettä tulee hoitajan varata riittävästi aikaa havaita riskipotilaat, jotta heille voidaan tarjota lääkityksen mahdollisuutta. Kolonoskopiapotilaan ohjaamista tulee myös kehittää yksilöllisemmäksi. Hoitajien tulee paremmin tiedostaa lääkkeettömien kivunhoitomenetelmien myönteiset vaikutukset ja käyttää niitä osana kolonoskopiapotilaan hoitoa.

Yleinen suomalainen asiasanasto (YSA): kipu; kivunhoito; kolonoskopia; hoitotyö

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Kuopio, February 2010

Eeva-Riitta Ylinen

LIST OF THE ORIGINAL PUBLICATIONS

The results of this dissertation are based on the following original studies and referred to in the text by their Roman numerals.

I Ylinen E-R, Vehviläinen- Julkunen K & Pietilä A-M. 2007. Nurses' knowledge and skills in colonoscopy patients' pain management. Journal of Clinical Nursing 16, 1125-1133.

II Ylinen E-R, Vehviläinen- Julkunen K & Pietilä A-M. 2009. Effects of patients' anxiety, previous pain experience and non-drug interventions on the pain experience during colonoscopy. Journal of Clinical Nursing, 18, 1937- 1944.

III Ylinen E-R, Vehviläinen- Julkunen K, Pietilä A-M, Hannila M-L & Heikkinen M. 2009. Medication-free colonoscopy- factors related to pain and its assessment. Journal of Advanced Nursing 65, 2597-607.

IV Ylinen E-R, Vehviläinen- Julkunen K & Pietilä A-M. 2009. The Colorado Behavioral Numerical Pain Scale in Assessing Medication-Free Colonoscopy Patients' Pain. Gastroenterology Nursing. Accepted for publication.

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LIST OF ABREVIATIONS USED IN THE TEXT

CBNPS= Colorado Behavioral Numerical Pain Scale

CGRP =Calcitonin Gene Related Peptide

CTC= Computered Tomography Colonography

FPS= Faces Pain Scale

FPS-R =Faces Pain Scale Revised

GABA=Gamma-Aminobutyric Acid

IASP= International Association for the Study of Pain

IPT= Iowa Pain Thermometer

MMSE =Mini Mental Status Exam

NaP= Sodium phosphate solutions

NGF= Nerve Growth Factor

NRS= Numeric Rating Scale

PEG = Polyethylene Glycol Electrolyte Lavage Solution

SG= Substantia Gelatinosa

SP=Substance P

TENS= Transcutaneous Electrical Nerve Stimulation

TNF=Tumor Necrosis Factor

VAS= Visual Analogue Scale

VDS= Verbal Descriptor Scale

VNS= Verbal Numeric Rating Scale

VRS= Verbal Rating Scale

1 INTRODUCTION

Optical colonoscopy has an essential role in colonic examination and the treatment of diseases of the colon as well as in colorectal cancer screening, which is the third most common form of cancer in Finland, where approximately 2200 new colorectal cancer cases are diagnosed annually (Finnish Cancer Registry 2007). Colonoscopy provides a visual diagnosis and gives the opportunity for a biopsy or the removal of lesions, but it is considered unpleasant. Patients may even consider the phase painful when the scope is inserted and the bowel is widened with air, the mesentery is stretched and the bowel is distended (Cotton & Williams 2003). Technically colonoscopy is more difficult and less tolerated by women (Takahashi et al. 2005) because females tend to have an inherently longer colon, which may predispose the colonoscope to painful looping. Furthermore elderly patients seem to tolerate it better than young subjects (Ristikankare 2000).

In Finland, colonoscopies are performed in university, central and district hospitals, health centres and private practices. As Appendix 1 demonstrates during 2007 a total of 25496 colonoscopies were conducted in Finnish hospital districts from which 23183 were outpatient procedures (Ristikankare et al. 1999, The National Institute for Health and Welfare 2009). In the Finnish university hospital's endoscopy unit, from which the samples to this study were drawn, approximately 420 colonoscopies were carried out during the recruitment period (1500 annually).

Medication-free colonoscopy, upon which attention is focused in many countries (Chak & Rothstein 2006, Ladas et al. 2006), is common practice in Finland (Ristikankare & Julkunen 1998, Ristikankare 2006), although medication is available if necessary i.e. if the patient is very anxious before the procedure or when pain emerges regardless of loop reduction, reducing bowel air or medication-free interventions.

Pain is culturally connected and assessed by human behaviour, so a person's cultural background influences their expression and meaning of pain (Finnstrom & Soderhamn 2006, Im et al. 2007, Reyes-Gibby et al. 2007). Pain is a physiologic response to tissue damage but it also includes emotional and behavioural responses based on individuals' past experiences and perceptions of pain (Davidhizar & Giger 2004, Devor 2008, Jensen & Gebhart 2008, Loeser & Treede 2008). The definition of pain in nursing highlights the experiencing person's own opinion of the existence of pain (Pesut&

McDonald 2007). Attention should also be paid to patients, who are unable to communicate verbally, e.g. the elderly with advanced dementia or unconscious patients, or in some other ways e.g. writing or by blinking their eyes to answer yes or no. The inability to communicate pain and discomfort because of physiologic, developmental or cognitive issues can be a barrier to patients' being sufficiently assessed for pain and receiving adequate pain management. (Herr et al. 2006.)

Pain can be divided into components as follows: detection of damage to human tissue, transmission of this information to the central nervous system, the brain's detection of the damage, human perception and interpretation of the nociceptive input and the emotional response to the perception (e.g. depression, fear, anxiety and suffering). The pain behaviour in response to these emotions and perceptions guides the observer to believe the individual is suffering from pain e.g. talking about pain, grimacing or moaning. (Loeser 2000.) The perception of pain seems to be the same between various racial and ethnic groups, however pain thresholds and/or tolerance may differ (Bonham 2001).

The Finns belong to the Northern European stoic expressing population who experience pain in a manner that is quietly enduring i.e. the culture of pain tends to honor the person who deals with pain without verbal expressions. In general the need to alleviate their pain seem to be lesser than e.g. among North American patients (Moore et al. 1998). Recently, it has been reported that there are factors (e.g. patients' previous abdominal or pelvic operations) which may increase the risk of pain and difficulty of caecal intubation during colonoscopy (Lee et al. 2006). Patients, especially females, can experience a moderate amount of anxiety about interventional procedures (Jones et al. 2004), and previous painful experiences seem to increase fear towards them (Munoz Sastre et al. 2006).

Pain assessment, which aims to get a thorough look of the patient's pain experience, is the basis of pain management. They are both known to be complicated issues with physiological, emotional, cognitive and social dimensions. Pain scales have an important role in pain management. (Williamson & Hoggart 2005, Layman Young et al. 2006, Young & Davidhizar 2008.) There are lots of appropriate scales to use on different occasions e.g. after an operation, during endoscopy, and for different kinds of patients

(e.g. elderly patients, ICU-patients) though they are not in common use among nurses e.g. when assessing pain intensity in hospitalised post surgical patients (Manias et al. 2002), or in the emergency department (Probst et al. 2005). Also, it is unclear how adequately nurses and physicians estimate patients' pain (Bergh & Sjostrom 1999, Klopfenstein et al. 2000) and it has been argued that it may be underestimated (Idvall et al. 2005, Sloman et al. 2005).

Pain management during colonoscopy procedures varies in different countries. Sedatives and pain medication are routinely administered by physicians, nurses or patients themselves in most European countries and in the United States (Stermer et al. 2000, Vicari 2002, Bright et al. 2003, Kulling et al. 2004, Heuss et al. 2004, Bowles et al. 2004, Faulx et al. 2005).

Nurses' role in pain management is important (Coll et al. 2004, Herr et al. 2004) and they require cognitive, psychomotor, social, moral and personal skills (Bastable 2008). Their responsibility is to advocate for the relief of pain based on a nursing assessment and predict, and control pain during and after procedures and operations based on patients' subjective experience of pain or nurses' observations (Pasero & McCaffery 1999, Ahern & McDonald 2002, D'Arcy 2007, Rawe et al. 2009). Nurses use versatile non drug interventions, in addition to pharmacological pain relief and as part of a holistic approach to care (Kwekkeboom 2003, Thompson et al. 2003, Nilsson et al. 2005). It is known that, for instance, promotion of psychological comfort and distraction relaxation has a positive effect on pain outcomes without any adverse effects (de Jong et al. 2007). For instance, sterile water injection can be considered effective for labour pain (Hutton et al. 2009).

The purpose of this clinical and procedural pain-oriented study was to describe the expertise of nurses in managing pain during colonoscopy and to describe the pain assessment during medication-free colonoscopy. In addition, the purpose was also to describe factors affecting patients' pain experience during medication-free colonoscopy from the viewpoints of nurses, patients and endoscopists. Pain, anxiety, discomfort, and concern can affect patients' attitudes and compliance towards future procedures. There is research in nursing science of pain assessment and management attached to children's

procedural pain (Halimaa 2003, Merry et al. 2004, Brown et al.2009, Rocha et al. 2009) and their postoperative pain (Pölkki et al. 2001, Hamers & Abu-Saad 2002, He et al. 2006, Kankkunen et al. 2008). Research of adults' postoperative pain also exists (Heikkinen et al. 2005, Li et al. 2007, Li et al. 2009), but there is a lack of such clinical research in the field of adults' procedural pain i.e. during diagnostic, and therapeutic medical procedures such as colonoscopy as well as routine procedures.

This study titled: "Patients' pain assessment and management during medication-free colonoscopy" belongs to the aria of clinical nursing research. It is a part of the pain assessment and care project at the University of Kuopio, Department of Nursing Science conducted by Professor Vehviläinen-Julkunen (Research Programme of the Department of Nursing Science 2009). The findings can be utilised to improve the treatment of pain during colonoscopy and other medical procedures, especially medication-free ones. The study yields new knowledge about nurses' role and expertise in colonoscopy patients' pain management, pain assessment and factors affecting patients' pain experience during medication-free colonoscopy.

Multiprofessional pain assessment and management congruent with patients' reported pain, is essential in order to reach individual pain management during colonoscopy. To avoid practise based on tradition, it is obvious that more research in nursing is needed. It is emphasised that evidence-based knowledge forms the basis for competent pain management so it is pertinent to increase nurses' professional expertise of pain assessment and management (Stenger et al. 2001, Bédard et al. 2006, Rahm Hallberg 2009, Forbes 2009): this is also aim of this study concerning adult patients during medication-free colonoscopy.

2 LITERATURE REVIEW

The literature review for this study was based on searches conducted in the databases of MEDLINE, PubMed, MEDLINE Ovid, CINAHL, EBSCOhost Academic Search Elite and Cochrane Library as well as manual searches all published in English. The search was also carried out on the MEDIC database to discover studies and articles published in Finnish. The searches covered the period from 1998 to September 2009. The main search terms were colonoscopy, endoscopy, procedure, pain, pain management, pain assessment, nursing, nurse, anxiety, fear, non-pharmacological methods, pain scales and procedural pain.

2.1 Phenomenon of pain

Pain is complex, multidimensional (i.e. consisting of physiological, psychological and experiential aspects) and universal and it is perhaps one of the most widely experienced and expressed phenomena in nursing practice (Davidhizar & Giger 2004).

2.1.1 Definition and classification of pain

Pain is a subjective and unique physiologic response with unpleasant and emotional experiences associated with actual or potential tissue damage or described in terms of such damage. Pain can be perceived as a protective mechanism for self-preservation. (IASP, Montes-Sandoval 1999.) It is based on individuals' past experiences and perceptions of pain (Davidhizar & Giger 2004, Devor 2008, Jensen & Gebhart 2008, Loeser & Treede 2008). Pain is assessed by human behaviour which is culturally connected so people's idea of man, philosophy of life and cultural background have an influence on the expression and meaning of pain (Finnstrom & Soderhamn 2006, Im et al. 2007, Reyes-Gibby et al. 2007). The definition of pain in nursing emphasises the importance of believing the patient's expression of pain (Pesut & McDonald 2007) and also paying attention also to patients who are unable to communicate verbally (Herr et al. 2006).

Individuals between various racial and ethnic groups perceive pain in similar ways. Variations in pain threshold or in pain tolerance occur between them because of genetics, but also according to social and cultural background, ethnicity and sex, emotional and psychological state, memories of past pain experiences as well as beliefs and values. The same person can also sense the pain experience differently at different times (Bonham 2001, Kalso 2002b). It is suggested that pain can have reciprocal interactions with anxiety and perceived powerlessness and can be caused by distressing thoughts when the individual is mentally misperceiving (Montes-Sandoval 1999).

Pain can be divided into normal healthy pain and pathological pain. It can also be classified according to stability or duration of symptoms or its origin mechanism. The distinction can be made between acute and chronic pain. Acute pain is a warning signal about actual or potential damage of tissue, inflammation or the disease process. It does not cause permanent damage and it is short in duration. Chronic pain, that persists longer than the temporal course of natural healing, is associated with a particular type of injury or disease process. It is long in duration, lasting over three to six months. The pain is no longer considered a symptom but an illness by itself. In chronic pain this process is difficult to reverse or eradicate once established. Changes in the central nervous system's pain pathway and in pain regulation systems maintain pain although the tissue damage has healed. The advantage of pain as a warning signal has, however, disappeared.(Vainio 2002b, Salanterä et al. 2006.)

Pain can be classified into neuropathic, idiopathic and nociceptive, based on the mechanism of the pain's origin. Neuropathic pain is due to tissue damage in the nervous system itself, caused by disease or trauma. The healing process is slow or is not happening. It causes changes in the structure and function of the nervous system which can lead to permanent and long lasting changes. Neuropathic pain may be divided into peripheral neuropathic pain caused by damage to nerves and to central neuropathic pain caused by damage to the spinal cord, the brainstem or the brain. When no explanatory tissue or nerve damage can be found or the damage is so minor that it is not realistically relative to the intensity of pain, the pain is classified as idiopathic. Pain can be classified as psychogenic, when it is caused, increased or prolonged by behavioural, mental or emotional factors.(Vainio 2002b.)

The cause of nociceptive pain is actual or potential tissue damage and the activation of nociceptive afferent nerve fibres. It can be divided as: pain transmitted by the somatic nerve system and visceral pain caused by the activation of autonomic nerves innervating internal organs. (Tigerstedt et al. 2001, Vainio 2002b, Vainio 2002a, Salanterä et al. 2006.)

Every internal organ has its specific superficial referred aria. Sensory fibres from the viscera enter the same segment of the spinal cord as somatic nerves, i.e. those from superficial tissues. The sensory nerve from the viscera stimulates the nearby somatic nerve so the pain localisation in the brain is confused. The further the stimulated organ is from the superficial tissue, the further the pain is referred. The diaphragm's irritation is sensitised in the neck and shoulder and the pain of a heart attack is felt in the left arm and shoulder, thorax, or epigastrium rather than in the chest. Oesophagus related pain is located in the left side of the chest and ectopic pregnancy pain is felt as a stitch in the shoulder. The sensibilisation of the visceral nervous system includes the same neurochemical changes in the spinal cord as somatic neuropathic pain as well as the possible weakening of the efferent inhibition.(Caterina et al. 2000, Vainio 2002a, Clark & Ram 2008.)

In this study pain is defined as a procedural specific, subjective and unpleasant experience. It is culturally connected and present when patients are expressing pain verbally or their pain behaviour guides health professionals to believe the individual is suffering from pain.

2.1.2 Procedural pain

Pain is an even more complex phenomenon in the case of procedural pain because it is procedure specific and varies considerably. Patients can experience procedural pain during diagnostic, therapeutic and interventional procedures and tests (e.g. gastrointestinal-radiological-, cardiovascular procedures) as well as routine procedures e.g. tracheal suctioning, drain – or catheter removal or central venous catheter placement. (Siffleet et al. 2007, Rawe et al. 2009, Arroyo-Novoa et al. 2008, Liden et al. 2009.) The Figure 1 shows the complexities of defining procedural pain.

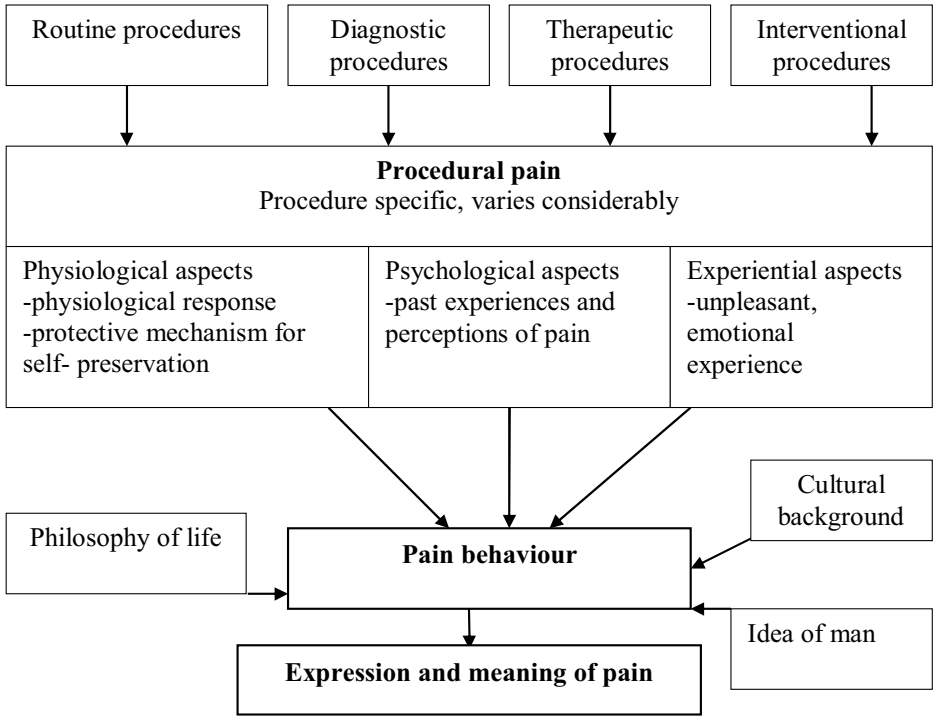

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Figure 1. The phenomenon of the procedural pain (IASP, Montes-Sandoval 1999, Davidhizar & Giger 2004, Finnstrom & Soderhamn 2006, Siffleet et al. 2007, Im et al. 2007, Reyes-Gibby et al. 2007, Pesut & McDonald 2007, Arroyo-Novoa et al. 2008, Devor 2008, Jensen & Gebhart 2008, Loeser & Treede 2008, Rawe et al. 2009, Liden et al. 2009)

Patients may expect more anticipatory pain than they experience during a procedure (Ellerkmann et al. 2004). Young patients with higher education announce pain more than older patients with less education. Oppressive atmosphere of the treatment environment can also increase patients' pain experience. (Okawa et al. 2005.) Nurses and physicians need to recognise these procedures and take them into account when planning patients' care (Puntillo et al. 2002, Resnick & Morrison 2004, Uman et al. 2006, Vaartio et al. 2008, Vaartio et al. 2009) because adequate management of procedural pain is an ethical responsibility (Ferrell 2005).

2.1.3 Pain mechanisms

The main components of the pain mechanism are transduction, transmission, modulation and perception. During transduction, which occurs in the periphery, the damage to human tissue causes nociceptive stimulations which activate nerve endings i.e. primary afferent nociceptors. There are two kinds of nerve endings in the viscera. Visceral mechanoreceptors are located in the omentum, internal organs' membranes, intestines and smooth muscle tissue. Visceral nociceptors are located in the intestines, heart and genitals. (Kalso 2002b.) Figure 2 (p.26) shows the main components of pain mechanisms.

Neurons use many different chemical signals to communicate with each other. Nerve growth factor (NGF) has an important role in nociception, because its production increases during inflammation. It stimulates the release of peptides SP (Substance P) and CGRP (Calcitonin gene related peptide). CGRP causes vasodilatation and triggers neurogenic inflammation which is a local inflammatory response to infection or injury.(Kalso 2002b.) SP transmits information about tissue damage from peripheral receptors to the central nervous system to be converted into the sensation of pain. It is also involved in neurogenic inflammation and causes both vasodilatation and vessels permeability. SP also releases inflammation transmitting enzymes i.e. neurotransmitters (glutamate, interleukin, tumour necrosis factor (TNF), arachidonic acid, histamine, 5-hydroxytryptamine cf. serotonin). For example, histamine causes vessel dilatation and exudation which inflict on congestion and pain. (Kalso 2002b, Weng et al. 2006, Kawasaki et al. 2008, Youn et al. 2008.). Figure 2 demonstrates examples of the chemical signals and organs involved.

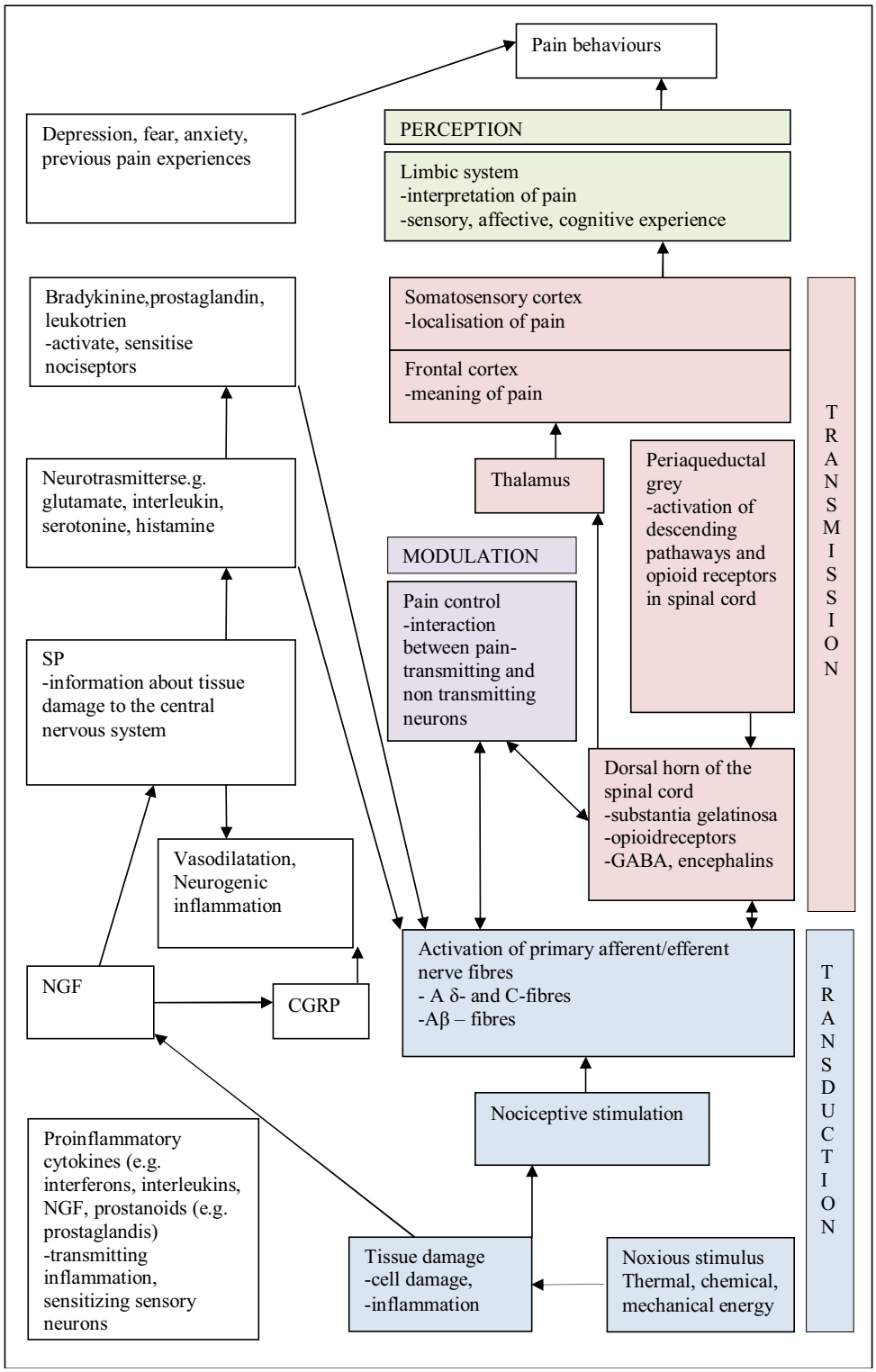

Figure 2. Summary of the pain mechanisms and examples of chemical signals and organs involved (Kalso 2002b, Weng et al. 2006, Salanterä et al. 2006, Bird et al. 2006, Kawasaki et al. 2008, Youn et al. 2008, Price et al. 2009)

Proinflammatory cytokines (e.g. interferons, interleukins such as interleukin-1beta, interleukin-6 and TNF), and prostanoids (prostaglandins, thromboxanes, prostacyclins) are inflammation transmitting and sensory neurons sensitising substances. During tissue damage and inflammation the transmitters release substances (e.g. bradykinin, prostaglandin (E_2, D_2 and I_2) adenosinephosphate, leukotrien and acid exudates) which activate nociceptors and sensitise them to other stimuli. (Kalso 2002, Weng et al. 2006, Kawasaki et al. 2008, Youn et al. 2008.)

During the transmission the information is conveyed from the peripheral nervous system to the dorsal horn of the spinal cord where nerve cells activate and the information is then processed to higher centres i.e. to the brainstem. It is believed that the thalamus forwards the message to the frontal cortex who assigns meaning to the pain. The information is then conveyed to the somatosensory cortex, which identifies and localises the pain and finally to the limbic system where the information is interpreted as pain. (Kalso 2002b, Salanterä et al. 2006.)

Most of the pain receptive afferent nerves which bring signals to the brain are A-delta (δ) – fibres and C-fibres. A delta (δ) – fibres are relatively thick, myelinated and fast, conducting well-localised, sharp, intense pain to be sensitised. They are sensitive to pressure and temperature and related to the avoidance reflex. C- fibres are small, thin, unmyelinated and slow, transmitting unlocalised, dull, aching pain, longer-term throbbing and chronic pain to be sensitised. They cause an increase in muscle tone and the activation of the autonomic nervous system. C-fibres are sensitive to chemicals and once stimulated, the pain receptive afferent neurons convey signals i.e. nerve impulses from receptors along the spinal cord and within the brain. They also communicate with interneurons which connect afferent and efferent neurons in the neural tract. (Kalso 2002b, Salanterä et al. 2006, Kawasaki et al. 2008.) Sense of touch is transmitted by the dorsal column system and sense of temperature, pain, itch and crude touch are transmitted by sensory pathways. Both originate in the spinal cord and transmit the information to the thalamus. The cell bodies of neurons that make up the spinothalamic tract are located principally within the dorsal horn of the spinal cord. These neurons receive input from sensory fibres that innervate the skin and internal organs.(Salanterä et al. 2006, Bird et al. 2006.)

Modulation is interaction between pain-transmitting and non-pain transmitting neurons i.e. pain control in the nervous system. The activation of non-pain transmitting neurons at the spinal cord can interfere with signals from pain fibres and inhibit or modulate an individual's experience of pain. Modulatory interneurons in the spinal cord are either inhibitory or excitatory. A-beta (β) - fibres are non-pain transmitting neurons with a large-diameter which inhibit the effects by A-delta (δ) and C- fibres. Only thin and small nerve fibres innervate deep tissues and organs such as the bowel, heart and urinary bladder. The velocity of the fibres explains pain with two phases of the acute pain. (Soinila et al. 2001, Kalso 2002b, Salanterä et al. 2006.)

The gate control theory of pain (Melzack & Wall 1993) is the theoretical groundwork in pain research for the spinal inhibition's role in endogenous pain control. According to the theory, the interpretation of pain includes the existence of sensory, affective and cognitive dimensions. The perception of pain is not directly resulted to the activation of nociceptors, but is modulated by interaction between pain-transmitting and non-pain-transmitting neurons so spinal inhibition is dynamically regulated.(Price et al. 2009.)

A projection site of small-diameter afferent nerve fibres that predominantly transmit nociceptive signals is located in the dorsal horn of the spinal cord, especially substantia gelatinosa (SG) whose neurons also receive descending inputs from the brainstem. The nociceptive myelinated A-delta (δ) – nerve and thin unmyelinated C-fibres' form synapses as well as non-nociceptive thick A-beta (β) fibres. The stimulation of the thin nociceptive nerve fibres "opens the gate". The activation of nerves or neurons that do not transmit pain signals, indirectly inhibit or modulate signals from pain fibres, "closing the gate" to the transmission of their stimuli, i.e. inhibit or modulate an individual's experience of pain. Stimulus that activates only non-nociceptive nerves can inhibit pain. When the injured area is rubbed, the pain seems to be lessened because of the activation of those non-nociceptive fibres. The "gate" allows the pain signal to go forwards, modulates it or inhibits the signal to go to the central nervous system. The brain can control the degree of pain that is perceived because afferent pathways interfere with each other. The brain controls the perception of pain and determines which stimuli are profitable to ignore to pursue potential gains and can be trained to

deactivate useless forms of pain. (Weng et al. 2006, Salanterä et al. 2006, Kawasaki et al. 2008, Youn et al. 2008, Price et al. 2009.)

Periaqueductal grey matter is also involved in the reduction of pain sensations. It surrounds the third ventricle and the cerebral aqueduct of the ventricular system. Stimulation of this area produces analgesia (but not totally numbing) by activating descending pathways that directly and indirectly inhibit nociceptors in the laminae of the spinal cord. It also activates opioid receptor-containing parts of the spinal cord. (Kalso 2002b, Salanterä et al. 2006,Vainio 2002a, Lovick & Adamec 2009.) Inhibiting interneurons in the pain pathway are localised near pain neurons. They secrete met-enkephalins and gamma-aminobutyric acid (GABA) which is the main inhibitory neurotransmitter. (Soinila et al. 2001, Kalso 2002b, Salanterä et al. 2006, Vainio 2002a, Nakamura et al. 2009.)

Endogenous opiates, endorphins and enkephalins bind to the body's opioid receptors and can inhibit the transmission of pain stimuli in the peripheral nervous system, the spinal cord and the brain. They produce a sense of well-being and analgesia which can be removed by inhibiting opiate receptors (μ-,κ-, and δ-reseptors). Pain stimuli, stress, acupuncture or external electric stimulation as well as pleasant stimuli can release endorphins. Endorphins work as "natural pain killers". Enkephalins are polypeptide compounds of two kinds. One contains leucine (leu^5-enkephalin) and the other methionine (met^5-enkephalin). They resemble the opiates and inhibit pain in the spinal cord. Encephalins are localised nearby opioid receptors.(Kalso 2002b, Salanterä et al. 2006, Vainio 2002a, Tian et al. 2009.)

Perception of pain is a neurophysiologic phenomenon which can be compared to the sense of heat or touch when the neurons transmit pain and evoke a subjective response to pain. The emotional response to the perception (e.g., depression, fear, anxiety, suffering), and the pain behaviour in response to those emotions and perceptions guide the observer to believe the individual is suffering from pain i.e. talking about pain, grimacing or moaning. (Loeser 2000, Kalso 2002b.) Pain pathways are connected to the brain regions which control emotions. Pain is experienced as unpleasant and harmful and something which individuals tried to avoid. (Kalso 2002a.)

2.1.4 Pain and anxiety

Pain is an emotional and cognitive experience of physical experience (Maggirias & Locker 2002) and the propensity for anxiety can lead to fear towards medical procedures and treatments (Hagglin et al. 2000, Närhi et al. 2002, Lago-Mendez et al. 2006, Armfield et al. 2006, Pohjola et al. 2007). In this study the focus of interest is on anxiety and concepts related to it (e.g. fright, depression, tension, strain) and their effects on patients' pain experience. Anxiety is a main construction in personality theories (Endler & Kocovski 2001) and according to Spielberger et al. (1983) it includes trait anxiety which is an individual's disposition to respond. State anxiety is a transitory emotion characterised by physiological arousal and consciously perceived feelings of strain, fright and tension and its' levels are conditional on both the person and the stressful situation. The situation must be in proportion to trait anxiety in order to evoke increases in state anxiety. (Spielberger et al. 1983). This distinction has received recognition and is widely used (Ramos et al. 2006, Ciccozzi et al. 2007). Anxiety levels and their effects relating to invasive procedures have been investigated (Luck et al. 1999, Mueller et al. 2000). Trait anxiety level is suggested as being a useful predictor of a patient's predisposition to procedural anxiety (Lago-Mendez et al. 2006).

Patients, especially females, experience a moderate amount of anxiety about interventional procedures(Hagglin et al. 2000, Jones et al. 2004), and previous pain experiences seem to increase fear towards them (Munoz Sastre et al. 2006). Women are more afraid of forthcoming procedures and express it more often than do men (Heikkila et al. 1999). Older people with low education fear more invasive procedures than do younger people with higher education. Women, in particular, experience procedures as oppressive (Maggirias & Locker 2002). Depression and anxiety increase patients' pain and pain experience (Naumann et al. 2004). Extent anxiety can increase the pulse during local anaesthesia and pain procedures. (Liau et al. 2008, van Wijk & Lindeboom 2008). It seems that physicians' abilities to assess patients' anxiety levels are insufficient (Jones et al. 2004).

2.1.5 Memory of pain

The memory of pain forms the basis of patients' future decisions about treatment, including compliance and satisfaction with pain management. Patients with a high level of emotional distress, even in childhood (Rocha et al. 2009) may also negatively distort the pain intensity at recall (Everts et al. 1999). To increase patients' willingness to return to a subsequent procedure it is important to minimise patients' long-term recollection of the aversiveness of procedures (Redelmeier et al. 2003) by using proper anxiety management (Gedney et al. 2003).

Patients recall the memory of pain during the procedure individually. Memories are strongly connected to the intensity of pain, to the most painful moment of the procedure and to the end of the procedure.(Redelmeier et al. 2003.) Previous pain experiences increase fear for invasive procedures. Patients with previous painful experiences and those who were anxious about the procedure are more likely to report pain. (Jones et al. 2004, Munoz Sastre et al. 2006.) Nervous patients with previous pain experiences who fear the procedure, experience more pain and expect the procedure to be more painful than it is (Okawa et al. 2005).

2.2 Medication-free colonoscopy

Medication-free colonoscopy is currently the centre of attention in many countries (Chak &Rothstein 2006, Ladas et al. 2006). It is known that sedation or medication may delay patient recovery and discharge, adds to the cost of the procedure, and increases the risk of cardiopulmonary complications. (Campo et al. 2004, Heuss et al. 2005, Huang et al. 2005, Cohen et al. 2006).

Medication-free colonoscopy is common practice in Finland (Ristikankare & Julkunen 1998, Ristikankare 2006). However, necessary medication is given for several reasons: the patient's intense anxiety or pain regardless of medication-free interventions, bowel air minimising or loop reduction. It is suggested that carefully performed sedation-free colonoscopy may be completed successfully in most patients, rarely causes complications and is well accepted by most patients and does not undermine their

willingness to undergo a similar procedure in the future. (Thiis-Evensen et al. 2000,Yörük et al. 2003, Takahashi et al. 2005, Leung et al. 2008.)

During colonoscopy the entire large intestine and the distal part of the small bowel can be examined. It grants the immediate opportunity for biopsy or removal of suspected lesions, ulcers and resection of most polyps. Optical colonoscopy is still the golden standard in colonic examination although the technology of virtual colonoscopy (computered tomography colonography i.e. CTC) and wireless endoscopy (endocapsule) has recently improved. (Morimoto et al. 2008, Moglia et al. 2009.) In contrast to virtual colonoscopy, there is no risk of radiation with optical colonoscopy and it allows operations to be performed during the procedure. In addition, it is less time-consuming than wireless endoscopy, which, as yet, is not a standard method in colonic examination. (Cotton & Williams 2003, Mazzarolo & Brady 2007.)

Performing colonoscopy is multiprofessional team work. It is a common practice in Finland that nurse assists the endoscopist during the procedure, but another nurse is available if the patient is medicated or operations are performed. To complete a successful colonoscopy, the bowel must be cleaned for the procedure so that the endoscopist can clearly view the colon. The polyethylene glycol electrolyte lavage solution (PEG) is osmotically balanced, nondigestible and nonabsorbable. Sodium phosphate (NaP) solutions have a high osmotic laxative effect when the fluid is shifted from plasma to the bowel. (Pikkarainen et al. 2002.)

At the beginning of the colonoscopy patient lies on their left side on an examination table and the endoscopist first performs a rectal examination by inserting a finger into the rectum and palpating the insides. The endoscope is then passed though the anus up the rectum, the colon (sigmoid, descending, transverse and ascending colon and the caecum) and, ultimately, to the terminal ileum i.e. the distal part of the small bowel. During this phase of the procedure patients may experience bloating, a cramped feeling in the abdomen or even pain. To allow the scope to move forward the patient's body position can be changed or the assisting nurse can perform the abdominal support using external hand pressure by propping up or pressing down on the abdomen. Visual inspection is performed and biopsies are taken upon withdrawal of the endoscope when

the lining of the large intestine is carefully examined. (Pikkarainen et al. 2002, Cotton & Williams 2003.)

2.2.1 Pain during colonoscopy

Colonoscopy pain is considered visceral, resulting from the activation of sensory afferent nerves that innervate intestines. The innervations in the abdominal cavity are sparse although the aria of the intestines is extensive. (Drewes et al. 1999, Kalso 2002b, Vainio 2002b, Al-Chaer & Traub 2002.) The mechanisms and the perception and psychological processing of visceral pain differ from somatic pain. Visceral pain is often unformed, diffused, difficult to localise, frequently referred to other intact tissues, where the sensation is localised to an area completely unrelated to the site of injury. It is not evoked from all viscera and not always linked to visceral injury. Autonomous and motor components, e.g. pallor, excessive sweating, bradycardia, dizziness, hypotension, nausea and fainting are features of it (Cervero & Laird 1999), and it is of concern because it seems to be resistant to current treatments (Westlund 2000).

2.2.2 Factors affecting colonoscopy pain experience

Colonoscopy as a medical procedure is generally perceived to be an embarrassing and painful examination. Patients may consider the phase painful when the scope is inserted and the bowel is distended when it is widened with air. (Cotton & Williams 2003.) Tight turns and redundancy in areas of the colon that are not “fixed”, tortuous, sharp angulated sigmoid and long transverse colon may predispose to painful loop formation when the sigmoid colon and its associated mesentery are stretched (Shah et al. 2002, Cotton & Williams 2003). It is better tolerated by old subjects than young and it is technically more difficult and less tolerated by women because females tend to have an inherently longer colon, which may predispose the colonoscope to painful looping (Ristikankare 2000, Thiis-Evensen et al. 2000, Froehlich 2003, Takahashi et al. 2005). Loop reduction is an essential technique to improve complete and successful colonoscopy and reduce discomfort and increase success (Waye 2004, Benjamin 2007).

Use of a variable-stiffness colonoscope can also decrease pain (Lee et al. 2007). It is suggested that female gender, younger age, low body mass index, pelvic operations, diarrhoea, first time colonoscopy and anxiety may predict colonoscopy patients' pain and difficulty of intubation (Chung et al. 2007, Park et al. 2007).

2.3 Pain assessment in patients undergoing medical procedures

Pain assessment aims to build a comprehensive picture of patients' pain experience. It includes pain measurement and identification of the location, intensity, occurrence and also the meaning of pain to the individual. It also aims to discover factors that relieve or worsen the pain and influence the pain experience. (Turk & Melzack 2001.) Instruments to assess procedural pain can be classified into two main types: pain scales based on patients' self report or health professionals' observation. The examples of pain scales available are demonstrated in Appendix 2.

2.3.1 Pain scales for assessing procedural pain

Pain scales are known to be important instruments in pain management. Table 1 shows that there are lots of appropriate scales to use on different occasions and for different kinds of patients in specific pain states and syndromes e.g. after Caesarean section, in older adults (Herr et al. 2004, Bird 2005, Ware et al. 2006), in endoscopy trials (Skovlund et al. 2005), or in critically ill patients (Ahlers et al. 2008). However, they are not used as commonly as they should be (Layman et al. 2008) e.g. when assessing pain intensity in hospitalised post surgical patients (Manias et al. 2002), or in emergency departments (Probst et al. 2005). Table 1 illustrates that research on pain scales has been very limited in Finland as well as in Scandinavia.

Pain scales based on patients' self report are e.g. the Visual Analogue Scale (VAS), (Bijur et al. 2001), Verbal Rating Scale (VRS) (Breivik et al. 2000, Gagliese et al. 2005, Hadjistavropoulos et al. 2007, Pesonen et al. 2008), Numerical Rating Scale (NRS) (Herr et al. 2004, Breivik et al. 2000, Coll et al. 2004, Skovlund et al. 2005) and the

McGill Pain Questionnaire (MPQ) (Bruce et al.2004, Dworkin et al. 2009, Epstein et al. 2009).

Examples of pain scales based on heath professionals' observation are: the Behavioural Pain Scale (BPS) (Payen et al. 2001, Young et al. 2006, Aissaoui et al. 2005, Pudas-Tahka 2009), Colorado Behavioural Numerical Pain Scale (CBNPS) (Salmore 2002), Mobilisation- Observation- Behaviour- Intensity- Dementia Pain Scale (MOBID) (Botvinick et al. 2005, Husebo et al. 2009) and Checklist of Nonverbal Pain Indicators (CNPI) (Feldt 2000, Nygaard & Jarland 2006, Puntillo et al. 2009). Medical and physical (e.g. quantification of function of low back, physical and occupational therapy assessment), physiological (e.g. pulse, blood pressure), psychological (e.g. psychological status with interviews and questionnaire, assessment of pain beliefs and coping with pain) evaluations of patients in pain are also pertinent.

It is important to have different approaches to pain measurement because patients may have difficulties in expressing the level of pain or the magnitude of their discomfort, because of cognitive or physical impairments and impaired communication. (de Rond et al. 1999, Turk & Melzack 2001, Bird 2003.) Patients may also tend under report pain, because of culture or age (Keogh et al. 2005). During the medical procedures patients experience subjective and sensorial perceptions whilst cognitive and emotional information is being processed. Moreover, the variation in patients' tolerance and expression of pain is wide. (Davidhizar & Giger 2004, Wiech et al. 2008, Wilson et al. 2009.) Pain scales selected in Table 1 present the current knowledge of pain measuring instruments for adult patients of different ages and with different capability of verbal expression.

Table 1. Studies of pain scales available for adults of different ages and different capability of verbal expression during 2003-2008

Researchers	Purpose of the study	Data/ Participants	N	Methods	Main findings
Bird 2003 UK	To determine which tool is appropriate for measuring pain in a diverse patient group.	Published literature between 1992 and 2002	63	Systematic literature review	Each tool has its merits and limitations and no one tool holds a level of psychometric stability
Herr et al. 2004 USA	To determine 1) the psychometric properties and utility of the VAS, NRS, VDS, VNS, FPS 2) factors related to failure to use scale3) pain rating scale preference 4) factors impacting scale	Young (age 25–55) Old (age 65–94) adult volunteer subjects	86 89	Questionnaire Statistical methods	All pain scales were effective in discriminating levels of pain sensation VDS was most sensitive and reliable. The most preferred scale was the NRS, followed by the VDS.
Skovlund et al. 2005 Norway	To compare the sensitivity of the VAS and VRS	Individuals undergoing a lower gastro-intestinal endoscopy	168	Questionnaire Statistical methods	VAS is more sensitive than the four-point VRS
Ware et al. 2006 USA	To determine the reliability and validity of the FPS-R, VDS, NRS and IPT	Older minority adults with an average MMSE of 23	68	Pain scales Statistical analysis	NRS was the preferred (cognitively intact) and FPS-R in cognitively impaired group. African-Americans and Hispanics preferred the FPS-R as well moderately, and mildly impaired participants.
Ahlers et al. 2008 The Netherlands	To determine the reliability of the NRS and BPS, to compare pain scores of different observers and the patient	Non-paralyzed critically ill patients Nurses	113	Observation Pain scales Statictical analysis	The different scales show a high relia-bility, but observer-based evaluation underestimates the pain

2.3.1.1 Pain scales based on patients' self report

Pain scales can be patients' self reports. The VAS consists of a 100mm continuous horizontal line. The left end (0mm) represents no pain and the right end (100mm) represents extreme pain. To indicate the level of pain the spot is marked on the horizontal line upon the assessor's verbalisations or a sliding marker is used. The severity of pain is measured as the distance between the zero position and the marked spot. (Bijur et al. 2001.) The NRS is a scale where patients are asked to give a number to their pain on a scale from zero to 10 at the present moment, when the pain is at its worst and when the pain is at its best. Patients are also asked to give a number to the pain level which is at an acceptable level. (Breivik et al. 2000, Coll et al. 2004, Skovlund et al. 2005.) The VRS has descriptors that represent pain of progressive intensity (e.g: 0 = no pain at all, 1=mild pain, 2 = moderate pain and 3= extreme pain). To complete it and indicate the pain intensity the patient selects one of the descriptors. It is valid and reliable in elderly patients as well as post-operative adult patients. (Breivik et al. 2000, Gagliese et al. 2005, Hadjistavropoulos et al. 2007, Pesonen et al. 2008). The VAS and VRS are considered to be reliable, valid and appropriate for use in clinical research (Breivik et al. 2000, Bijur et al. 2001, Coll et al. 2004,Williamson & Hoggart 2005, Skovlund et al. 2005). The VRS is supposed to be more sensitive than or as sensitive as the VAS, which is also considered to be more sensitive than the NRS (Briggs & Closs 1999, Clark et al. 2003, Lund et al. 2005). Table 2 summaries the pain scales available for adults based on patients' self report.

The MPQ, with 20 sub-classes of words describing pain and the Short-form McGill Pain Questionnaire (SF-MPQ-2) are questionnaires developed to specify subjective pain experience. They provide quantitative measures of clinical pain and a quantitative profile of four major psychological dimensions of pain: sensory-discriminative sub-classes (1–10) including words that describe the sensory quality of the pain experience in terms of temporal, spatial, pressure, thermal, and other properties e.g. throbbing, shooting, and stabbing. Motivational-affective sub-classes' (11–15) words describe affective qualities of pain, including tension, fear, and autonomic properties that are part of the pain experience e.g. tiring, sickening, punishing.

Table 2. Summary of pain scales available for adults based on patients' self report during 2000-2009

Authors	Instrument	Recommended occasion / Patient group
Breivik et al. 2000 Bijur et al. 2001 Coll et al. 2004 Skovlund et al. 2005	Visual Analogue Scale (VAS)	Acute pain Day or oral surgery Postoperative pain Healthy individuals Endoscopy
Williamson & Hoggart 2005 Gagliese et al. 2005	Numerical Rating Scale (NRS)	Clinical practice Young and old surgical patients
Pesonen et al.2008	Verbal Rating Scale(VRS)	Elderly patients Cardiac surgery
Bruce et al. 2004	The McGill Pain Questionnaire	Adults Chronic post-surgical pain
Gagliese et al. 2005 Peters et al.2007	Verbal Descriptor Scale (VDS)	Young and old surgical patients Patients of 75 years or older Female individuals
Pesonen et al.2008 Pesonen et al.2009	Red Wedge Scale (RWS)	Cognitively impaired patients Elderly patients, Acute pain

Cognitive-evaluative sub-class (16) words describe the subjective overall intensity of the total experience of pain e.g. miserable, annoying, and intense. In miscellaneous sub-classes (17–20) word groups 17–19 represent sensory terms (e.g. spreading, tight, numb), and group 20 represents affective and evaluative terms (e.g. nagging, agonising). The patient first circles the words that describe his/her pain from each group (one word in a group) and then circles the three words in groups 1-10 that most convey their pain response. After that the patient circles the two words in groups 11-15, picks one word in group 16 and one word in groups 17-20. At the end the patient have seven words that will help describe both the quality and intensity of pain. (Bruce et al.2004, Dworkin et al. 2009 Epstein et al. 2009.)

The Verbal Descriptor Scale (VDS) includes adjectives which describe increasing levels of pain intensity e.g. the six-level pain rating scale: none, very mild, mild, moderate, severe, and very severe. The scale is known to be suitable for young and old surgical patients and females. (Peters et al. 2007.) The Red Wedge Scale (RWS) with a visual

50-cm red-coloured horizontal wedge scale is designed for the assessment of patients' post- operative pain immediately after an operation with surgical general anaesthesia. It has also been successfully used to measure post-operative pain in demented surgical patients. (Pesonen et al. 2009.)

2.3.1.2 Pain scales based on health professionals' observation

Health professionals can assess patients 'pain by observation (Table 3). The BPC scores the expression of pain validly and reliably in sedated, mechanically ventilated patients (Payen et al. 2001, Young et al. 2006, Aissaoui et al. 2005, Pudas-Tahka 2009). The CBNPS, developed from the BPC, is designed to assess pain among sedated patients undergoing a gastrointestinal examination. This scale allows the possibility to assess patients' pain without any papers or scales in hands and to assess patients' pain without using verbal impression (Salmore 2002) which is not always employed by Finnish patients. The CBNPS was built from the terms considered appropriate for pain assessment by the Agency for Health Care Policy and Research (1992) guidelines and the concepts and indicators obtained from the literature review The CBNPS lists behavioural observational descriptors on a 0–5 scale (0= restful, no facial expression, 1= moaning, frowning, restless, 2= facial grimacing, protective body positioning, 3= resistive, crying out, 4= yelling, tossing, 5= combative) which are known to correlate with increased pain. (Salmore 2002.)

The MOBID is based on pain behaviour indicators i.e. pain noises, facial expressions and defence and it is considered to be reliable in assessing pain in older persons with severe dementia (Botvinick et al. 2005, Husebo et al. 2009). Face scales can also be used in pain assessment among elderly patients (Ware et al. 2006, Kim & Buschmann 2006).

Table 3. Summary of pain scales available for adults based on observation years 2001-2009

Authors	**Instrument**	**Recommended occasion / patient group**
Payen et al. 2001 Aissaoui et al. 2005 Young et al. 2006 Pudas-Tahka et al. 2009	Behavioral Pain Scale (BPS)	Sedated, mechanically ventilated patients
Salmore 2002	Colorado Behavioral Numerical Pain Scale(CBNPS)	Sedated patients gastrointestinal examination
Botvinick et al. 2005 Husebo et al. 2009	Mobilisation-Observation-Behaviour-Intensity-Dementia Pain Scale (MOBID)	Older persons with severe dementia
Feldt 2000 Nygaard & Jarland 2006 Puntillo et al. 2009	Checklist of Nonverbal Pain Indicators(CNPI)	Cognitively impaired elders

The CNPI, designed to measure pain behaviours in cognitively impaired elders, is a modified version of the University of Alabama Pain Behavior with six behaviour items that are commonly considered to be associated with pain in demented persons: vocalisation, grimaces, bracing, rubbing, restlessness and verbal complaints. Items are accompanied by characteristic key words, e.g. for “restlessness”: rocking or constant shifting of position and for “vocal complaints”: e.g. “ouch”, “that hurts”. Each behaviour is scored yes = 1 or no = 0, giving a maximum score of six. (Feldt 2000, Nygaard & Jarland 2006, Puntillo et al. 2009.)

In this study the interest is on pain scales for adults of different ages and different capabilities of verbal expression undergoing medical procedures.

2.4 Procedural pain management in a multiprofessional team

Procedural pain requires a multidisciplinary approach to pain management so both pharmacological and medication-free interventions must be utilised to reflect the multidimensional nature of pain.

2.4.1 Procedural pain assessed by nurses, patients and physicians

It seems that both physicians and nurses (Klopfenstein et al. 2000, Heins et al. 2006, Jacobsen et al. 2007, Lauzon Clabo 2008, Wilson 2009, van Herk 2009) assess and manage pain inadequately. Nurses' assessment and response to patients' pain is insufficient when patients for example, describe it verbally or use a pain scale (Heikkinen et al. 2005, Brown & McCormack 2006, McDonald et al. 2007). Regardless they seem to be able to assess the effect of pain management satisfactorily (Idvall et al. 2005, Sloman et al. 2005).

According to Sloman et al. (2005), nursing education was found not to influence their pain assessment which is in contrast to Hansson et al's (2006) and Layman Young et al's (2006) findings which highlighted that nurses with training beyond basic nursing education tend to assess patients' pain more accurately (Sloman et al. 2005, Hansson et al. 2006, Layman Young et al. 2006). It is also supposed that nurses' knowledge has critical deficits and misbeliefs about pain management (Watt-Watson et al. 2001). Therefore it is important to emphasise better training to reach systematic pain assessment and pain management (Klopfenstein et al. 2000).

2.4.2 Pharmacological pain management

In most European countries and in the United States (Appendix 3) sedatives and pain medication are in common use and administered by physicians, nurses or patients themselves during medical procedures e.g. colonoscopy (Stermer et al. 2000, Vicari 2002, Bright et al. 2003, Kulling et al. 2004, Heuss et al. 2004, Bowles et al. 2004,

Faulx et al. 2005, Cohen et al. 2006). Sedation has four stages, ranging from minimal (anxiolysis) to moderate (conscious sedation) to deep and finally general anaesthesia (Gross et al. 2002). Opiates are often given in combination with benzodiazepines to induce sedation and analgesia e.g. meperidine (a fast-acting opioid) and midatzolam, (an ultra short-acting benzodiazepine) can increase the tolerance during the procedure (Terruzzi et al. 2001, Rex et al. 1999) but may cause cardiorespiratory problems (Ristikankare 2000). Remifentanil (an ultra short-acting synthetic opioid) can be considered safe during short radiology and palliative procedures. Patients are capable of moving after the procedure without medication for pain and nausea. (Moser et al. 2005.) It can also be an appropriate analgesic choice for stapedotomy (Mesolella et al. 2004) and extracorporeal shock wave lithotripsy patients (Medina et al. 2005) as well as for older patients undergoing medical procedures (Greilich et al. 2001). Patient controlled anaesthesia (PCA) is supposed to be safe and satisfactory for patients (Kulling et al. 2004, Stermer et al. 2000). It is known that midazolam and/or fentanyl (synthetic opioid) and propofol (a short-acting hypnotic agent) alone or together may cause significant cognitive impairment at discharge from elective colonoscopy (Padmanabhan et al.2009). It is still worth bearing in mind that routine sedation practices are time-consuming for patients and staff, not to mention the financial costs involved (Aisenberg et al. 2005, Jonas et al. 2007), as well as the adverse events and complications attributable to use of medication (Sieg et al. 2001, Levin et al. 2006, Ko et al. 2007).

Nitrous oxide (an inhaled anaesthetic agent) combined with oxygen can increase patients' willingness to attend the procedure because of fast recovery and discharge without diminishing driving capability (Martin et al. 2000, Castera et al. 2001). Pharyngeal anaesthesia in both non sedated and sedated oesophagogastroduodenoscopy is known to increase procedural completion rate, ease of intubation and patient and endoscopist satisfaction (Evans et al. 2006, Amornyotin et al. 2009).

Pain management must also be taken into account for minor procedures. Tissue adhesives are suitable for traumatic lacerations as they are quicker and cause less pain than suturation (Farion et al. 2002). Lidocaine/prilocaine mixture cream is an effective and well tolerated local anaesthetic when applied to intact skin as a cream (Zilbert 2002). Lidocaine, dosed with facemask and combined with nebulisator before

nasogastric tube insertion can reduce patient discomfort but may increase the risk of nasal bleeding (Schmidt 2005).

2.4.3 Non-drug interventions

Non-drug interventions in pain relief can be defined as a variety of methods designed to relieve pain without medication (e.g. distraction, relaxation, imagery, listening to music, patient education and guidance) and has been used to treat procedure pain (c.f. Lee et al. 2002, Schaffer & Yucha 2004, Olney 2005). Non- drug interventions can reduce the emotional components of pain, give patients a sense of control over the situation and make pain more tolerable. (McCaffery & Pasero 1999, Richardson & Mustard 2009).

The use of these interventions has its basis in pain mechanism and they are thought to be explained through the gate control theory of pain (Melzack & Wall 1993) and spinal inhibition's role in endogenous pain control. According to this theory the interpretation of pain includes the existence of sensory, affective and cognitive dimensions. It is proposed that information coming from the periphery of the body may transmit directly to the brain through the spinal cord. The stimulation of the thin nociceptive nerve fibres (A-delta (δ) and C) "opens the gate". Regardless, as a result of e.g. cognitive factors the perception of pain is modulated by the interaction between pain-transmitting and non-pain transmitting neurons so spinal inhibition is dynamically regulated. (Price et al. 2009.) The activation of nerves or neurons that do not transmit pain signals (A-beta (β) fibres) indirectly inhibits or modulates signals from pain fibres, "closing the gate". Stimulus that activates only non-nociceptive nerves can inhibit pain e. g. when the injured area is rubbed, touched or massaged the pain seems to be lessened. The "gate" can also be closed by activating the inhibitory system by the use of non-drug interventions e.g. distraction and relaxation. (Kalso 2002b, Weng et al. 2006, Salanterä et al. 2006, Kawasaki et al. 2008, Youn et al. 2008, Price et al. 2009.)

There is some research on non-drug interventions for adults undergoing medical procedures. Nurses can teach muscle relaxation, breathing techniques and relaxed posture to patients (Schaffer & Yucha 2004). Massage may lower blood pressure and

pulse during ambulatory operations (Olney 2005). Listening to music can reduce the patients' anxiety, decrease blood pressure and pulse and minimise sedation (Salmore & Nelson 2000, Allen et al. 2001, Lee et al. 2002, Hayes et al. 2003, Cooke et al. 2005) and can relieve tension and make the procedure more pleasant (Chlan et al. 2000). Some patients may consider it disturbing (Kwekkeboom 2003), which is why it is not suitable for all procedures (Domar et al. 2005). Patient education and guidance can decrease patients' anxiety and depression before procedures (Andrewes et al. 1999, Bytzer & Lindeberg 2007), if expressions which reflect negative experiences increase patients' pain experiences, fear and anxiety are excluded (Lang et al. 2005). Stimulation of sense of seeing and hearing can decrease unpleasant feelings in the abdomen (Lembo et al. 1998) but TENS (transcutaneus electrical nerve stimulation) does not relieve colonoscopy pain (Robinson et al. 2001). Regardless, there is only a limited amount of studies of non-drug interventions available designed as intervention studies (Lee et al. 2002, Bytzer & Lindeberg 2007) depicting the effectiveness of non-pharmacological methods in colonoscopies.

2.5 Summary and gaps in existing literature

Pain, especially procedural pain, is a complex phenomenon with physiological, affective, sensory, cognitive and socio-cultural elements. It is procedure specific, varies notably and as an experience it is unique and subjective and is therefore demanding as a research topic. Colonoscopy is a primary procedure to diagnose and treat deseases of the colon. Earlier findings have revealed that colonoscopy patients' pain management are not consistent. Some findings recommend managing patients' pain with pain medication or sedatives (Stermer et al. 2000, Vicari 2002, Bright et al. 2003, Kulling et al. 2004, Heuss et al. 2004, Bowles et al. 2004, Faulx et al. 2005), whereas others address medication-free colonoscopy which patients seem to tolerate (Chak & Rothstein 2006, Ladas et al. 2006, Leung et al. 2008).

Many studies (Puntillo et al. 2002, Takahashi et al. 2005, Okawa et al. 2005) have demonstrated that patients suffer from pain during medical, diagnostic, therapeutic and interventional procedures and tests as well as routine procedures. It is also known, that patients' previous pain experiences or e.g. previous operations may affect to pain

experience (Naumann et al. 2004). Anxious patients may be more at risk of experiencing pain and discomfort during medical procedures.

Pharmacological pain management is in common use in procedural pain management but it may cause serious side-effects to the patients. There are lots of appropriate pain scales that can be used in different kind on situations (Manias et al. 2002, Probst et al. 2005), but it seems that they are still not in everyday use, so there is an obvious lack of studies exploring this phenomenon. There is also no congruence between the research findings of the priority of pain scales. Nurses require specific knowledge and skills to manage patients' pain. According to earlier studies they seem to use non-drug interventions when managing e.g. adults' postoperative or children' procedural pain whereas research on the usage of these methods is limited among adult procedural patients. It also seems that both nurses and physicians fail to assess patients' pain.

Some studies had fairly small samples (Lembo et al. 1998, Chlan et al 2000, Lago-Méndez et al. 2006, Armfield et al. 2006) and the cultural background of the representatives was often unclear while it is known to affect the pain experience. Lots of medical (Tu et al. 2006, Poon et al. 2007, Pambianco et al. 2008, Dewitt et al. 2008, Lee & Kim 2009, Baudet et al. 2009, Hayee et al. 2009. Ko et al. 2009, Liu et al. 2009, Hsieh et al. 2009) and odontological (Hagglin et al. 2000, Okawa et al. 2005, Lago – Méndez et al. 2006, Armfield et al. 2006, Pohjola et al. 2007, van Wijk et al. 2008) research of procedural pain and its management are available but the quantity of the research of nursing science is very limited. There is a lack of research especially concerning nurses' role in assessing and managing colonoscopy patients' pain before and during colonoscopy. The guidelines of good practice in procedural pain management exist among paediatric patients (Bhargava & Young 2007, Howard et al 2008) but these seem to be lacking among adult patients.

Figure 3 demonstrates the summary and gaps in existing literature to illustrate the importance to conduct the study concerning medication-free colonoscopy patients' pain assessment and management. To gain the latest information of the existing literature the new literature review was completed. The searches covered the period from 2000 to December 2009 (Appendix 4).

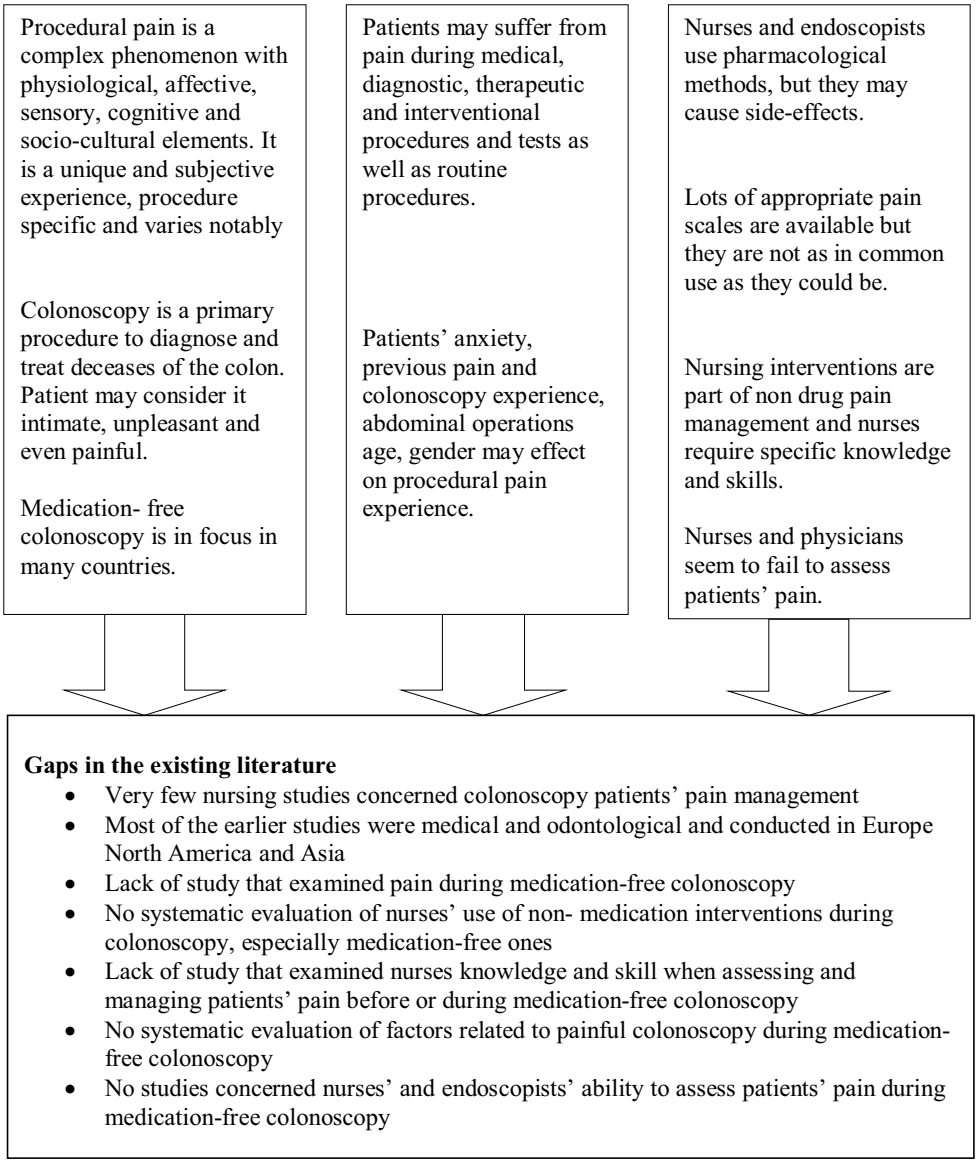

Figure 3. The summary and gaps in existing literature

3 PURPOSES OF THE STUDY AND RESEARCH QUESTIONS

The purpose of this study was: 1) to describe the expertise of nurses in managing pain during colonoscopy and (2) pain assessment during medication-free colonoscopy. In addition the purpose was (3) to describe factors affecting patients' pain experience during medication-free colonoscopy from the viewpoints of nurses, patients and endoscopists. The objective was to provide information that can be used when improving the treatment of pain during colonoscopy, especially medication-free ones, and nurses' pain education.

The following research questions were addressed:

Part 1: Nurses' expertise in pain management during colonoscopy (Article I)

What kind of knowledge and skills do nurses have in pain management during colonoscopy?

Part 2: Pain assessment during medication-free colonoscopy (Articles III and IV)

1. How adequate is the Colorado Behavioral Numerical Pain Scale (CBNPS) when assessing patients' pain intensity during colonoscopy?

2. How accurate are nurses' and physicians' evaluations of colonoscopy patients' pain compared to the estimate made by patients themselves?

Part 3: Factors affecting patients' pain experience during medication-free colonoscopy (Articles II-III)

1. How do previous colonoscopy, previous pain experience and anxiety before colonoscopy affect patients' pain experience during the procedure?

2. Which patient related factors can predict a painful colonoscopy?

3. How effective are non-drug interventions in pain management during colonoscopy assessed by patients?

4 DATA AND METHODS

The study consists of three parts. Part 1 described nurses' expertise in colonoscopy patients' pain management, whereas Part 2 described colonoscopy patients' pain assessment during medication-free colonoscopy. In addition, Part 3 described factors affecting patients' pain experience during medication-free colonoscopy. The parts of the study are illustrated in Figure 4.

4.1 Sample, data collection and analysis (Part 1)

Sample and data collection

The endoscopy nurses' enquiry was conducted during 2002 by collecting the sample with a self-completed semi-structured questionnaire presented to the nurses of the hospitals performing colonoscopies in Finland (n=44), with the exception of the one where the questionnaire was pilot-tested. The sample was drawn by mailing questionnaires (n=147) to endoscopy units to be completed by nurses. The sample consisted of registered nurses with different degrees (86%), practical nurses (11%) and porters (3%). Most of them (92%) were female, and their average age was 44 years. The numbers of nurses varied between hospitals. Most of them were district hospitals with small endoscopy units which is why it was decided to recruit three nurses from each unit.

Nurses (=116) who participated in the study focusing on nurses' knowledge and skills of colonoscopy patients' pain management were mostly (92%) female, and their average age was 44 years. Over four-fifths (86%) of respondents were registered nurses with different degrees and nearly half (49%) of them worked at the district hospitals. The nurses had an average of 10 years' work experience in the endoscopy unit.

Three questionnaires were mailed to the ward sister of each unit for subsequent distribution to the nurses. An instruction letter explaining the nature of the study was enclosed and the completed questionnaires were returned directly to the researcher in pre-paid return envelopes.

PART 1 ***Nurses expertise***	**PART 2** ***Pain assessment during medication-free colonoscopy***	**PART 3** ***Factors affecting patients' pain experience during medication-free colonoscopy***
Survey to nurses assisting colonoscopy during 2002 (Article I)	1) Testing of the instrument (CNBPS) during 2005-2006. 2) Comparison of patients' reported pain assessment to nurses' and endoscopists' observations during 2006 (Articles III and IV)	Survey to colonoscopy patients, nurses and endoscopists during 2006 (Article II and III)
Purpose: • to describe the knowledge and skills of nurses • in managing pain during colonoscopy	**Purpose:** •to evaluate the adequacy of the CBNPS when assessing patients' pain intensity during colonoscopy •to compare colonoscopy patients' reported pain assessment to nurses' and endoscopists' observations	**Purpose:** • to identify correlations between the previous colonoscopy and pain experience, preprocedural anxiety levels and pain during colonoscopy • to elucidate the factors related to a painful colonoscopy • to evaluate the affect of non-drug interventions during colonoscopy assessed by patients
Setting: • 116 nurses from 44 hospitals performing colonoscopies	**Setting:** 1) *Phase1. The expert panel* •17 expert panellists from 13 Finnish hospitals •The CBNPS translation into Finnish •Comparison of expert panellists' descriptions to those in CBNPS *Phase 2. Nurses assessment of patients' pain intensity with the CBNPS, VAS and VRS* •11 nurses assisting in 138 colonoscopies •comparison of patients' pain intensity assessed by nurses with the CBNPS, VAS, VRS 2) • 138 patients, 11 nurses and 11 endoscopists • comparison of colonoscopy patients' reported pain assessment to nurses' and endoscopists' observations • Questionnaires The expert panellists' form The nurses' questionnaire" including testing of the CBNPS	**Setting:** *Article II* • 130 patients • 11endoscopists and 11 nurses *Article III* • 138 patients • 11 nurses and 11endoscopists
• Questionnaire: The endoscopy nurses' enquiry		• Questionnaires The anxiety inventory STAI The patients' questionnaire" The nurses'questionnaire The endoscopists' questionnaire"
Statistical analysis Quantitative and qualitative content analysis	Statistical analysis Quantitative and qualitative content analysis	Statistical analysis

Figure 4. Study design and publications

The response rate was 79% (n=116) which meant that the sample could be considered representative (Abbott & Sapsford 1998, Burns & Grove 2001) and no second request was needed. The returned questionnaires were properly completed, with hardly any missing information, and none of the questionnaires were therefore rejected. The questionnaire survey was justified as a way to elicit information from a large group of nursing professionals (Burns & Grove 2001, Pierce 2009).

The questionnaire

The questionnaire "Endoscopy nurses' enquiry" (Appendix 5) was developed for this study based on earlier research, and instruments (Ristikankare 2000) and the researcher's practical experience. The questionnaire consisted of 105 closed- and 6 open-ended questions focusing on nurses' knowledge and skills of pain management during colonoscopy. The instrument was structured into six sections. Section 1 inquired about the respondents' background and endoscopy units' organisational factors (29 items). Section 2 consisted of four open-ended questions which elicited nurses' own feelings of pain and their actions and interventions used in colonoscopy patients' pain assessment and management. Section 3 (six items) comprised information about how nurses seek new professional knowledge of pain and its assessment and management. Section 4 (39 items) inquired into information about nurses' knowledge of colonoscopy patients' pain assessment and management. Section 5 (19 items) elicited information about nurses' skills in colonoscopy patients' pain management. Section 6 (14 items) comprised information about nurses' own evaluation of the level of their knowledge. The answers to Sections 1 and 4 were given on a four point Likert -type scale ranging from "totally agree" to "agree" to "disagree" and finally "totally disagree". The answers also ranged from "always" to "nearly always" to "sometimes" to "very seldom" and "not at all" This section also consisted of multiple-choice questions (e.g. 1= man, 2= women) and two open-ended questions which inquired about respondents' opinions about pain management during colonoscopy. The answers of Section 2 and 5 were given on a three point Likert-type scale ranging from "often" to "sometimes" and "not at all" or "always" to "sometimes" and "not at all". A four point Likert-type scale ranging "good" to "quite good" to "rather poor" and finally "poor" was used in Section 6. The internal consistency of the questionnaire was evaluated with Cronbach's alpha coefficient (α=0.75).

Data analysis

The data from the questionnaire completed by the nurses was analysed with statistical methods, such as frequencies and percentages and the results are presented as their distributions. The responses to the open-ended questions were analysed using quantitative and qualitative content analysis (Appendix 6). After writing down the answers to the open-ended questions, similar expressions were categorised and ranked based on their frequency of occurrence (Burns & Grove 2001, Krippendorf 2004).

4.2 Samples, data collection and data analysis (Part 2)

4.2.1 Testing of the instrument (CNBPS)

During 2005 a non-experimental approach was used. *In Phase 1* the expert panellists described medication-free colonoscopy patients' behaviour and the descriptions were compared with those of the CBNPS by the researcher. *During Phase 2* in 2006, data from medication- free colonoscopy patients and nurses was collected using questionnaires to test the CNBPS and assess patients' pain during medication-free colonoscopy.

Sample and data collection (Phase1)

The panel of experts in Phase 1 consisted of experienced endoscopy nurses (n=17) from 13 Finnish hospitals. Their expertise can be described e.g. by the following characteristics: knowledge (i.e. a professional qualification or registration) and clinical experience (i.e. an individual should have worked within an area for a certain length of time) (Baker et al. 2006). All expert panellists were registered nurses with a formal period of basic nursing education and training, including three years, 4.600 hours (EU Directive 77/452/EEC). They had a minimum of one year's experience in general nursing (European Network of Nurses Organisations' Framework 2000) as well as a clinical experience (1-15 years) assisting colonoscopy in university, central and district hospitals as well as in the private sector. They were all attending the academic year-long endoscopy nurses' specialist education which was, for the first time in Europe, based on

the European Society of Gastroenterology and Endoscopy Nurses and Associates' (ESGENA) core curriculum.

The expert panel members were asked (Appendix 7) inductively and independently to describe colonoscopy patients' facial expressions, gestures, movements and sounds on a 0–5 scale (0=not at all pain, 5=extremely pain) during the procedure (see Appendix 8 for examples of the descriptions). Next the CBNPS was translated into Finnish by the expert translator of the University of Kuopio and permission to use it was obtained.

Data analysis (Phase 1)

The descriptions of the expert panel's were analysed with methods of quantitative and qualitative content analysis. After writing down the descriptions, similar expressions were categorised and ranked based on their frequency of occurrence to provide a systematic and objective means of describing, classifying and quantifying the material. (Giacomini & Cook 2001, Burns & Grove 2001, Krippendorf 2004, Burla et al. 2008, Elo & Kyngas 2008.) Expert nurses' descriptions were then compared to the descriptors in the CBNPS by the researcher.

Sample and data collection (Phase 2)

During 2006 a quantitative descriptive survey design was adopted to evaluate the CBNPS. Assisting nurses (n=11) evaluated colonoscopy patients' pain during medication-free colonoscopy (n=138) with the CBNPS, VAS and VRS and the results were then compared to each other. All colonoscopies of the study were performed without pain medication and sedation. *All participating patients* were outpatients attending elective colonoscopy. The most common indication for colonoscopy was colorectal cancer follow-up or inflammatory bowel disease. Almost a quarter (24%) of the clinical findings was normal while in over another quarter (27%) polyps were found. Operations were performed in almost one-third (30%) of colonoscopies, the most common being polypectomy.

Nurses assisting in colonoscopies were registered nurses working permanently in the performing endoscopy unit. The length of working experience as a nurse ranged from 9 to 23 years. Two-fifths (41%) of colonoscopies were assisted by a nurse who had less

than one year's working experience in colonoscopies, and nearly two-fifths (38%) were assisted by nurses with 1–10 years' experience. The remaining (21%) colonoscopies were assisted by nurses with over 10 years' experience. Over two-thirds (68%) of colonoscopies involved nurses who assisted in 11–20 colonoscopies weekly and one-third (31%) by nurses who assisted in 6–10 procedures per week. Nurses' work experience as a nurse ranged from 9- 23 years.

The information letter incorporating informed consent to attend the study was sent, with pre-paid return envelopes to patients undergoing elective colonoscopy. To obain patients of various ages for the study, it was decided to recruit the endoscopy unit's first colonoscopy patient in the morning, which is usually an elderly person, and the first patient in the afternoon, which is usually a younger patient. The letters were sent two weeks before their procedure to give time for patients to consent to the study. Patients were asked to send their completed consent form to the endoscopy unit and to attend the unit half an hour before the examination in order to have enough time to complete the questionnaire.

The inclusion criteria for patients were as follows: aged over 20 years old, adequate eyesight and hearing, able to complete questionnaires, ability to use the VAS and voluntary participation in the research. *The exclusion criteria were*: dementia, psychiatric illness and mental deficiency. According to the National Advisory Board on Research Ethics in Finland (2002), prisoners, pregnant or breastfeeding women were also excluded from the study.

Before the study the researcher provided personnel with instructions on how to use the CBNPS, VAS and VRS. Prior to colonoscopy the CBNPS was placed in the endoscopy room's closet door so that patients were unable to see it but it was easy for assisting nurses to look at. The colonoscopy was divided into four phases: 1) when the procedure began, i.e., when the scope was inserted into the rectum; 2) when the tip of the colonoscope passed the flexure lienalis; 3) when the tip of the colonoscope was in the caecum; and 4) when the procedure was completed. The assisting nurse evaluated patients' pain retrospectively with the CBNPS when the endoscopist announced the next phase and wrote down the assessment scores. During the procedure they observed

patients' pain intensity and after the procedure wrote down the total assessment scores of patients' pain intensity measured with the CBNPS and both the VAS and VRS.

Questionnaire (Phase 2)

The questionnaire for nurses "*Testing the CBNPS*" consisted of the CBNPS, VAS and VRS and it included the "Nurses' questionnaire" (Appendix 9). Patients' pain intensity was assessed with the CBNPS including behavioural observational descriptors on a 0–5 scale (0= restful, no facial expression, 1= moaning, frowning, restless, 2= facial grimacing, protective body positioning, 3= resistive, crying out, 4= yelling, tossing, 5= combative) and both VRS (1=no pain at all; 2= pain to some extent, 3= moderate pain; 4= extreme pain) and the VAS with a 100mm horizontal line. The left end (0 mm) represents the first sentence ("no pain at all") and the right end (100 mm) represents the last sentence ("extreme pain") of the VRS.

Data analysis (Phase 2)

Statistical analysis was carried out using SPSS® 14.0 software (SPSS Inc.,Chicago, IL, USA) The p-value less or equal to 0.05 was treated as statistically significant (Burn& Grove 2001, Landau & Everitt 2003). Statistics such as frequencies and percentages were used to describe the background factors of the nurses and patients, nurses and clinical characteristics of the colonoscopies. Spearman correlation coefficients were used to measure the correspondence between nurses' assessment of colonoscopy patients' pain intensity with the CBNPS to their assessment of patients' pain with the VRS and VAS.

4.2.2 Comparison of patients' reported pain assessment to nurses' and endoscopists' observations.

Sample and data collection

A cross-sectional descriptive study was conducted in a Finnish university hospital using questionnaires to compare colonoscopy patients' reported pain assessment to nurses' and endoscopists' observations. The sample of 138 colonoscopy outpatients undergoing elective medication-free colonoscopy, 11 nurses and 11 endoscopists working

permanently in the endocopy unit was recruited in 2006. In this part of the study the patients' inclusion and exclusion criteria, their recruitment and nurses' and patients' background knowledge were identical to those in Part 2, Phase 2 (p.37-38).

During colonoscopy nurses evaluated the degree of difficulty of the colonoscopy and observed patients' pain intensity (Appendix 9) as did endoscopists (Appendix 10). *Thirty to 60 minutes after the procedure* patients completed their questionnaire ("Patients' questionnaire") focusing on patients' previous pain and colonoscopy experience and the degree of pain during the procedure (Appendix 11).

Questionnaires

The questionnaires ("Patients' questionnaire", "Nurses' questionnaire" and "Endoscopists' questionnaire") concerning the degree of pain during the procedure were specifically developed based on the researcher's practical experience and earlier instruments (Ristikankare 2000). All questionnaires included items with the VRS (e.g. 1=no pain at all; 2= pain to some extent, 3= moderate pain; 4= extreme pain) and the VAS with a 100mm horizontal line. The left end (0 mm) represents the first sentence ("no pain at all") and the right end (100 mm) represents the last sentence ("extreme pain") of the VRS (Appendices 9, 10 and 11). Both the VRS and VAS are considered reliable, valid and appropriate for use in clinical research (Breivik et al. 2000, Coll et al. 2004, Williamson & Hoggart 2005, Skovlund et al. 2005). Spearman's Rho correlation coefficients for the results (p= .602-.846) of the same items' with the VAS and with the VRS indicated a statistical correlation between scales.

4.3 Samples, data collection and data analysis (Part 3)

During 2006 a quantitative descriptive survey design was implemented to identify correlations between the previous colonoscopy and pain experience, preprocedural anxiety levels, non-drug interventions and pain intensity during colonoscopy. The survey was also designed to elucidate the factors related to a painful colonoscopy experience.

Samples and data collection

The study samples were recruited from outpatients undergoing elective colonoscopy (n=130), 11 nurses and 11 endoscopists working permanently in the endoscopy unit where the study was implemented. Samples were collected with questionnaires to patients, nurses and endoscopists. The patients' inclusion and exclusion criteria, their recruitment as well patients' and nurses' background knowledge were identical to those in the Part 2, Phase 2 (p. 37-38). Two-thirds (66%) of colonoscopies were completed by endoscopists (n=11) who had more than four years' of colonoscopy experience and nearly one-third (30%) were completed by endoscopists with one to four years of colonoscopy experience. The remaining (4%) procedures were performed by endoscopists with less than one year of experience. The endoscopists' working experience as a physician ranged from one to 35 years. Over half (56%) of colonoscopies were completed by endoscopists who performed 11–20 examinations weekly and one-third (30%) by those who performed 6–10 colonoscopies a week. Twenty (14%) were completed by endoscopists who examined 1–5 colonoscopy patients a week.

It was difficult to carry out sample size calculations because of the complex data collection methods, which included questions and variables about Finnish patients and pain management practices (e.g. there is use of far less sedation and medication in Finland compared with other countries where earlier studies were done). It was decided that this volume of data could be collected without generating higher costs or a greater workload for endoscopy staff and still provide reasonable results (see Figure 4, p. 34).

Before colonoscopy patients completed the Spielberger State Trait Anxiety Inventory (STAI) (Appendix 12) designed to measure trait and state anxiety (Spielberger 1983). Nurses completed their questionnaire ("Nurses' questionnaire") items concerning patients' demographic information and their clinical characteristics and observed patients' nervousness. *During colonoscopy* nurses used non-drug interventions. They also evaluated the degree of difficulty of the colonoscopy and observed patients' pain intensity (Appendix 9) as did endoscopists. They used "Endoscopists' questionnaire" (Appendix 10) and also registered colonoscopy findings and operations carried out

during the procedure. Nurses recorded detailed insertion time i.e. intubating caecum, withdrawal time and total endoscopy time (Appendix 9).

Thirty to 60 minutes after the colonoscopy patients completed the second questionnaire ("Patients' questionnaire") focusing on patients' previous pain and colonoscopy experience and the degree of pain during the procedure. The effect of non-drug interventions was measured by asking the patients to assess how much nurses' peaceful talk, explaining the reason for pain and guidance helped them to cope with the pain (Appendix 11).

Questionnaires

The STAI is a two-part 40-item self-report (Appendix 12). It is a widely used scale for the evaluation of anxiety (Smolen et al. 2002, Nijkamp et al. 2004), and it is simple to use and easy to score. The trait anxiety statements measure the person's general disposition, whereas the state anxiety statements indicate how the person feels at the time. The instrument is rated on a four-point Likert-scale and responses range from one (not at all) to four (very much so). A weighted score (1- 4) is given to each item, the higher scores indicating higher levels of anxiety. The maximum anxiety scale is 80 and minimum 20. (Spielberger et al. 1983.) The inventory was first translated into Finnish and permission to use it was obtained.

The questionnaires completed by patients, nurses and endoscopists in this study were specifically developed based on the researcher's practical experience and earlier instruments (Ristikankare 2000). All questionnaires included items with the VRS and VAS that are considered reliable, valid and appropriate for use in clinical research (Breivik et al. 2000, Coll et al. 2004, Williamson & Hoggart 2005, Skovlund et al. 2005). Spearman's Rho correlation coefficients for the results (p= .602-.846) of same items' with the VAS and with the VRS indicated a statistical correlation between scales.

The "Patients' questionnaire" was completed after the procedure and consisted of multiple-choice questions focusing on patients' previous pain (1=yes; 2=no) and colonoscopy (1= yes; 2= no) experience. First the verbal rating was used to measure the patients' preprocedural anxiety; (1= extremely calm; 2= calm; 3=anxious, 4= extremely

anxious), pain intensity during colonoscopy: (1=no pain at all; 2= pain to some extent, 3= moderate pain; 4= extreme pain) and the effect of non-drug interventions: (1=very much; 2=much; 3=to some extent; 4=none at all). Secondly the VAS with a 100mm horizontal line was adapted. The left end (0 mm) of the scale represents the first sentence (e.g.“no pain at all”) and the right end (100 mm) represents the last sentence (e.g.“extreme pain”) of the VRS. The “Nurses’ questionnaire” was completed before and after the procedure and included the same items concerning patients’ preprocedural anxiety and pain intensity during colonoscopy as the “Patients’ questionnaire”. In addition, seven items concerning patients’ demographic information, their clinical characteristics and nurses’ own background information (four items) were part of this questionnaire. The “Endoscopists’ questionnaire” was also completed before and after the procedure and included three items consisting of findings and operations carried out during the procedure and also the same items concerning patients’ preprocedural anxiety and pain intensity during colonoscopy as the “Patients’ questionnaire”.

Data analysis

Statistics such as frequencies and percentage distributions and cross-tabulation were used to describe the background factors of the patients, nurses and endoscopists and the clinical characteristics of the colonoscopies as well as the results of the Likert-scaled items concerning previous colonoscopy and pain experience, and the effect of non-drug interventions used during colonoscopy. Likert-scaled variables also measured patients’ pain in four classes: “no pain at all”, “pain to some extent”, ‘‘moderate pain” and ‘‘extreme pain”. These groups were reclassified into two classes combining the first two and last two classes together: “not painful” and “painful patients”. It was chosen as a natural cut-off point because colonoscopy is always an unpleasant experience. The univariate independent samples t-test and Pearson chi-square test were used to explore whether there were differences between ‘‘painful” and ‘‘not painful” patients in terms of possible factors that might be used to predict painful colonoscopy. A multivariate logistic regression model was used to assess the risk factors of the painful colonoscopy while simultaneously assessing how well painful and non-painful patients can be differentiated by this model. A linear mixed model was used to compare the pain assessments of patients, nurses and endoscopists. Statistical analysis was carried out using SPSS®14.0 software (SPSS Inc., Chicago, IL, USA). The p-value less or equal to

0.05 was treated as statistically significant (Burns & Grove 2001, Landau & Everitt 2003).

As variables of the VAS were very skewed, the differences between categories comprising sex, previous colonoscopy and pain experiences, pain intensity, as well as non-drug interventions used during the procedure, was tested by non-parametric tests (Burns & Grove 2001). The statistical significance of differences was determined through the Mann-Whitney U-Test and Kruskal-Wallis Test. These tests were also used to determine the relationships between background factors (age, gender and abdominal operations) and caecal intubation and withdrawal times. Spearman correlation coefficients for the results were used to measure the dependence between items, as likewise was the Pearson chi-square test. (Vivar et al. 2007.)

5 STUDY ETHICS

Study ethics includes the norms concerning the researcher's responsibility for the research and the subject's rights (Abbott & Sapsford 1998, Burns & Grove 2001, Flory & Emanuel 2004). In this study the researcher gave assurances of confidentiality to the participants and reported data in such a way that the source could not be identified in the discussion on the results. The researcher stored the data securely and used a system of coding to protect the individuals' identity during the process of data analysis and in the results' publication. Before the data collection each of the studies was approved by the nursing director or the medical director of each hospital (Part 1) and by the research ethics committee of the hospital district (decision number 11/2006) where the study was implemented (Parts 2 and 3).

The individuals who participate in a study have the right to the freedom of choice to consent or decline to participate in the research. They have the right to dignity, confidentiality and privacy and protection from harm and discomfort. Adequate and understandable information regarding the research and the benefits and risks of the research must be provided to them. To protect attending individuals and to improve their understanding of forthcoming research (Flory & Emanuel 2004, Burns & Grove 2001, Polit & Beck 2006) an information letter was sent which briefly explained the aim of the study, and in accordance with the ethical guidelines it indicated that the identities of the participating hospitals and participants would not be revealed. It also guaranteed that participation was voluntary and assured the patients that a refusal to attend would not affect their care and that answers would remain confidential. It was also explained that participating in the study did not prevent patients from receiving sedation or pain medication during colonoscopy. Before colonoscopy and possible attendance in the study, participants had the opportunity to contact the performing endoscopy unit and the researcher to discuss the procedure and the research. In this study all participating patients gave written informed consent to participate in the study. A basic description of the study, principles of confidentiality and voluntary participation were discussed with the participating nurses and endoscopists by the researcher, whose contact information was also given to the staff.

According to the National Advisory Board on Research Ethics in Finland (2002) good scientific practice and research ethics include accurate planning and conducting of research, ethically sustainable data collection as well as recording, presenting, reporting and judging research results according to the standards set for scientific knowledge. Before starting the research project rights, co-authorship, liabilities and obligations of the members of a research team must be determined and recorded in a manner acceptable to all members. The sources of financing relevant to the conduct of research must be announced to the members in the research and reported when the findings are published. Commitment to good scientific practice is up to each researcher and each member of a research team individually.

In this study carefully planned research processes, review of the earlier literature of colonoscopy patients' pain assessment and management to clarify the research topic, the making of methodological decisions and the open and honest reporting of the processes of data collection and analysis were the tools used to ensure ethical research. The inclusion and exclusion criteria were also made to protect participating patients. The participating patient had to be over 20 years old, have adequate eyesight and hearing and be able to complete questionnaires, have the ability to use a VAS and want to voluntarily participate in the research. Patients who had dementia, psychiatric illness and mental deficiencies, as well as prisoners and pregnant or breastfeeding women were excluded from the study.

6 RESULTS

6.1 Nurses' expertise in colonoscopy patients' pain management

Nurses' expertise in colonoscopy patients' pain management is discussed in two sections as follows: (1) nurses' knowledge of pain management during colonoscopy; and (2) nurses' skills in management of pain during colonoscopy. The results are based on article I. Figure 5 summarises nurses' expertise in colonoscopy patients' pain management.

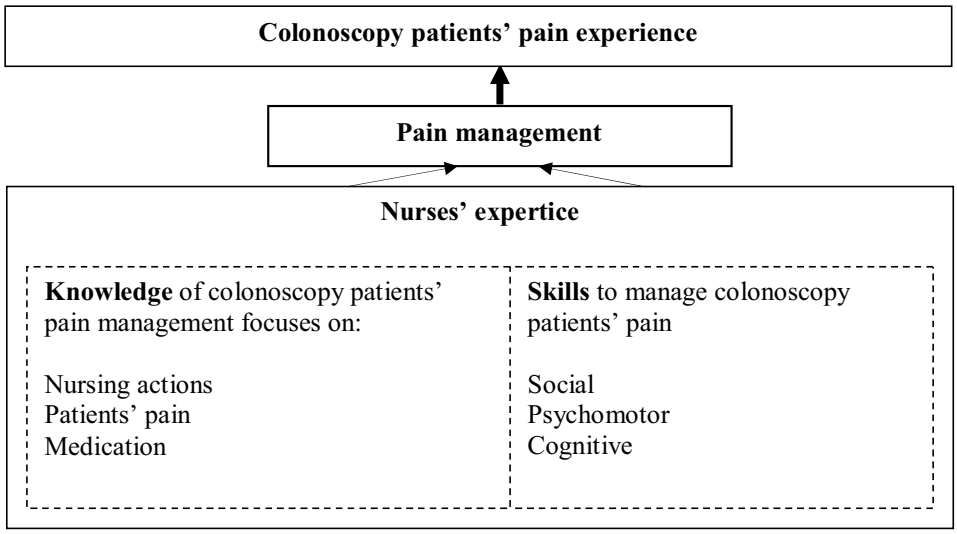

Figure 5. Summary of nurses' expertise in colonoscopy patients' pain management

6.1.1 Background factors

One-fifth (19%) of the nurses had had training in pain management. Most (74%) of the nurses occasionally attended Finnish nursing education/training symposia, but attendance at international nursing or medical conferences was rare. Half of the nurses never read or consulted nursing publications for information, and two-thirds never searched for professional knowledge on the Internet. About a fifth (22%) of nurses never searched professional information from the library and pain education and the acquisition of new professional knowledge was rarely reported. Most (95%) hospitals

did not use pain scales (Table 4) and ethical conversation was lacking amongst endoscopy staff. The nursing philosophy was locally developed in half (58%) of the endoscopy units, and only a few (16%) units encouraged nursing staff to discuss the ethical guidelines. In two-fifths (40%) of the hospitals, the whole staff had discussed ethics of pain management.

Table 4. Nurses' methods to measure patients' pain intensity during colonoscopy (n=116)

Nurses' methods to measure patients' pain intensity during colonoscopy	Always		Sometimes		Never		Total	
	n	%	n	%	n	%	n	%
Pain scales	4	3	16	14	95	83	115	100
Observation of patients' behaviour	111	97	4	3	0	0	114	100
Observation of patients' physiological changes	72	63	43	37	0	0	115	100
Documentation of the degree of pain and interventions used	21	18	62	54	32	28	115	100

6.1.2 Nurses' knowledge of pain management during colonoscopy

The majority (94%) of nurses agreed that, when assessing pain, it is best to ask the patient. The opportunity for pain medication should be offered to every patient without waiting for a request. Nearly all nurses (97%) agreed that patients should be monitored when administered pain medication or sedatives. Nurses' presence and conversation with the patient had a positive effect on the patient's pain experience. Nearly three-quarters (71%) of the nurses pointed out that the best pain alleviation is patient education and counselling before the procedure, and nearly all (96%) agreed that telling patients about pain does not increase pain. All nurses used non-drug interventions when managing colonoscopy patients' pain (Table 5).

Most (96%) respondents agreed that pain medication or sedatives do not cause addiction to the patients, and over four-fifths (81%) said that an appropriate dose does not change the patients' vital functions significantly. Still, half of the respondents agreed that

sedatives cause respiratory depression, and two-thirds said that pain medication and sedatives cause hypotension. Four-fifths (79%) considered a combination of sedative and pain medication to be the optimal choice. (Table 5.)

Table 5. Nurses' knowledge of colonoscopy patients' pain management focused on nurses' action and medication

Nurses' knowledge of colonoscopy patients' pain management	**Agree**		**Disagree**		**Total**	
	n	%	n	%	n	%
Focus on nurses' action:						
When assessing pain, it is best to ask the patient	109	94	7	6	116	100
Opportunity for pain medication should not be offered to every patient but wait for a request.	8	7	108	93	116	100
Patients vital functions should be monitored when administered pain medication or sedatives	113	97	3	3	116	100
Nurses' presence has a positive effect on the patient's pain experience	107	94	7	6	113	100
Nurses' conversation with the patient had a positive effect on the patient's pain experience	115	99	1	1	116	100
The best pain alleviation is patient education and counselling before the procedure	83	71	33	29	116	100
Telling about pain increases it	5	4	111	96	116	100
Nurses should use non-drug interventions in pain management	116	100	0	0	116	100
Focus on medication:						
Pain medication causes addiction	4	4	111	96	115	100
An appropriate dose does not change the patients' vital functions significantly	98	86	16	14	114	100
Sedatives cause respiratory depression	61	53	53	47	114	100
Pain medication and sedatives cause hypotension	76	66	39	34	115	100
A combination of sedative and pain medication the optimal choice	91	79	24	21	115	100

In their responses to the open-ended questions most nurses said that they based their knowledge of pain management during colonoscopy on their own practical experience (n=69), colleagues' advice (n=28) and patients' experiences (n=18).

6.1.3 Nurses' skills in management of pain during colonoscopy

Over four-fifths (81%) of the nurses said that the atmosphere during colonoscopy allowed for conversations between patient, nurse and endoscopist. Calm talk, to explain the reason for the pain to the patient was used by nearly every member of the nursing staff. Only half of the nurses said that they tried to distract the patient's thoughts away from the pain. Most of the nurses explained the meaning of the patient's symptoms, always educated their patients individually and explained the cause of pain and how the patients could deal with the pain themselves. They forewarned of upcoming pain during the examination, but never used calming music in the colonoscopy room (Table 6).

Working steadily was considered important by most (97%) nurses. They always kept the patient warm and dry and in a relaxed position, and observed the tension and relaxation of the patient's muscles during colonoscopy. They noticed the patient's hyperventilation, but nearly half (46%) of them asked the patient to breathe into a paper bag to calm down the situation. They advised the patient to give off gas, so that the bowel would not be stretched and propped up or pressed down the abdomen (Table 6).

6.2 Pain assessment during medication-free colonoscopy

Pain assessment during medication-free colonoscopy is discussed in the following sections: (1) the adequacy of the CBNPS in colonoscopy patients' pain assessment (2) nurses' and endoscopists' capability to evaluate colonoscopy patients' pain. The results are based on the papers III and IV.

Table 6. Nurses' social, cognitive and psychomotor skills in colonoscopy patients' pain management

Nurses' skills	Always		Sometimes		Never		In total	
	n	%	n	%	n	%	n	%
Social skills								
Able to maintain soothing conversation	93	81	22	19	0	0	115	100
Able to talk calmly and explain the reason for the pain to the patient	109	95	6	5	0	0	115	100
Able to lead the patient's thoughts away from pain	54	47	50	50	4	3	108	100
Cognitive skills								
Able to explain the potential risk of pain	63	55	44	38	8	7	115	100
Able to explain the meaning of breathing into a paper bag	79	70	27	24	7	6	113	100
Able to educate the patient individually	82	71	32	28	1	1	115	100
Psychomotor skills								
Able to work steadily	113	97	3	3	0	0	116	100
Able to keep the patient in a relaxed and comfortable position	95	83	20	17	0	0	115	100
Able to press down/prop up the abdomen	56	49	59	51	0	0	115	100
Able to advise the patient to breathe into a paper bag during an episode of hyperventilation	52	46	50	45	10	9	112	100
Able to observe and relax the tension of the patient's muscles	99	86	16	14	0	0	113	100
Able to advise the patient to give off gas	89	78	20	17	6	5	115	100
Able to notice hyperventilation	89	79	22	20	1	1	112	100

6.2.1 The adequacy of the CBNPS in colonoscopy patients' pain assessment

Expert panellists' descriptions of patients' facial expressions, gestures, movements and sounds on a 0–5 scale during medication-free procedure were found to be similar to those of the CBNPS (Appendix 8). The assessment of colonoscopy patients' total pain intensity with the CBNPS had a statistically significant correlation with the pain assessment during the phases of colonoscopy: after flexure lienalis (r=.573), after caecum (r=.581), and at the end of the procedure (r=.233). Spearman's Rho correlation coefficients for the results (p = 0.602–0.846) of the same items with the VAS and the VRS indicated a statistical correlation between the scales in assessing colonoscopy patients' pain intensity. The total pain assessment with the CBNPS correlated statistically significantly with the assessment of the total pain intensity of the VRS(r= .551) and with VAS (r=.517) giving parallel results. Assisting nurses announced that the CBNPS was easy to use. See more details from the original article IV (Appendix 13).

6.2.2 Nurses' and endoscopists' capability to evaluate colonoscopy patients' pain

The mean pain intensity assessed by patients, nurses and endoscopists was 3.8 (95% CI: 3.3–4.2), 2.7 (95% CI: 2.3–3.2) and 2.7 (95% CI: 2.3–3.2) respectively. Both nurses and endoscopists evaluated patients' pain intensity by an average of one unit less (95% CI: 0.6–1.3, $p < 0.001$) than patients. Nurses' and endoscopists' evaluations did not differ significantly from each other (p = 0.992).

6.3 Factors affecting patients' pain experience during medication-free colonoscopy

Factors affecting patients' pain experience during medication-free colonoscopy are discussed in the following sections: 1) effects of previous colonoscopy experience, previous pain experience and preprocedural anxiety; 2) effect of non-drug interventions on pain experience; and 3) factors predicting painful colonoscopy. The results are based on the papers II and III.

6.3.1 Effects of previous colonoscopy, previous pain experience and preprocedural anxiety

Colonoscopy was painful to some extent for more than half (58%) of the respondents, moderately painful to just over one fifth (21%), not at all painful to one-sixth (17%), and extremely painful to five patients (4%). The median of the VAS responses was 3.4. Women evaluated the colonoscopy as more painful than men (p =<0.001). Almost two-thirds (62%) of respondents found the colonoscopy easy, less than one-sixth (15%) found it very easy, and nearly one-quarter (23%) of respondents found it difficult. None found it very difficult. The median of the VAS responses was 2.7. Women evaluated colonoscopy to be more difficult than men (p =<0.001).

Nearly three-quarters (70%) of patients had *previous experience of colonoscopy*. Over one-third (34%) of patients admitted that the examination had been easier than the previous one. Nearly one-third (30%) stated that the examination had been similar to the previous one, and nine patients (7%) considered that it had been more difficult than the previous one. There was no difference between men and women in previous experience of colonoscopy. Previous colonoscopy experience had no effect either on patients' evaluation of pain during colonoscopy or on their evaluation of the difficulty of colonoscopy.

More than four- fifths (84%) of patients had had a *previous pain experience* which impacted on their evaluation of the difficulty of colonoscopy (p=.010) and their evaluation of pain during colonoscopy (p=.002). Men's and women's statistical comparisons differed significantly from each other (p=. 016). See more details from the original article II (Appendix 13).

Medians of the STAI responses were both 36. Women's state (p=.027) and trait *anxiety* (p=.038) was higher than men's. There was a statistically significant correlation between state anxiety and trait anxiety (r= .550). Previous colonoscopy or pain experience had no effect on either state or trait anxiety whereas state anxiety has an impact on the evaluation of the difficulty of colonoscopy (r=.271) and pain during it (r=.261). See more details from the original article II (Appendix 13).

6.3.2 Patient related factors predicting a painful colonoscopy

Gender, the degree of patient's nervousness and the technical difficulty of the colonoscopy, regardless of assessor (patient, nurse or endoscopist), were the major factors leading to patients' pain during colonoscopy. The percentage of females in the painful patient group was nearly twice that of the not painful patient group (73% versus 39%). Patients' nervousness and the technical difficulty of the colonoscopy were assessed as being higher, on average, in the painful patient group. Age, previous colonoscopy, abdominal operation and operations during colonoscopy as well as endoscopist's experience were not related to patients' pain.

As there were correlations between assessors (nurses and endoscopists) in patients' nervousness (Spearman's r = 0.69) and the technical difficulty of the colonoscopy (Spearman's r = 0.26), their mean value, in addition to gender, were used as explanatory variables in a multivariate logistic regression model. Patients' own assessment of nervousness and the technical difficulty of the colonoscopy were excluded from the model since predictors that are easily available were required. In this model gender was no longer statistically significant (the odds ratio of a painful colonoscopy was 0.50 for male versus female with 95% CI: 0.19–1.37 and p = 0.177). Odds ratios for the one unit increase of nervousness and technical difficulty were 1.64 (95% CI: 1.2–2.2) and 1.61 (1.3–2.0) respectively.

Another logistic regression model was modified to predict a painful colonoscopy in order to select patients who would need sedation or pain medication. Technical difficulty was excluded from the model as this is unknown prior to colonoscopy. In the data of this study 33% of painful and 8% of not painful patients were predicted to be painful in this model. In the first model (where technical difficulty was included) the corresponding figures were 42% and 8% (see more details from the original article III) (Appendix 13).

Over three-quarters (76%) of respondents reported either no pain at all (17%) or mild pain (59%). They evaluated the intensity of pain as 2.7 (range 0–9.1) in VAS. The remaining respondents (nearly a quarter) had moderate pain (20%) or extreme pain

(4%), with a median of 6.9 (range 4.3–9.8) in VAS. Over three-quarters (76%) of respondents agreed that colonoscopy was easy while almost a quarter (24%) judged it as difficult. The median VAS value for the difficulty of colonoscopy was 2.9 ranging from 0 to 9.5. Over one-fifth (22%) of patients compared colonoscopy pain to muscular cramp and almost one-fifth (19%) to dental pain, e.g. drilling. Almost one-third (29%) compared it to some other pain such as flatulence, a cramped feeling in the stomach or migraine. Some women (13%) compared it to delivery pain. Abdominal operations, operations during colonoscopy, indication for colonoscopy or the endoscopist's experience had no effect on patients' pain intensity.

The caecal intubation rate was 100%. The median caecal intubation time was 9.5 minutes, ranging from 2 to 59 minutes. Neither abdominal operations ($p = 0.571$) nor age ($p = 0.671$) affected this. The caecal insertion time was faster ($p = 0.009$) among males (median 8 minutes, range 2–39) than females (median 10.5 minutes, range 3–59). The median withdrawal time was 13 minutes, ranging from 2 to 109 minutes. Neither abdominal operations ($p = 0.094$) nor age ($p = 0.869$) were related to this. The withdrawal time was faster ($p = 0.027$) in women (median 11 minutes, range 2–55) than in men (median 13 minutes, range 2–109).

6.3.3 Effects of non-drug interventions on pain experience assessed by patients

Nearly two-fifths (39%) of the patients (n=130) agreed that nurses' peaceful talk helped them very much, and nearly two-fifths (38%) of them were of the opinion that it helped greatly in pain management. The median of the responses was 1.9. More than one-quarter (28%) agreed that explaining the reason for the pain helped them very much and for half (50%) of them it helped a lot. The median of the responses was 2.5. Guidance from nurses was very helpful for one-third (33%) of the patients, and more than two-fifths (42%) of them received considerable help from their guidance. The median of the responses was 2.5. There was no difference between men's and women's responses related to nurses' peaceful talk, explaining the reason for pain and nurses' guidance. Patients were divided into four state anxiety groups: no anxiety = 20- 34 scores (n= 49), some anxiety = 35- 49 scores (n=66), moderate anxiety = 50- 64 scores (n= 15), and

extreme anxiety = 65- 80 scores (n=0), and they were compared to the patients' opinions about the nurses' calm talk, explanations of the reasons for pain, and to the advice given. There was no difference between groups (see more details from the original article II, Appendix 13).

6.4 Summary of the main results

The main results of this study are summarised below:

1) The majority of nurses used non- drug interventions to manage pain. They had practical based knowledge and skills of pain management during colonoscopy and it appeared that nurses seldom sought new professional information and failed to use pain scales.

2) The CBNPS gave the same kinds of results as the VRS and VAS when assessing colonoscopy patients' total pain intensity and the pain during the phases of colonoscopy. Assisting nurses announced the CBNPS easy to use.

3) It appeared that both nurses and endoscopists evaluated patients' pain intensity less than did patients.

4) Over three-quarters of patients reported mild pain or no pain at all and agreed that colonoscopy was easy. Women evaluated colonoscopy as painful but more difficult than did men. More than four fifths of patients had had a previous pain experience and they evaluated colonoscopy more difficult and painful than did patients without previous pain experience. Women's state and trait anxiety was higher than men's. Patients with high state anxiety levels evaluated colonoscopy as more difficult and painful than did patients' with lower state anxiety level. According to both female and male patients nurses' non-drug interventions helped them in pain management. Non-drug interventions also helped both anxious and not anxious patients.

5) The degree of patient's nervousness was the major factor in predicting patients' pain during colonoscopy. For example age, previous colonoscopy, abdominal operation and operations during colonoscopy were not related to patients' pain.

7 DISCUSSION

7.1 Validity and reliability

Internal and external validity are employed to evaluate the adequacy of research control mechanisms and research design (Burns & Grove 2001). Internal validity indicates the degree to which a questionnaire measures what it is assumed to measure, i.e. it is the extent to which the results founded in the study are a true reflection of the reality. The internal validity types are: construct (including convergent**,** discriminant validity), content and criterion validity. The external validity addresses the generalisation of the research findings referrering of the findings to other settings or samples (Burns & Grove 2001).

Reliability is the degree of consistency with which an instrument measures the attribute it is designed to measure. Stability, equivalence and internal consistency are important features in the assessment of reliability. In this study, Cronbach's alpha test for scale reliability was used to assess the internal consistency of the questionnaire (Burns & Grove 2001). In the present study, the following alpha values were obtained: Part I, nurses' knowledge and skills (α=0.75 and α =0.70) and Part II, anxiety, previous pain experience, non-drug interventions, (α= 0.72), factors related to pain and its assessment (patients α =0.70, endoscopists α 0.70, and nurses 0.71). The alpha values showed the instruments to be internally consistent.

Internal validity

Convergent and discriminant validity and are ways to measure construct validity (Burns & Grove 2001). *The convergent validity* shows that the assessment is related to what it should theoretically be related to i.e. there must be a correspondence or convergence on other tests that are designed to measure the same subjects in focus. High correlations between the test scores would be evidence of a convergent validity. *The discriminant* validity measures of constructs that theoretically should not be related to each other e.g. scores of the questionnaire measured before, during and after the procedure. In this study *the construct validity* was attempted to increase by using previously validated instrument as parts of the questionnaires developed for the study e.g. the STAI is used in research (Smolen et al. 2002, Nijkamp et al. 2004, Vaughn et al. 2007, Ciccozzi et al. 2007,

Ramos et al. 2006) as well as the CBNPS, VAS and VRS (Breivik et al. 2000, Bijur et al. 2001, Salmore 2002, Coll et al. 2004,Williamson & Hoggart 2005, Skovlund et al. 2005). Efforts were made to improve *the content validity* of the instruments used by using expert panels and developing instruments based on the existing scientific knowledge, previous instruments (e.g. Ristikankare 2000) and the researcher's experience.

In the first part of the study the questionnaire was pre-tested with nurses (n=12) assisting colonoscopies in two Finnish hospitals. An assessment letter was attached to the questionnaire, in which the respondents were given an opportunity to evaluate the content and clarity of the questions and the time they needed to complete it. Based on the information from the pilot test, some questions were re-formulated into a more understandable form by revising the sentence structure. The questionnaire was considered slightly too long, but the period of 30 minutes needed to respond was considered reasonable.

In the second and third parts of the study an expert panel of five endoscopy nurses and three endoscopists was used before the data collection to assess the clarity of the questionnaires. In consultation with the researcher they revised the questionnaires. In addition, two questions were added so as to obtain more specific information concerning the actual implementation of colonoscopy. Subsequently, both questionnaires were presented to five colonoscopy patients, who were also included in the study. Patients agreed that the questionnaires were easy and quick to complete. When the adequacy of the CBNPS was tested, the expert panellists of endoscopy nurses (n=17) were first called on to describe inductively colonoscopy patients' facial expressions, gestures, movements and sounds. The panel members were experienced endoscopy nurses from 13 Finnish hospitals and therefore they were assumed to be the best informants. The descriptions made by them were found rich. However, it might have been easier for some panellists to describe colonoscopy patients in pain in an interview.

The patients of various ages attending the study were not medicated, thus it was possible to have a clear understanding of patients' pain experience, without amnesia and

disorientation caused by medication. However, this may complicate the comparison of results with other studies. With regard to nurses and endoscopists in the second part of the study, all professionals working regularly in the endoscopy unit were the study was implemented, were included in this study and all of them actively took part. *The criterion validity* of the study was not achieved, because the questionnaires used were employed for the first time and it was impossible to reflect the results against the results obtained by another instrument.

The external validity

In the first part of the study the sample consisted to a notable extent of district hospitals' nursing professionals. No far-reaching conclusions concerning patients' pain management during colonoscopy procedures can be made, and the study does not aim at generalisations, but it does yield new findings concerning colonoscopy nurses' knowledge and skills in managing pain as a result of colonoscopy. The importance of this theme might explain the good response rate of nurses (79%). Anonymity may have given the nurses an opportunity to describe their actions realistically, but they might also have described ideal actions rather than reality. The fast pace and the pressure of work might have disturbed the circumstances of completing the questionnaire and also shifted the respondents' focus and affected the quality of their answers. The nurses answered the questionnaire sufficiently, and the answers to the open-ended questions were rich. However, it might have been easier for some respondents to discuss their feelings and opinions in an interview.

The second and the third part of the study were conducted in one Finnish university hospital. The external validity could have been reinforced by collecting data from more than one hospital. The external validity of the study was decreased because 22% of patients refused to take part in the study, which may reflect the complexity of feelings patients experience ahead of colonoscopy. Participating in the research might have felt like a burden to them. Many patients were also excluded from the study and this further decreased the sample size. The anonymity may have provided patients with an opportunity to describe their experience realistically, but they might also have downplayed their experience of pain. The current invasive procedure may have interrupted the circumstances of completing questionnaires, shifted the patients' focus

and affected the quality of their answers. However, the results may be fairly representative of people who attend screening colonoscopies without medication but results need to be confirmed in a study with a broader sample. Nurses and endoscopists were familiarised with the study design and complete the questionnaires which they did satisfactorily. However, the results might be different in other hospitals owing to the distinctions between staff and their work experience. The second and the third parts of our study were designed as a study of colonoscopy without medication, rather than as a trial comparing different approaches.

Validity of open- ended questions

As regards the validity of open ended questions, it is essential for the researcher to analyse the questions and to find categories that soundly correspond to content. The material was typed out, and mutually similar expressions were categorised and ranked based on their frequency of occurrence by the researcher (Giacomini & Cook 2001, Burns & Grove 2001, Krippendorf 2004, Burla et al. 2008, Elo & Kyngas 2008) who herself also possessed great endoscopy experience.

7.2 Discussion of the results

The study consisted of three parts. Part 1 described nurses' expertise in colonoscopy patients' pain management. Part 2 described pain assessment during medication-free colonoscopy whereas Part 3 evaluated factors affecting patients' pain experience during medication-free colonoscopy. The details of the main results are discussed in the following sections:

7.2.1 Nurses' expertise in colonoscopy patients' pain management

This study showed that the nurses considered their knowledge to be based on practice and acquiring education and that seeking new professional knowledge was minimal**.** This result is similar to that reported by (Goni Leranoz & Perez de Albeniz Crespo 2009), but is contradictory to colonoscopy nurses' own opinion, which claimed that

skilful nurses should update their knowledge regularly. Competence assessment and competency assurance of healthcare professionals are now being highlighted as aspects of patients' safety and error prevention (Minarik 2005). Nurses considered pain medication and sedatives to be the best combination. PCA, in which the patients are first given basic sedation and then administered pain medication in response to their subjective pain sensation, (Stermer et al. 2000) is considered to be a good and safe pain management method. According to nurses, the drugs used to manage pain during colonoscopy procedures do not cause addiction. Psychic addiction is rare among patients using opioids for pain (Compton & Estepa 2000).

Nurses agreed that the patient's vital functions should be monitored, and that accurate dosage of pain or sedative medication does not affect these functions. Still, they also pointed out that these drugs may cause respiratory depression and hypotension, which agrees with the findings of Ristikankare et al. 2000. The contradictory results may reflect nurses' lack of knowledge of pain management during colonoscopy procedure. Hyperventilation caused by visceral pain and tension (Cervero & Laird 1999) is common in colonoscopy. Still, only half of the nursing professionals advised the patient to breathe into a paper bag during an episode of hyperventilation and explained the meaning and symptoms of this phenomenon. The result may reflect nurses' inadequate knowledge of the physiology of pain during the colonoscopy procedure.

The study demonstrates that the use of pain scales to measure the level of colonoscopy pain is insufficient, though the pain scale is known to be an important instrument in pain management (Williamson & Hoggart 2005, Young & Davidhizar 2008). Nurses measured pain by observing the patient's behaviour and assessing the external signs of pain, and pathophysiological changes. Nearly all respondents agreed that patients are the experts of their own pain, and that painlessness is the goal of good care during procedures.

The results of this study demonstrated that most of the nurses used non- drug interventions, such as creating a soothing and calm atmosphere and environment, conversation, guidance, changing the patient's position, relaxation, pressing down or propping up the abdomen and leading the patient's thoughts away from pain. This finding is consistent with earlier studies concerning non-pharmacological methods in

managing acute and chronic pain (Schaffer & Yucha 2004) burn injury pain (Richardson & Mustard 2009) or children's pain (e.g. Pölkki et al. 2001)

7.2.2 Pain assessment during medication-free colonoscopy

The adequacy of the CBNPS in colonoscopy patients' pain management

The results of this study showed that the descriptions made by the expert nurses were similar to those of the CBNPS. The results also indicated a statistical correlation between the CBNPS and the VRS and VAS. The result is consistent with the findings of earlier research, which demonstrated the VRS and VAS to be reliable, valid and appropriate for use in clinical research (Williamson, &Hoggart, 2005, Skovlund et al. 2005, Coll et al. 2004). The results contrast with the findings of Lund et al. (2005) who found the VRS more sensitive than the VAS (Lund et al. 2005).

Reliability is the degree of consistency with which an instrument measures the attribute it is designed to measure (Burns & Grove 2001). The result of the study indicated a statistical correlation between the CBNPS and VRS and VAS, so the CBNPS can be considered reliable and provides the same kinds of results as the VRS and VAS. The result confirms the results of Salmore (2002) who found the CBNPS valid and reliable in sedated patients undergoing a gastrointestinal examination (Salmore, 2002). The result of this study is also consistent with earlier researches which indicated the BPS, from which the CBNPS is developed, as valid and reliable when assessing mechanically-ventilated patients' pain intensity (Young et al. 2006, Aissaoui et al. 2005). Nurses announced the CBNPS easy and simple to use.

Nurses' and endoscopists' capability to evaluate colonoscopy patients' pain

Both nurses and endoscopists evaluated patients' pain intensity at a lower level than patients did themselves did. This finding matched those of earlier studies (Bergh & Sjostrom 1999, Klopfenstein et al. 2000). Nurses' and endoscopists' evaluations did not differ significantly from each other which contrasts with the finding that endoscopy nurses are more accurate than endoscopists in assessing colonoscopy pain (Ramakrishnan et al. 2004).

7.2.3 Factors affecting patients' pain experience and its management during medication-free colonoscopy

Effects of previous colonoscopy, previous pain experience and preprocedural anxiety on patients' pain experience

Most patients had previous pain experience related to visceral pain e.g. colonoscopy, dilatation of the cervix or bile stones, which in turn had an impact on patients' evaluation of the difficulty of colonoscopy. This result is opposite to Muñoz Sastre et al's (2006) findings, which highlighted the influence of previous pain experiences on increased fear prior to the procedures. (Muñoz Sastre et al. 2006). Unexpectedly, previous pain experience had no effect either on state anxiety or evaluation of pain during colonoscopy. Over one-fifth of patients compared colonoscopy pain to muscular cramp, and almost one-fifth to some other pain such as stomach pain, flatulence, or a congested feeling in stomach, which are all mild pain experiences. Almost one-fifth compared it to dental pain, e.g. drilling, and female respondents to delivery pain, which are of the more intense kind.

Previous colonoscopy did not affect levels of anxiety. This result is in contrast to the findings of Luck et al. (1999), where novice patients were more anxious, and to Mueller et al's (2000) results, which highlighted the implications of previous experience in reducing anxiety (Luck et al. 1999, Mueller et al. 2000). The results in this present study may be a reflection of the fact that colonoscopy had been performed on most of the respondents earlier, and only a few (7%) considered the examination more difficult than previously.

The study indicated a statistically significant correlation between state-and trait anxiety which is congruent with the findings of Spielberger et al. (1983), who predicted that persons with high trait anxiety tend to be higher in state anxiety (Spielberger et al. 1983). Female colonoscopy patients are more state and trait anxious than men, which is parallel with Luck et al's (1999) and Moser et al's (2003) findings (Luck et al.1999, Moser et al. 2005). The level of state anxiety before colonoscopy has a significant effect on how difficult and painful colonoscopy is. Vaughn et al. (2007) came to the same result, thus showing a positive correlation between preoperative anxiety and

postoperative pain (Vaughn et al. 2007). Trait anxiety has less effect on patients' overall evaluation of colonoscopy than strait anxiety. The result is congruent with the results of Feeney (2004) but is in contrast to Lago-Méndez et al's (2006) findings where the trait anxiety level is suggested to be a useful predictor of a patient's predisposition to anxiety in relation to invasive procedures (Feeney 2004, Lago-Mendez et al. 2006).

Factors predicting a painful colonoscopy

The phenomenon of pain is complex (Davidhizar & Giger 2004, Loeser & Treede 2008, Jensen & Gebhart 2008). It was not easy to find factors that relate to a painful colonoscopy experience. Using univariate methods, women were found to experience more painful colonoscopies than men. Bernstein et al. (2005) and Hsieh et al. (2008) came to the same conclusion, demonstrating that females tolerate the procedure less well (Bernstein et al. 2005, Hsieh et al. 2008). Gender was no longer statistically significant in a multivariate logistic regression model whereas nervousness was found to be a risk factor for having a painful colonoscopy. Vaughn et al. (2007) and Eckardt et al. (2008) came to the same result, thus demonstrating a positive correlation between preoperative anxiety and pain (Vaughn et al. 2007, Eckardt et al. 2008). Therefore, abdominal operations, gender, operations during colonoscopy, the indication for colonoscopy and the endoscopist's experience had no effect on patients' pain intensity. This is consistent with Lee et al. (2006) but contrasts with Chung et al. (2007), who found that previous hysterectomy and diarrhoea were predictors of patients' pain and difficulty of caecal intubation (Lee et al. 2006, Chung et al. 2007). The result also contrasts with Eckardt et al. (2008), who reported that pain is associated with the female gender (Eckardt et al. 2008).

The results of this study demonstrated that 75% of colonoscopy patients either did not suffer pain or pain was only mild during colonoscopy. They also considered the examination to be easy. The result is consistent with that of others (Thiis-Evensen et al. 2000, Yörük et al. 2003, Takahashi et al. 2005, Leung 2008). Patients compared colonoscopy pain to mild pain experiences such as muscular cramp, stomach pain, flatulence or a bloated feeling in the stomach. Other patients compared it to more intense kinds of pain such as dental pain, e.g. drilling, and in female respondents to delivery pain. PCA may be a tool to optimise pain relief during colonoscopy (Kulling et

al. 2004), but medication may also cause respiratory complications and delayed recovery (Huang & Eisen 2004, Newcomer et al. 1999). Women evaluated the colonoscopy as more difficult than men, and those respondents who reported extreme pain were all women. Takahashi et al. (2005) came to the same result, thus showing that females tolerate the procedure less well than men (Takahashi et al. 2005). Nonetheless it is most important to recognise patients, to whom sedation or pain medication is pertinent, and to take the individual and gender differences seriously.

The median caecal insertion time was 9.5 minutes and it was faster in males, with no effect of age or previous abdominal operations. This is consistent with previous studies (Bernstein et al. 2005, Lee et al. 2006, Park et al. 2007, Hsieh et al. 2008), but contrasts with Chung's results, which indicated that previous hysterectomy is a predictor of difficulty for caecal intubation (Chung et al. 2007). In this study, duration of caecal intubation was a little longer than in other studies (Barclay et al. 2006, Lee et al. 2008), which could lead to a better tolerated endoscopy because it takes extra time to avoid looping of the scope. The median withdrawal time was 13 minutes, which is sufficiently long enough to note potential findings (Barclay et al. 2006). This time was not lengthened by either abdominal operations or age.

Effects of non-drug interventions on pain experience

Most respondents agreed that non-drug interventions, such as nurses' peaceful talk, helped them very much, as well as the explanation for the reason for the pain and nursing guidance. Non-drug interventions were effective in the case of both anxious and non-anxious patients and both female and male patients. Non-drug interventions are also considered to be effective in both somatic and visceral pain (Smolen et al.2002, Nilsson et al. 2005, McCaffrey & Taylor 2005). Nurses considered relatives to have a negative impact on the colonoscopy patient's experience of pain. Melender & Lauri's (2002) research of experiences of security associated with pregnancy and childbirth yielded opposite results, highlighting the social support from the spouse in particular (Melender & Lauri 2002). The nurses reported patient education and guidance to be the best methods of pain management. The result is accordant with the findings of Reynolds (2009) who found patient education effective in postoperative management as well as Ristikankare and Julkunen (1998), who showed that sedative and pain

medication is not in common use in Finland (Ristikankare & Julkunen 1998, Reynolds 2009).

7.3. Conclusions and implications for medication-free colonoscopy patients' pain assessment and management

This study provided new knowledge of factors related to medication-free colonoscopy patients' pain experience and its' management. The following conclusions are drawn from this study:

1) Nurses used non-drug interventions to manage pain during colonoscopy. According to both female and male patients, the nurses' peaceful talk, explanation of the reason for pain, and their guidance, are non-drug interventions which helped both anxious and non-anxious patients to cope with the colonoscopy pain. As a result of this, nurses should be more aware of the positive effects of these interventions in their practice, acquire knowledge and develop non-drug interventions as a part of colonoscopy patients' pain management.
2) Nurses had practice-based knowledge of colonoscopy patients' pain management and they seldom sought new professional information. In addition, they failed to use pain scales. There is a need to provide more education in pain assessment and management to nurses in order to provide optimal pain management to both colonoscopy and other medical procedures, especially medication-free ones. Nurses themselves should be motivated by education of their own speciality. In order for pain scales to work in the field of endoscopy, they must be easy to use. For example the CBNPS was found to be an adequate and simple to use scale when assessing patients' pain. It gives a possibility to assess patients' pain without using verbal impressions and holding papers or scales in your hand. It is also a proper tool for improving nursing documentation.
3) Both nurses and endoscopists were found to evaluate patients' pain intensity less than patients. This fact must be kept in mind, when decisions concerning pain

medication or sedatives are made. Endoscopy staff should be more involved with patients in the decision making of medication and its options.

4) Most of the patients considered the examination to be tolerable. Patients with previous pain experience evaluated colonoscopy as more difficult and painful than patients without previous pain experience. Women experienced more state and trait anxiety than men and they also reported more pain and discomfort than men. The degree of patient's nervousness was the major factor leading to patients' pain during colonoscopy. Nurses play a key role in recognising anxious patients and those to whom medication is pertinent. It is essential to pay attention to patients' previous pain experiences and their anxiety and gender differences when preparing them for colonoscopy. Reducing anxiety and pain during colonoscopy may contribute to patients' capacity to attend future examinations more willingly.

The results of the study have implications with the increase in screening colonoscopies, especially medication-free ones. The applicability of these findings can be seen for endoscopy settings in countries where medication-free colonoscopy is a common practice or its introduction is the focus of attention in order to improve the assessment and management of pain during colonoscopy. While cultural differences may occur in relation to how colonoscopy patients experience pain, there are cross-cultural similarities in the nursing care needs of these patients. The multiprofessional pain assessment, congruent with patients' reported pain, is essential to attain individual pain management during colonoscopy. Additionally, the findings of this study can be used to develop colonoscopy patients' pain assessment and management and nurses' pain education. This could also include motivating nurses to think ethically, education of their own speciality of pain assessment and management to contribute to knowledge-related procedural pain management.

Although there is a need for further research in this area, these are several clinical implications worth considering. The results of this study reveal that attention should be paid to the following standpoints of nursing practice in order to achieve optimal pain management in colonoscopy patients.

1) Systemic pain education should be organised so that endoscopy personnel can improve their knowledge in order to provide optimal pain management to colonoscopy patients, especially medication-free ones.
2) It is pertinent to find out pain scales e.g. the CBNPS which is practical and provides reliable information about the pain experience and, hence, improve its overall management.
3) There is a need to optimise the role of nurses when interviewing colonoscopy patients before the procedure in order to detect anxious patients who are at risk of having a painful colonoscopy to whom medication is pertinent and to present them for sedation.
4) It is important to properly select and present patients for a sedation-free colonoscopy, although the practice is acceptable for most colonoscopy patients.
5) Nurses should be more aware of the positive effects of non-drug interventions in their practice, acquire new knowledge and develop this as a part of colonoscopy patients' pain management.

7.4 Suggestions for future research

This study has stimulated the following ideas for further research:

1) The pain scales adequate for use during colonoscopy and the lack of using scales should be studied more broadly.
2) Colonoscopy patients' gender differences, and nurses' knowledge and attitudes in relation to use non-drug interventions in pain management need to be examined more thoroughly.
3) The Finnish policy of procedural pain management should be studied further.
4) Memories of pain connected to medical procedures and their effect on the compliance for forthcoming procedures needs further and broader research.
5) The prevention of the aversion of medical procedures needs to be examined.

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Appendix Table 1.Outpatient and inpatient colonoscopies in The Finnish hospital districts during 2005-2007.

Appendix Table 1. Outpatient and inpatient colonoscopies in the Finnish hospital districts during 2004- 2007.

Hospital districts	2005		2006		2007	
	Outpatient colonoscopy	Inpatient colonoscopy	Outpatient colonoscopy	Inpatient colonoscopy	Outpatient colonoscopy	Inpatient colonoscopy
Helsinki/ Uusimaa	6069	823	6274	777	6762	839
Varsinais -Suomi	2997	410	289	75	365	86
Sata- kunta	1023	57	962	41	927	58
Kanta- Häme	641	62	622	74	672	92
Pirkan- maa	2522	68	3618	94	1842	82
Päijät- Häme	136	34	306	56	607	60
Kymen- laakso	13	10	648	70	1379	107
South- Karelia	821	172	1000	220	1086	91
South- Savo	918	200	898	206	747	128
East- Savo	572	58	596	52	549	33
North- Karelia	1420	23	1495	14	1407	22
North- Savo	1842	39	1969	126	2101	104
Central Finland	1087	182	997	178	1576	196
South Ostro- bothnia	321	28	321	19	344	24
Vaasa	533	61	511	45	497	42
Central Ostro- bothnia	28	22	85	16	187	21
North Ostro- bothnia	383	159	1004	356	924	224
Kainuu	875	66	912	35	1020	36
West- Pohja	6	2	8	5	8	6
Lapland	90	45	190	46	172	51
Aland	10	10	11	11	11	11

Appendix 2. Examples of pain scales available for adult patients.

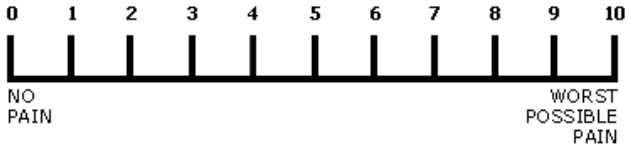
Appendix 2(1)

Examples of pain scales available for adult patients

Numerical Rating Scale (NRS)

No pain 1 2 3 4 5 6 7 8 9 10 Worst pain imaginable

Numerical Pain Scale (NRS)



Available from:
http://www.uams.edu/anesthesiology/pediatric/pain_clip_image001_0000.gif

Visual Analogue Scale (VAS)

0-10cm

No pain |_____| Worst pain imaginable

The Verbal Rating Scale (VRS)
0-4

0	no pain
1	slight pain
2	moderate pain
3	severe pain
4	unbearable pain

Appendix 2(2)

Verbal Descriptor Sale (VDS)

None
Very mild
Mild
Moderate
Severe
Very severe

Red Wedge scale (RWS)
0-50cm

Available from:
http://www.terveyskirjasto.fi/terveyskirjasto/tk.koti?p_artikkeli=reu00170

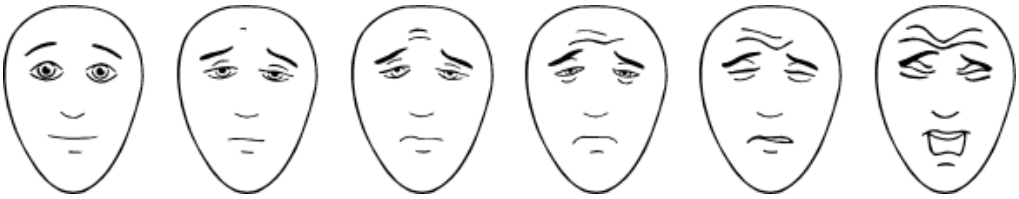
Colorado Behavioural Numerical Pain Scale (CBNPC)

CBNPS- scores
0 Restfull, no facial expressions
1 Moaning, frowning, restless
2 Facial grimacing, protective body positioning,
3 Resistive, crying out
4 Yelling, tossing
5 Combative

(Salmore 2002)

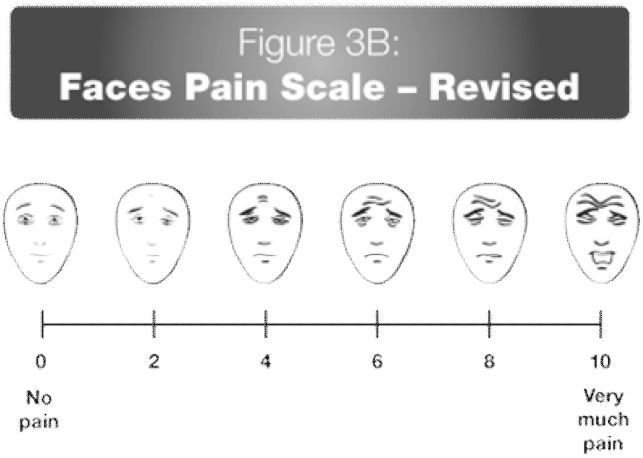
Appendix 2(3)

Face Pain Scale (FPS)



Available from: http ://www.chw.edu.au/parents/factsheets/imgs/faces_pain_scale.gif

Face Scales revised (FPS-R)



Available from: http://www.painxchange.com.au/images/FacesPainScale-R.png

Appendix 2(4)

Behavioural Pain Scale(BPC)

Medscape® www.medscape.com

Score	Facial expression	Verbalization	Body position
0	Neutral/positive facial expression, composed, calm	Normal conversation laugh, crow	Inactive, laying relaxed with all extremities or sitting, walking
1	Negative facial expression, concerned	Completely quiet or sobbing and/or complaining but not because of pain	Restless movements, shifting fashion and/or touching wound or wound area
2	Negative facial expression, grimace, distorted face	Crying, screaming and/or complains about pain	Lying rigid and/or drawn up with arms and legs to the body

The scale is composed of three variables which indicate pain in children. Each of these variables has three grades 0, 1 or 2. By scoring each variable and adding the scores, the sum of BOPS score will be between 0 and 6. Pain measurements performed every three hours. Analgesic effect is evaluated 15-20 minutes after intravenous administration or 30-45 minutes after oral / rectal administration. Score > 2 should lead to an analgesic consequence if other factors are not obviously apparent such as fear, discomfort, parent separation etc.

Source: PCCM © 2007 Lippincott Williams & Wilkins

Available from:
http://img.medscape.com/fullsize/migrated/555/153/pccm555153.fig1.gif

Thermometer

Available from:
http://img.medscape.com/fullsize/migrated/574/105/574105.fig1.gif

Appendix 2(5)

McGill Pain Questionnaire (MPQ)

To use the questionnaire, circle the words that describe your pain but do not circle more than one word in a group. Then when you have that done, go back and circle the three words in groups 1-10 that most convey your pain response. Pick the two words in groups 11-15 that do the same thing. Then pick one word in group 16. Finally, pick 1 word in groups 17-20. At the end you should have seven words that you can take to your doctor that will help describe both the quality of your pain and the intensity of it.

Group 1 Flickering, Pulsing, Quivering, Throbbing, Beating, Pounding
Group 2 Jumping, Flashing, Shooting
Group 3 Pricking, Boring, Drilling, Stabbing
Group 4 Sharp, Gritting, Lacerating
Group 5 Pinching, Pressing, Gnawing, Cramping, Crushing
Group 6 Tugging, Pulling, Wrenching
Group 7 Hot, Burning, Scalding, Searing
Group 8 Tingling, Itching, Smarting, Stinging
Group 9 Dull, Sore, Hurting, Aching, Heavy
Group 10 Tender, Taut (tight), Rasping, Splitting
Group 11 Tiring, Exhausting
Group 12 Sickening, Suffocating
Group 13 Fearful, Frightful, Terrifying
Group 14 Punishing, Grueling, Cruel, Vicious, Killing
Group 15 Wretched, Binding
Group 16 Annoying, Troublesome, Miserable, Intense, Unbearable
Group 17 Spreading, Radiating, Penetrating, Piercing
Group 18 Tight, Numb, Squeezing, Drawing, Tearing
Group 19 Cool, Cold, Freezing
Group 20 Nagging, Nauseating, Agonizing, Dreadful, Torturing

Available from: http://www.ncbi.nlm.nih.gov/pubmed/1235985

Appendix 3. American Gastroenterological Association (AGA) summary statements and recommendations of endoscopic sedation.

Appendix 3(1)

American Gastroenterological Association (AGA) summary statements and recommendations of endoscopic sedation

1. A preprocedure evaluation of the patient should be performed before endoscopy to identify pertinent history and physical findings that could affect the outcome of sedation adversely. The findings of this assessment should be documented before initiating sedation. The implementation of a structured form designed specifically for procedural sedation improves compliance with this process.
2. The use of an anesthesia professional should be strongly considered for ASA physical status IV and V patients. Other possible indications for an anesthesia specialist include patients with a history of alcohol or substance abuse, pregnancy, morbid obesity, neurologic or neuromuscular disorders, and patients who are uncooperative or delirious. Endoscopic procedures that may require an anesthesia specialist include endoscopic retrograde cholangiopancreatography, stent placement in the upper gastrointestinal tract, endoscopic ultrasound, and complex therapeutic procedures (eg, endoscopic submucosal dissection, plication of the cardioesophageal junction, esophagogastroduodenoscopy [EGD] with drainage of a pseudocyst).
3. The endoscopist should be familiar with the pharmacokinetic and pharmacodynamic properties as well as potential drug–drug interactions of all agents used for sedation and reversal. An understanding of the time to peak effect is especially important to avoid oversedation during the induction phase of sedation.
4. The majority of patients can be sedated adequately by using a combination of an opioid and a benzodiazepine. The addition of an adjunctive agent in combination with conventional sedation drugs may be useful for the difficult-to-sedate patient.
5. Gastroenterologist-directed administration of propofol is a safe and effective alternative to sedation with opioids and benzodiazepines. Specialized training is required for the physician and nursing staff before instituting a propofol sedation program.
6. Personnel who administer sedation agents should possess the ability to recognize and rescue patients whose level of sedation becomes deeper than originally intended.
7.The use of noninvasive blood pressure monitoring devices, measurement of oxygen saturation, and other devices are supplemental to clinical observation of the patient.
8.New methods of monitoring are undergoing clinical evaluation. These monitoring devices have not yet undergone rigorous study to assess their impact on clinical outcomes, and their routine use for moderate sedation cannot be recommended based upon the current literature.
9. Physicians targeting moderate sedation (either with an opioid/benzodiazepine combination or propofol) should be capable of rescuing a patient who enters deep sedation. Similarly, physicians targeting deep sedation require additional training with emphasis on advanced airway management and treatment of cardiorespiratory complications.

Appendix 3(2)

10. Training for endoscopic sedation should emphasize an understanding of medications used for endoscopic sedation and the skills necessary for the diagnosis and treatment of cardiopulmonary complications. All endoscopists should possess current certification in advanced cardiac life support (or its equivalent), and should be capable of providing respiratory support for patients with apnea and upper-airway obstruction. This includes the use of jaw thrust and chin-lift maneuvers, oral or nasal airway, and bag-mask ventilation.
11. The gastroenterology professional societies should encourage member training and certification in sedation, as well as continuing education and recertification
12. Informed consent should be obtained during a face-to-face discussion between the endoscopist and the patient. During this encounter the risks, benefits, and alternatives to the proposed sedation should be reviewed and the patient should be provided with an opportunity to ask questions. The consent process should be documented.
13. The endoscopist should be ACLS certified, and provide sedation in keeping with expert practice guidelines and with institutional and state guidelines. Endoscopy units should conform to practice guidelines regarding procedure-related sedation, including documentation, training of staff, maintenance of rescue equipment, creation of appropriate emergency protocols, and quality assurance programs.
14. Gastroenterologist-directed propofol sedation is medicolegally reasonable, but requires appropriate endoscopist training, patient selection, and adherence to protocols for administration, as well as compliance with institutional and local regulations.
15. Although the majority of patients having upper and lower endoscopy can be sedated satisfactorily using an opioid/benzodiazepine combination, the pharmacologic properties of these agents render them suboptimal for brief, ambulatory endoscopic procedures. The increase in propofol use for endoscopic sedation during the past few years indicates that improved methods of sedation are needed.
16. New drugs and drug-delivery systems for endoscopic sedation, including fospropofol disodium, patient-controlled sedation, TCI, and computer-assisted personalized sedation currently are being evaluated for effectiveness and safety. Randomized, controlled studies will be required to compare these new methods with present practices. In addition to the standard assessment of efficacy and safety, functional recovery (when can the patient resume normal activity/work), patient and physician satisfaction, staffing requirements, and the economic impact of these new methods of sedation should be compared with conventional modes of treatment.

Appendix 4. Summary of the studies in nursing science and medicine from the field of endoscopy available during 2005-2009 from Cinahl and PubMed.

Appendix 4(1)

Summary of the studies of nursing science and medicine from the field of endoscopy available during 2000-2009 from Cinahl, and PubMed

The search conducted in the MEDLINE PubMed and CINAHL. The search terms used were colonoscopy AND pain AND (nursing OR nurse); endoscopy AND pain AND (nursing OR nurse); procedural pain AND (nursing OR nurse) NOT neonates; Mesh-terms: endoscopy AND pain AND nursing (2005-2009) + endoscopy AND pain AND (nursing OR nurse); procedural pain AND (nursing OR nurse) NOT children NOT infants (2005-2009)

NURSING SCIENCE		
Authors, year	**Name of the article**	**Country**
Hutson 2009	Is the use of intravenous opioids essential to control pain during colonoscopy?	UK
Vaartio et al. 2009.	Nursing advocacy in procedural pain care.	Finland
Voynarovska & Cohen 2008	The role of the endoscopy nurse or assistant in the endoscopic sedation	USA
Vaartio et al. 2008.	The content of advocacy in procedural pain care -- patients' and nurses' perspectives.	Finland
de Jong et al. 2007.	Non-pharmacological nursing interventions for procedural pain relief in adults with burns: A systematic literature review.	The Netherlands
D'Arcy 2007.	Recognizing and easing procedural pain.	USA
Siedliecki et al.2006	Effect of music on power, pain, depression and disability	USA
de Jong & Gamel 2006.	Use of a simple relaxation technique in burn care: literature review.	The Netherlands
Deitrick & Polomano 2006.	Procedural pain in oncology patients: what the evidence reveals.	USA
Bull et al. 2006.	Upper gastrointestinal endoscopy training: a retrospective audit of the first 210 examinations performed by an Advanced Practice Nurse (APN) at a metropolitan hospital in South Australia.	Australia
Speroni et al. 2005.	Evaluation of demographic, behavioral, and procedural factors on pain perception by patients undergoing colonoscopy and moderate sedation.	USA
Holger et al. 2005.	Nursing use between 2 methods of procedural sedation: midazolam versus propofol.	USA

Appendix 4(2)

MEDICINE		
Authors, year	**Name of the article**	**Country**
Radaelli et al. 2009	High-dose senna compared with conventional PEG-ES lavage as bowel preparation for elective colonoscopy: a prospective, randomized, investigator-blinded trial.	Italy
Maslekar et.al. 2009	Patient satisfaction with lower gastrointestinal endoscopy: doctors, nurses and non-medical endoscopists.	UK
Baudet et al. 2009	Use of sedation in gastrointestinal endoscopy: a nationwide survey in Spain.	Spain
Hayee et al. 2009	Midazolam with meperidine or fentanyl for colonoscopy: results of a randomized trial.	UK
Koornstra et al. 2009	Colonoscopy training for nurse endoscopists: a feasibility study.	the Netherlands
Ko et al. 2009.	Factors influencing patient satisfaction when undergoing endoscopic procedures.	Canada
Lee & Kim 2009	Superiority of split dose midazolam as conscious sedation for outpatient colonoscopy.	South Korea
Liu et al. 2009	Nurse-administered propofol-alfentanil sedation using a patient-controlled analgesia pump compared with opioid-benzodiazepine sedation for outpatient colonoscopy.	Hong Kong
Hayee et al. 2009	Midazolam with meperidine or fentanyl for colonoscopy: results of a randomized trial.	UK
Hsieh et al. 2009	Propofol alone versus propofol in combination with meperidine for sedation during colonoscopy.	Taiwan
Yanai et al. 2008	Patient satisfaction with endoscopy measurement and assessment.	Israel
Dewitt et al. 2008	Nurse-administered propofol sedation compared with midazolam and meperidine for EUS: a prospective, randomized trial.	USA
Pambianco et al. 2008	An assessment of computer-assisted personalized sedation: a sedation delivery system to administer propofol for gastrointestinal endoscopy.	USA
Leung et al. 2008	Unsedated colonoscopy: time to revisit this option?	USA
Poon et al. 2007	Safety of nurse-administered propofol sedation using PCA pump for outpatient colonoscopy in Chinese patients: a pilot study.	China
Tu et al. 2006	Diphenhydramine as an adjunct to sedation for colonoscopy: a double-blind randomized, placebo-controlled study.	USA

Appendix 5. The endoscopy nurses inquiry.

Appendix 5(1)

Kyselylomake hoitotyöntekijöille

VASTAUSOHJE:

Pyydän Sinua ystävällisesti vastaamaan oheisen lomakkeen kysymyksiin huolellisesti. Kysymyksiin vastataan ympyröimällä mielipidettäsi parhaiten vastaava vaihtoehto tai kirjoittamalla vastaus sitä varten varattuun tilaan kysymyksen yhteydessä ilmoitetulla tavalla.

1. Sukupuoli
   1 Nainen
   2 Mies

2. Ikä_____vuotta

3. Siviilisääty
   1 Naimaton
   2 Naimisissa
   3 Avoliitossa
   4 Eronnut tai asumuserossa
   5 Leski

4. Peruskoulutus
   1 Kansakoulu
   2 Peruskoulu
   3 Keskikoulu
   4 Ylioppilas

5. Ammatillinen koulutus

Suoritettu tutkinto	Kyllä	Ei
1 Apuhoitaja vuonna ____	1	2
2 Perushoitaja vuonna ____	1	2
3 Lähihoitaja vuonna ____	1	2
4 Vanhamuotoinen sairaanhoitaja (ei erikoistumista) vuonna _____	1	2
5 Vanhamuotoinen erikoissairaanhoitaja vuonna ____ erikoistumisala _____ _____	1	2

Appendix 5(2)

Suoritettu tutkinto	Kyllä	Ei
6 Terveydenhoitaja	1	2
7 Uusimuotoinen sairaanhoitajatutkinto vuonna ____ Erikoistumisala _____ _____	1	2
8 AMK- sairaanhoitajatutkinto vuonna ____ Erikoistumisala _____ _____	1	2
9 Yliopistotutkinto vuonna__ tutkinnon nimi_____ _____	1	2
10 Muu koulutus, mikä _____ _____	1	2

6. Työkokemukseni hoitotyössä on_____ vuotta. Tästä ajasta olen työskennellyt tähystysyksikössä _____vuotta, (jos alle vuoden,_____ kk) ja kolonoskopioissa_____ vuotta, (jos alle vuoden _____kk).

7. Työskentelen
   1 Yliopistollisessa sairaalassa
   2 Keskussairaalassa
   3 Aluesairaalassa

8. Olen osallistunut kipukoulutukseen
   1 Kyllä,_____kertaa
   Millaiseen koulutukseen? _____
   _____
   Milloin?_____
   2 En ole osallistunut

9. Oletko itse ollut potilaana paksunsuolentähystyksessä?
   1 Kyllä
   2 En ole ollut potilaana paksunsuolentähystyksessä

10. Kipukokemuksesi tähystyksen aikana
   1 Ei lainkaan kipua
   2 Lievää kipua
   3 Kohtalaista kipua
   4 Kovaa kipua
   5 Sietämätöntä kipua

   Mikäli sinulla oli kipua, miten sitä hoidettiin?
   _____
   _____
   _____
   _____

Appendix 5(3)

11. Onko joku läheisistäsi ollut paksunsuolentähystyksessä?
    1 Kyllä
    2 Läheiseni ei ole ollut paksunsuolentähystyksessä

12. Läheisen kipukokemus tähystyksen aikana
    1 Ei lainkaan kipua
    2 Lievää kipua
    3 Kohtalaista kipua
    4 Kovaa kipua
    5 Sietämätöntä kipua

    Mikäli hänellä oli kipua, miten sitä hoidettiin?
    _____
    _____
    _____
    _____

13. Työyksikössäni tehdään kolonoskopioita keskimäärin
    1 1-5 tähystystä / viikko
    2 6-10 tähystystä/ viikko
    3 11-20 tähystystä/ viikko
    4 21-30 tähystystä/ viikko
    5 31-40 tähystystä/ viikko
    6 41 tähystystä tai enemmän

14. Kolonoskopioita tekevät
    1 Sisätautigastroenterologit _____tähystystä/ viikko
    2 Gastroenterologikirurgit _____tähystystä/ viikko
    3 Muun erikoisalan lääkäri _____tähystystä/ viikko, minkä_____

Appendix 5(4)

Rengasta valitsemasi vastaus jokaiseen vaihtoehtoon.

15. Kolonoskopiassa on yleensä lääkärin lisäksi mukana

	Aina	Lähes	Joskus aina	Erittäin harvoin	Ei koskaan
1 Yksi sairaanhoitaja	1	2	3	4	5
2 Kaksi sairaanhoitajaa	1	2	3	4	5
3 Yksi perushoitaja	1	2	3	4	5
4 Kaksi perushoitajaa	1	2	3	4	5
5 Yksi sairaanhoitaja ja yksi perushoitaja	1	2	3	4	5
6 Yksi sairaanhoitaja ja muun koulutuksen saanut henkilö, mikä koulutus_____	1	2	3	4	5
7 Yksi perushoitaja ja muun koulutuksen saanut henkilö, mikä koulutus_____	1	2	3	4	5
8 Vain muun koulutuksen saanut/saaneet henkilöt, mikä koulutus/ mitkä koulutukset _____	1	2	3	4	5

Rengasta valitsemasi vastaus jokaiseen vaihtoehtoon.

16. Mikäli potilas tarvitsee tai toivoo lääkitystä, päätöksen lääkkeen antamisesta tekee yleensä

	Aina	Lähes	Joskus aina	Erittäin harvoin	Ei koskaan
1 Potilas	1	2	3	4	5
2 Lääkäri	1	2	3	4	5
3 Potilas ja lääkäri yhdessä	1	2	3	4	5
4 Hoitaja	1	2	3	4	5
5 Potilas, lääkäri ja hoitaja yhdessä	1	2	3	4	5
6 Potilas ja hoitaja yhdessä	1	2	3	4	5

17. Osastolla työskentelee kolonoskopioissa yhteensä _____ hoitajaa

18. Hoitotyö osastolla on

1 Yksilövastuista
2 Tehtäväkeskeistä
3 Hoitotyö on organisoitu moduulimallin mukaan
4 Jokin muu työn organisointitapa,
mikä _____

Appendix 5(5)

19. Osastollamme on laadittu hoitotyön filosofia
    1 Kyllä
    2 Ei

20. Tiedän, mitä kivun hoidosta sanotaan Sairaanhoitajien eettisissä ohjeissa
    1 Kyllä, mitä
    _____
    _____
    2 En tiedä

21. Tiedän, mistä löydän Sairaanhoitajien eettiset ohjeet
    1 Kyllä,
mistä_____
    2 En tiedä

Seuraavana on väittämiä osaston toimintatavoista. Rengasta valitsemasi vastausvaihtoehto.

	Täysin samaa mieltä	Samaa mieltä	Eri mieltä	Täysin eri mieltä
22. Osastoni kolonoskopiapotilaalle tarkoitetussa kutsukirjeessä mainitaan potilaan mahdollisuus saada kipu –ja/ tai rauhoittavaa lääkitystä tähystyksen aikana.	1	2	3	4
23. Osastollamme on sovittu, että ohjatessaan kolonoskopia-potilasta mukana oleva hoitaja kertoo mahdollisuudesta saada rauhoittavaa- ja/ tai kipulääkettä ennen tähystystä tai tähystyksen aikana.	1	2	3	4
24. Hoitohenkilökunta on osastollamme käynyt yhdessä läpi sairaanhoitajan eettiset ohjeet ja keskustellut niiden merkityksestä potilaan kivun hoidossa.	1	2	3	4
25. Osastomme koko henkilökunta on keskustellut yhdessä kivun hoidon periaatteista ja menetelmistä.	1	2	3	4

Appendix 5(6)

26. Kuvaa, millaisia tunteita ja ajatuksia Sinussa hoitotyöntekijänä herättää kolonoskopian suorittamisen aiheuttama kipu potilaalle?

_____
_____
_____
_____
_____

27. Kuvaa, mitä menetelmiä käytät potilaan kivun mittaamisessa.

_____
_____
_____
_____
_____

28. Kuvaa, mitä menetelmiä käytät kolonoskopiapotilaan kivun ja jännittyneisyyden lievittämiseen ja hoitoon.

_____
_____
_____
_____

29. Kuvaa omaa toimintaasi hoitajana, kun arvioit kolonoskopiapotilaan kärsivän kivusta.

_____
_____
_____
_____

30. Millaisiin lähteisiin perustuvat tietosi kolonoskopiapotilaan kivusta ja sen hoitamisesta?

_____
_____
_____

31. Osastollamme on käytössä kipumittarit kolonoskopiapotilaan kivun arvioinnissa.

1 Kyllä, mikä/mitkä mittarit_____
2 Ei ole käytössä

32. Osastolleni on tilattu hoitotieteellisiä lehtiä.

1 Kyllä, mitä lehtiä _____
2 Ei ole tilattu

Appendix 5(7)

Rengasta valitsemasi vastausvaihtoehto.
33. Luen seuraavia lehtiä.

	Jatkuvasti	Joskus	En koskaan
Hoitotiede	1	2	3
Sairaanhoitaja	1	2	3
Gastroenterology Nursing	1	2	3
Journal of Advanced Nursing	1	2	3
Muita lehtiä, mitä_____	1	2	3

Rengasta valitsemasi vastausvaihtoehto.
Kehitän itseäni seuraavilla tavoilla:

	Usein	Joskus	En koskaan
34. Osallistun alani kotimaiseen hoitotyön koulutukseen.	1	2	3
35. Osallistun alani kotimaiseen lääketieteelliseen koulutukseen.	1	2	3
36. Osallistun alani ulkomaiseen hoitotyön koulutukseen.	1	2	3
37. Osallistun alani ulkomaiseen lääketieteelliseen koulutukseen.	1	2	3
38. Haen internetin kautta ammattitietoa.	1	2	3
39. Haen kirjaston kautta ammattitietoa.	1	2	3

Seuraavana on kipuväittämiä. Rengasta valitsemasi vastausvaihtoehto.

	Täysin samaa mieltä	Samaa mieltä	Eri mieltä	Täysin eri mieltä
40. Potilas on kipunsa paras asiantuntija.	1	2	3	4
41. Potilaan kivuttomuus on hyvän hoidon tavoite.	1	2	3	4
42. Kaikki kolonoskopia-potilaat eivät tarvitse kivun lievitystä.	1	2	3	4
43. Kaikkien kipu pystytään hoitamaan.	1	2	3	4

Appendix 5(8)

Kipuväittämät jatkuvat, rengasta valitsemasi vastausvaihtoehto.

	Täysin samaa mieltä	Samaa mieltä	Eri mieltä	Täysin eri mieltä
44. Kolonoskopiaan tuleville potilaille ei tarjota riittävästi tietoa kivun hoidon mahdollisuuksista, jotta he voisivat sitä itselleen toivoa.	1	2	3	4
45. Kolonoskopian aikana on hoitajan aina arvioitava myös kivun ulkoisia merkkejä.	1	2	3	4
46. Kolonoskopiaan tulevalle ei pidä tarjota kipulääkkeen mahdollisuutta etukäteen, vaan odottaa, että hän sitä itse pyytää.	1	2	3	4
47. Aikaisemmat kivuliaat kolonoskopiakokemukset vaikuttavat potilaan tapaan reagoida kipuun tähystyksen aikana.	1	2	3	4
48. Kipulääkkeet aiheuttavat riippuvuutta.	1	2	3	4
49. Potilaat eivät yleensä uskalla valittaa kivusta tähystyksen aikana.	1	2	3	4
50. Lääkärit eivät mielellään anna kipu- tai rauhoittavaa lääkettä kolonoskopiassa.	1	2	3	4
51. Vain taitamattoman tähystäjän tarvitsee antaa potilaalleen kipulääkettä.	1	2	3	4
52. Kipu- ja rauhoittavaa lääkitystä ei mielellään anneta, koska potilaan tarkkailuaika pitenee.	1	2	3	4
53. Rauhoittavat lääkkeet aiheuttavat hengityslamaa.	1	2	3	4
54. Kipu- ja rauhoittavat lääkkeet alentavat verenpainetta	1	2	3	4

Appendix 5(9)

Kipuväittämät jatkuvat, rengasta valitsemasi vastausvaihtoehto.

	Täysin samaa mieltä	Samaa mieltä	Eri mieltä	Täysin eri mieltä
55. Annettaessa kipu- ja tai ja/tai rauhoittavia lääkkeitä on aina huolehdittava potilaan elintoimintojen tarkkailemisesta.	1	2	3	4
56. Potilaalle paras lääkeyhdistelmä on rauhoittavan ja kipulääkkeen yhdistelmä.	1	2	3	4
57. Oikein annosteltuna kipu- ja rauhoittavat lääkkeet eivät aiheuta muutoksia potilaan vitaalielintoiminnoista.	1	2	3	4
58. Arvioitaessa kipua on sitä aina kysyttävä potilaalta itseltään.	1	2	3	4
59. Kolonoskopiaan tulevat potilaat kysyvät yhä useammin lääkityksenmahdollisuutta.	1	2	3	4
60. Potilas saa kipu- ja tai rauhoittavan lääkityksen etukäteen aina sitä pyytäessään.	1	2	3	4
61. Potilas saa kipulääkityksen kolonoskopian aikana aina, mikäli hän sitä pyytää.	1	2	3	4
62. Paras lääke potilaan kipuun on etukäteen annettu ohjaus ja neuvonta.	1	2	3	4
63.Ammattitaitoinen hoitaja käyttää potilaan hoitoon myös ei-lääkinnäiisiä menetelmiä	1	2	3	4
64. Kolonoskopiaan kuuluu aina jonkin verran kipua, joka tulee kestää.	1	2	3	4
65. Suomalaisten kipukynnys on korkeampi kuin muiden.	1	2	3	4
66. Hoitajan tulee päivittää tietonsa kivun hoidosta säännöllisesti.	1	2	3	4

Appendix 5(10)

Seuraavana on lisää kipuväittämiä, rengasta valitsemasi vastausvaihtoehto

	Täysin samaa mieltä	Samaa mieltä	Eri mieltä	Täysin eri mieltä
67. Kivun hoito kuuluu vain tähystävän lääkärin tehtäviin ja päätösvaltaan.	1	2	3	4
68. Potilaan hyperventilaatio on seurausta kivusta tai jännittyneisyydestä.	1	2	3	4
69. Kipua voitaisiin lievittää ja tehokkaammin mikäli henkilökuntaa olisi enemmän.	1	2	3	4
70. Kipu varoittaa aina kudos-vaurion mahdollisuudesta.	1	2	3	4
71. Keskustelu on hyvä tapa lievittää potilaan kipua.	1	2	3	4
72. On sama annetaanko kipu-lääke ennen kipua vai sen jo ilmettyä.	1	2	3	4
73. Naisille kolonoskopia on kivuliaampi kuin miehille.	1	2	3	4
74. Nuorille kolonoskopia on kivuttomampi kuin vanhemmille ihmisille.	1	2	3	4
75.Ohjausta saaneet potilaat ovat kivuliaampia kuin ohjaamattomat potilaat.	1	2	3	4
76. Kivusta etukäteen kertominen lisää kivun tunnetta.	1	2	3	4
77. Hoitajan läsnäolo vaikutta myönteisesti potilaan kivun kokemiseen kolonoskopiassa.	1	2	3	4
78. Omaisen läsnäolo vaikuttaa myönteisesti potilaan kivun kokemiseen kolonoskopiassa.	1	2	3	4

Appendix 5(11)

Seuraavassa on väittämiä kolonoskopiapotilaan kivun hoidosta, rengasta valitsemasi vastausvaihtoehto.
Käytän seuraavia keinoja kivun lievitykseen:

	Aina	Joskus	En koskaan
79. Käännän potilaan ajatukset muualle keskustelemalla hänen kanssaan tähystyksen aikana.	1	2	3
80. Työskentelen rauhallisesti	1	2	3
81. Puhun rauhoittavasti ja kerron mitä tapahtuu ja mistä mahdollinen kipu saattaa johtua.	1	2	3
82. Varoitan potilasta etukäteen tulevasta kivusta.	1	2	3
83. Huoneessa soi rauhoittava musiikki.	1	2	3
84. Pidän potilaani lämpimänä ja kuivana.	1	2	3
85. Pidän potilaan asennon hyvänä ja rentona.	1	2	3
86. Huomioin etukäteen lähestyvän hyperventilaation (hikisyys, levotto-muus, jalkojen ja vartalon tärinä, pahoinvointi).	1	2	3
87. Ehkäisen hyperventi-laation pyytämällä potilasta hengittämään pussiin.	1	2	3
88. Kerron potilaalle mistä oireet johtuvat (hyperventilaatio) ja miten pussiin hengittäminen vaikuttaa elimistöön.	1	2	3
89. Tarkkailen potilaan lihasten jännittyneisyyttä ja muistutan häntä rentoutumisesta.	1	2	3
90. Vatsan painaminen voi auttaa myös kipuun.	1	2	3
91. Käytän kipumittareita arvioidessani potilaani kipua.	1	2	3

Appendix 5(12)

Väittämät kolonoskopiapotilaan kivun hoidosta jatkuvat, rengasta valitsemasi vastausvaihtoehto.

Käytän seuraavia keinoja kivun lievitykseen:

	Aina	Joskus	En koskaan
92. Mittaan kipua tarkkailemalla potilaan käytöstä (puhe, ääni, kasvon ilmeet, hengitys).	1	2	3
93. Mittaan kipua tarkkailemalla fyysisiä muutoksia (hengityksen ja sydämen sykkeen tiheys).	1	2	3
94. Ohjaan potilaani huolellisesti ja yksilöllisesti tähystykseen ja kerron kivun mahdollisuudesta, sen syystä ja miten potilas itse voi vaikuttaa kipuun (anatomian kertaaminen, tähystyksen kulku).	1	2	3
95. Kirjaan potilaani kivun asteen ja käyttämäni auttamiskeinot potilaspapereihin.	1	2	3
96. Potilas, hoitotyöntekijä ja lääkäri keskustelevat tähystyksen aikana.	1	2	3
97. Hoitotyöntekijä pyytää potilasta päästämään pois suolesta ilmaa, jotta suoli ei venyisi ja aiheuttaisi kipua.	1	2	3

Seuraavaksi on väittämiä kolonoskopiaan liittyvästä tiedosta, rengasta valitsemasi vastausvaihtoehto.

	Hyvät	Melko hyvät	Melko huonot	Huonot
98. Tietoni ruoansulatuselimistön anatomiasta.	1	2	3	4
99. Tietoni kivun fysiologiasta.	1	2	3	4
100. Tietoni kolonoskopiapotilaan kipuun vaikuttavista tekijöistä.	1	2	3	4
101. Tietoni kivun lääkehoidosta.	1	2	3	4

Appendix 5(13)

Väittämät kolonoskopiaan liittyvästä tiedosta jatkuvat, rengasta valitsemasi vastausvaihtoehto.

	Hyvät	Melko hyvät	Melko huonot	Huonot
102. Tietoni kivun ei- lääkinnällisestä hoidosta.	1	2	3	4
103. Tietoni hoitotyön auttamismenetelmistä kivun hoidossa.	1	2	3	4
104. Tietoni eri kipulääkkeistä.	1	2	3	4
105. Tietoni eri kipulääkkeiden vaikutusmekanismeista.	1	2	3	4
106. Tietoni kipulääkityksen sivuvaikutuksista.	1	2	3	4
107. Tietoni koetun kivun vaikutuksista elimistöön.	1	2	3	4
108. Tietoni kivun mittaamisesta.	1	2	3	4
109. Tietoni kivun lievityksen vaikutuksista.	1	2	3	4
110. Mahdollisuuteni yhteistyöhön muiden ammattiryhmien kanssa.	1	2	3	4
111. Yksikköni mahdollisuus	1	2	3	4

parantaa kolonoskopia-
potilaan kivun hoitoa.

KIITOS VASTAUKSISTASI!

Appendix 6. Examples of the similar expressions categorised and ranked based on their frequency of occurrence.” Nurses’ interventions of patients’ pain assessment”.

Appendix 6(1)

Examples of the similar expressions categorised and ranked based on their frequency of occurrence. ”Nurses interventions of patients’ pain assessment”

Conversation:	
Inquire after pain intensity and location	82
Observation:	
Observing patients’ facial expression	50
Observing patients’ sweatiness	42
Observing patients’ physical and mental state	35
Observing patients’ breathing	33
Observing patients’ gestures	23
Observing patients’ pulse	21
Observing patients’ colour	18
Observing patienst’ muscle tension	15
Observing patients’ movements	12
Observing strain and tension in the abdominal muscles	11
Observing patients’ voice	10
Observing patients’ boodpressure	5
Observing patients’ arterial oxygen saturation	4
Observing patients’ nausea	2
Observing patients’ anxiety	2
Pain scales:	
VAS- scale (1-10cm)	12
Ask the patient to squeeze nurse’s hand during pain	3

Appendix 7.The expert panellists' form.

Appendix 7(1)

HYVÄ KOLLEGA

Teen väitöskirjaa kolonoskopiapotilaan kivun arvioinnista ja tarvitsen suomalaisten kolonoskopioissa avustavien hoitotyön ammattilaisten kuvauksia eriasteisesta kolonoskopiapotilaan kivusta. Tulen käyttämään niitä arvioidessani amerikkalaisen kipumittarin soveltuvuutta suomalaisen potilaan kivun arviointiin.

Mieti, miten kuvaat kolonoskopiapotilaan kipua asteikolla 0-5 eli millainen (esim.ilmeet, eleet, liikkeet, käytös, keskustelu, puhe) on kolonoskopiapotilas, jolla ei ole mielestänne kipua (0), millainen on potilas, jolla on kipua 3-4 ja lopuksi millainen on potilas, jolla on erittäin voimakasta kipua (5).

Tallenna oheinen taulukko/tämä dokumentti omalle tietokoneellesi ja täytä se. Palaute täytetty lomake kansioon tuotokset - kipumittarin palautus kansioon tai suoraan minulle sähköpostiin: eeva-riitta.ylinen@pp.inet.fi 4.12.2005 mennessä.

Kivun numeerinen arvo	**Kuvaus potilaasta**
0	
1	
2	
3	
4	
5	

Appendix 8. Examples of expert panellists' descriptions of colonoscopy patients' facial expressions, gestures, movements and sounds.

Appendix 8(1)

Examples of expert panellists' descriptions of colonoscopy patients' facial expressions, gestures, movements and sounds.

Expert panellists' descriptions		CBNPS- scores
Restful, peaceful x11 Relaxed conversation x10 No movements x5 No body tension x4 Restful facial expressions and movements x2	⟺	0 Restful, no facial expressions
Worried facial expressions and frowning x7 Following guidance, conversation x5 Fidgets nervously, restless x5 Toes bendingx3	⟺	1 Moaning, frowning, restless
Tensed muscles x12 Tensed facial expression x5 Restless, moving during pain x6 Straight faced x3 Silent x2	⟺	2 Facial grimacing, protective body positioning
Very restless x13 Tensed muscles x11 Moaning, crying out x9 Facial grimacing x 6 Gnashing of teeth x 2	⟺	3 Resistive, crying out
Tossingx11 Tensed facial expression, facial grimacing x2 Gnashing of teeth x 2	⟺	4 Yelling, tossing
Crying out, screaming, swearing x13 Extremely restless, going up from the bedx7 Combative, tossing x 10	⟺	5 Combative

Appendix 9.The nurses' questionnaire.

Appendix 9(1)

KYSELYLOMAKE HOITAJALLE

n:o _____
pvm ____/____

Potilaan sukunimen ensimmäinen kirjain_____
Potilaan etunimen ensimmäinen kirjain_____
Potilaan henkilötunnus_____/___/_____
päivä kk vuosi
Potilaan sukupuoli: Mies_____ Nainen_____

1. Työkokemukseni sairaanhoitajana on _____ vuotta.

2. Työkokemukseni tähystysyksikössä on _____vuotta, (jos alle vuoden,_____ kk)

3. Työkokemukseni kolonoskopioissa on_____ vuotta, (jos alle vuoden _____kk).

4. Avustan kolonoskopioissa keskimäärin

1 1-5 tähystystä / viikko
2 6-10 tähystystä/ viikko
3 11-20 tähystystä/ viikko
4 21-30 tähystystä/ viikko

POTILAAN TIEDOT

5. Potilaan sukupuoli

1 Nainen
2 Mies

6. Kolonoskopiaan tulosyy

1 Ripuli
2 Veriripuli
3 Vatsakipu
4 Ummetus
5 Suolentoiminnan muutos/vaihtelu
6 Verta ulosteessa
7 Meleena
8 Anemia
9 Laihtuminen
10 Epämääräinen vatsavaiva
11 Ilmavaivat
12 Maligniteettiepäily
13 Polypektomia
14 Polypektomiaseuranta
15 Kolorektaalisyövän seuranta
16 Crohnin tauti
17 Colitis ulcerosa
18 Divertikuloosi
19 Muu, mikä_____

Appendix 9(2)

7. Potilaan aikaisempi kokemus kolonoskopiasta

1 Ei
2 Kyllä

8. Potilaan aikaisempi kokemus kolonoskopiakivusta

1 Ei lainkaan kipua
2 Lievää kipua
3 Kohtalaista kipua
4 Kovaa kipua
5 Sietämätöntä kipua

9. Potilaan vatsan alueen leikkaukset

1 Ei vatsan alueen leikkauksia
2 Kyllä, mikä _____
3 Gynekologinen leikkaus, mikä

10. Potilaan säännöllinen rauhoittavien lääkkeiden käyttö

1 Ei säännöllistä rauhoittavien lääkkeiden käyttöä
2 Kyllä, lääke ja annos_____

11. Potilaan säännöllinen uni- ja nukahtamislääkkeiden käyttö

1 Ei säännöllistä unilääkkeiden käyttöä
2 Kyllä, lääke ja annos_____

12. Kolonoskopian kesto (kellon aika)

Kolonoskopia alkoi ____,_____ CBNPS_____

____

Flexura lienalis _____, _____ CBNPS_____

Caecum _____,_____ CBNPS_____

Tähystin pois suolesta ____,_____ CBNPS_____

Kokonaisarvio tähystyksestä CBNPS_____

13. Jouduttiinko vatsaa tukemaan painamalla?

1 Ei
2 Kyllä

14. Jouduttiinko potilasta kääntämään tutkimuksen aikana?

1 Ei
2 Kyllä

Appendix 9(3)

15. Biopsioita otettiin: _____ kpl (montako palasta)

16. Millainen potilas oli ennen tutkimusta?

1 Erittäin rauhallinen
2 Rauhallinen
3 Jännittynyt
4 Erittäin jännittynyt

Merkitse pystyviiva suoralle:

Erittäin rauhallinen |_____ Erittäin jännittynyt

17. Millainen tutkimus teknisesti oli?

1 Erittäin helppo
2 Helppo
3 Vaikea
4 Erittäin vaikea

Merkitse pystyviiva suoralle:
Erittäin helppo |_____| Erittäin vaikea

18. Millainen oli potilaan yhteistyökyky?

1 Erittäin hyvä
2 Hyvä
3 Huono
4 Erittäin huono

Merkitse pystyviiva suoralle:

Erittäin hyvä |_____| Erittäin huono

19. Kuinka kivulias tutkimus oli mielestäsi potilaalle?

1 Ei lainkaan kivulias
2 Jonkin verran kivulias
3 Kohtalaisen kivulias
4 Erittäin kivulias

Merkitse pystyviiva suoralle:
Ei lainkaan kivulias |_____ Erittäin kivulias

Appendix 9(4)

20. Saiko potilas lääkitystä ennen tutkimusta?

1 Ei
2 Kyllä

Lääke_____ annos_____klo_____

Lääke_____ annos_____klo_____

Lääke_____ annos_____klo_____

21. Saiko potilas lääkitystä tutkimuksen aikana?

1 Ei
2 Kyllä

Lääke_____ annos_____klo_____

Lääke_____ annos _____klo_____

Lääke_____ annos_____ klo_____

Muuta
huomioitavaa:_____
_____

Appendix 10. The endoscopists' questionnaire.

Appendix10(1)

KYSELYLOMAKE TÄHYSTÄVÄLLE LÄÄKÄRILLE

n:o _____
pvm ____/____

Potilaan sukunimen ensimmäinen kirjain_____
Potilaan etunimen ensimmäinen kirjain_____
Potilaan henkilötunnus_____/___/_____
päivä kk vuosi

Potilaan sukupuoli: Mies_____ Nainen_____

1. Koulutukseltani olen
   1 Gastroenterologi
   2 Gastrokirurgi
   3 Erikoistuva lääkäri, gastrokirurgia
   4 Erikoistuva lääkäri, gastroenterologia

2. Työkokemukseni lääkärinä on _____ vuotta.

3. Työkokemukseni tähystysyksikössä on _____vuotta, (jos alle vuoden,_____ kk)

4. Työkokemukseni kolonoskopioissa on_____ vuotta, (jos alle vuoden _____kk).

5. Teen kolonoskopioita keskimäärin

   1 1-5 tähystystä / viikko
   2 6-10 tähystystä/ viikko
   3 11-20 tähystystä/ viikko
   4 21-30 tähystystä/ viikko

POTILAAN TIEDOT

6. Millainen kolonoskopiapotilas oli ennen tutkimusta?

   1 Erittäin rauhallinen
   2 Rauhallinen
   3 Jännittynyt
   4 Erittäin jännittynyt

Merkitse pystyviiva suoralle:

Erittäin rauhallinen |_____| Erittäin jännittynyt

7. Millainen tutkimus oli teknisesti?

   1 Erittäin helppo
   2 Helppo
   3 Vaikea
   4 Erittäin vaikea

Merkitse pystyviiva suoralle:

Erittäinhelppo |_____| Erittäin vaikea

Appendix 10(2)

8. Millainen oli potilaan yhteistyökyky?

1 Erittäin hyvä
2 Hyvä
3 Huono
4 Erittäin huono

Merkitse pystyviiva suoralle:

Erittäinhyvä |_____| Erittäin huono

9. Kuinka kivulias tutkimus mielestäsi oli potilaalle?

1 Ei lainkaan kivulias
2 Jonkin verran kivulias
3 Kohtalaisen kivulias
4 Erittäin kivulias

Merkitkää pystyviiva suoralle:

Ei lainkaan kivulias |_____| Erittäin kivulias

10. Kololonoskopialöydökset

1 Normaali
2 Polyyppejä
3 Peräpukamat
4 Divertikuloosi
5 Colitis ulcerosa
6 Crohnin tauti
7 Pahanlaatuisuus, missä_____
8 Muu_____, mikä_____

11. Skopian yhteydessä tehdyt toimenpiteet

0 Toimenpiteitä ei tehty
1 Polypektomia
2 Elektrokoagulaatio
3 Dilataatio
4 Muu, mikä? _____

12. Tehtiinkö rektumissa inversio?

0 Inversiota ei tehty
1 Kyllä, skopian alussa
2 Kyllä, skopian lopussa

Muita huomioita:

_____
_____

Appendix 11. The patients' questionnaire.

Appendix 11(1)

KYSELYLOMAKE POTILAALLE PAKSUNSUOLEN TÄHYSTYKSEN ELI KOLONOSKOPIAN JÄLKEEN

n:o _____ Sukunimenne ensimmäinen
kirjain_____
pvm ____/____ Etunimenne ensimmäinen
kirjain_____

Sukupuolenne: Mies___

Nainen___

Syntymäaikanne_____/___/_____

päivä kk vuosi

Teille on tänään tehty koko paksusuolen tähystystutkimus eli kolonoskopia. Vastatkaa kysymyksiin rengastamalla vaihtoehdoista sopivin. Lisäksi osassa kysymyksiä Teitä pyydetään merkitsemään lyhyellä pystyviivalla suoralle se kohta, joka vastaa parhaiten tuntemustanne suhteessa suoran alku- ja loppupäähän, jotka edustavat äärimmäisen voimakkaita tuntemuksia. Suoran keskikohta on merkitty pienellä pisteellä.

Esimerkiksi, jos kysymys olisi: Millainen mielentilanne on tällä hetkellä?

1 Erittäin iloinen
2 Iloinen
3 Surullinen
4 Erittäin surullinen

Merkitkää pystyviiva suoralle:

Erittäin iloinen |_____| Erittäin surullinen

Valitsette rengastamalla sen vaihtoehdoista 1- 4, joka parhaiten mielestänne kuvaa tämänhetkistä mielentilaanne. Siis, jos olette esim. mielestänne iloinen, rengastatte kohdan 2. Vastaavasti merkitsette suoralle lyhyen pystyviivan tuntemustanne vastaavaan kohtaan. Suoran alku- ja loppupää edustavat äärimmäisiä tuntemuksia, joten tässä tapauksessa tulisi pystyviiva sijoittaa jonnekin keskikohdan vasemmalle puolelle.

Appendix 11(2)

1. Onko Teille aiemmin tehty kolonoskopiaa eli koko paksusuolen tähystystutkimusta?

1 Ei
2 Kyllä

2. Jos Teille on aiemmin tehty kolonoskopiaa eli koko paksusuolen tähystystutkimus, millainen tämänkertainen tutkimus mielestänne oli?

1 Helpompi kuin aiempi tutkimus
2 Samanlainen kuin aiempi tutkimus
3 Vaikeampi kuin aiempi tutkimus

3. Millainen olitte mielestänne ennen tutkimusta?

1 Erittäin rauhallinen
2 Rauhallinen
3 Jännittynyt
4 Erittäin jännittynyt

Merkitkää pystyviiva suoralle:

Erittäin rauhallinen |_____| Erittäin jännittynyt

4. Millainen tutkimus oli mielestänne kokonaisuutena?

1 Erittäin helppo
2 Helppo
3 Vaikea
4 Erittäin vaikea

Merkitkää pystyviiva suoralle:

Erittäin helppo |_____| Erittäin vaikea

5. Esiintyikö tutkimuksen aikana kipua vatsan alueella?

1 Ei lainkaan
2 Jonkin verran kipua
3 Melko paljon kipua
4 Erittäin paljon kipua

Merkitkää pystyviiva suoralle:

Ei lainkaan |_____| Erittäin paljon

Appendix 11(3)

6. Esiintyikö kipua tutkimuksen aikana mahdollisesti jossain muualla?

1 Ei esiintynyt
2 Kyllä, missä? _____

7. Millainen tutkimus mielestänne oli?

1 Ei lainkaan kivulias
2 Jonkin verran kivulias
3 Kohtalaisen kivulias
4 Erittäin kivulias

Merkitkää pystyviiva suoralle:

Ei lainkaan kivulias |_____| Erittäin kivulias

8. Mihin seuraavista kipukokemuksista kokemanne tähystyskipu on verrattavissa?

1 synnytyskipu
2 hammaslääkärissä koettu kipu (esim. hampaan poraaminen)
3 sappikivikipu
4 virtsatiekivikipu
5 rasitusrintakipu
6 sydäninfarkti
7 migreeni
8 lihaskramppi
9 luunmurtuma
10 muu kipu, mikä_____
11 ei kokemusta muusta kivusta

9. Kuinka paljon hoitajan rauhallinen puhe auttoi Teitä tähystyksen aikana?

1 Erittäin paljon
2 Paljon
3 Hieman
4 Ei lainkaan

Merkitkää pystyviiva suoralle:
Erittäin paljon |_____| Ei lainkaan

Appendix 11(4)

10. Kuinka paljon kivun syyn selvittäminen auttoi Teitä kivun hallinnassa tähystyksen aikana?

1 Erittäin paljon
2 Paljon
3 Hieman
4 Ei lainkaan

Merkitkää pystyviiva suoralle:
Erittäin |_____| Ei
paljon lainkaan

11. Kuinka paljon hoitajan antama ohjaus ja neuvonta auttoivat Teitä kivun hallinnassa tähystyksen aikana?

1 Erittäin paljon
2 Paljon
3 Hieman
4 Ei lainkaan

Merkitkää pystyviiva suoralle:
Erittäin |_____| Ei
paljon lainkaan

12. Kuinka paljon mahdollinen sukulaisen tai läheisen mukanaolo voi mielestänne vaikuttaa kivun hallintaan tähystyksen aikana?

1 Erittäin paljon
2 Paljon
3 Hieman
4 Ei lainkaan

Merkitkää pystyviiva suoralle:
Erittäin |_____| Ei
paljon lainkaan

Mikäli Teillä on vielä jotain kommentoitavaa tähystystutkimuksesta, voitte kirjoittaa sen tähän:

_____
_____
_____
_____

Kiitokset vastauksistanne!

PALAUTTAKAA TÄYTTÄMÄNNE TUTKIMUSLOMAKKEET SULJETUSSA KIRJEKUORESSA, TUTKIMUKSESSA MUKANA OLLEELLE SAIRAANHOITAJALLE.

Appendix 12. STAI Y-1 and STAI Y-2

Appendix 12(1)

STAI Y-1 and STAI Y-2

n:o _____
pvm ____/____

Sukunimenne ensimmäinen kirjain_____
Etunimenne ensimmäinen kirjain_____
enkilötunnuksenne_____/___/_____
päivä kk vuosi
Sukupuolenne: Mies___ Nainen___
Ikä_____ vuotta

OHJE:

Alla on erilaisia olotiloja kuvaavia väittämiä. Lue väittämät ja ympyröi oikea vaihtoehto sen mukaan, millaiseksi tunnet olosi juuri tällä hetkellä. Oikeita tai vääriä vastauksia ei ole. Älä pohdi vastauksiasi pitkään, vaan ympyröi vaihtoehdot, joka kuvaavat parhaiten **tämänhetkisiä tuntemuksiasi**.

	Ei lainkaan	Jonkin verran	Kohtalaisesti	Hyvin paljon
1. Olen levollinen	1	2	3	4
2. Tunnen oloni turvalliseksi	1	2	3	4
3. Olen kireä	1	2	3	4
4. Tunnen itseni rasittuneeksi	1	2	3	4
5. Tunnen oloni rauhalliseksi	1	2	3	4
6. Olen järkyttynyt	1	2	3	4
7. Olen huolissani mahdollisista vastoinkäymisistä	1	2	3	4
8. Tunnen itseni tyytyväiseksi	1	2	3	4
9. Olen peloissani	1	2	3	4
10. Oloni on mukava	1	2	3	4
11. Olen itsevarma	1	2	3	4
12. Olen hermostunut	1	2	3	4
13. Olen jännittynyt	1	2	3	4
14. Tunnen oloni päättämättömäksi	1	2	3	4
15. Tunnen itseni rentoutuneeksi	1	2	3	4
16. Olen tyytyväinen	1	2	3	4
17. Olen huolissani	1	2	3	4
18. Olen hämmentynyt	1	2	3	4
19. Tunnen oloni vakaaksi	1	2	3	4
20. Tunnen oloni miellyttäväksi	1	2	3	4

Appendix 12(2)

Alla on erilaisia olotiloja kuvaavia väittämiä. Lue väittämät ja ympyröi oikea vaihtoehto sen mukaan, millaiseksi yleensä tunnet olosi. Oikeita tai vääriä vastauksia ei ole. Älä pohdi vastauksiasi pitkään, vaan ympyröi vaihtoehdot, jotka kuvaavat parhaiten, miltä sinusta **yleensä ottaen tuntuu**.

	Ei juuri koskaan	Joskus	Usein	Melkein aina
21. Tunnen oloni miellyttäväksi	1	2	3	4
22. Tunnen itseni hermostuneeksi ja rauhattomaksi	1	2	3	4
23. Olen tyytyväinen itseeni	1	2	3	4
24. Toivoisin olevani yhtä onnellinen kuin miltä muut vaikuttavat	1	2	3	4
25. Tunnen itseni epäonnistuneeksi	1	2	3	4
26. Tunnen oloni levänneeksi	1	2	3	4
27. Olen levollinen, vakaa ja sinut itseni kanssa	1	2	3	4
28. Tunnen ylitsepääsemättömien vaikeuksien kasaantuvan tielleni	1	2	3	4
29. Huolehdin liikaa pikkuasioista	1	2	3	4
30. Olen onnellinen	1	2	3	4
31. Minulla on häiritseviä ajatuksia	1	2	3	4
32. Minulla on heikko itseluottamus	1	2	3	4
33. Tunnen oloni turvalliseksi	1	2	3	4
34. Päätöksien teko on minulle helppoa	1	2	3	4
35. Tunnen itseni riittämättömäksi	1	2	3	4
36. Tunnen itseni tyytyväiseksi	1	2	3	4
37. Pikkuasiat pyörivät häiritsevästi mielessäni	1	2	3	4
38. Otan pettymykset niin vakavasti, että minun on vaikea päästä niistä yli	1	2	3	4
39. Olen vakaa ihminen	1	2	3	4
40. Kiihdytän itseni jännittyneeseen tilaan ajatellessani viimeaikaisia huoliani ja kiinnostuksen kohteitani	1	2	3	4

Eeva-Riitta Ylinen

Patients' Pain Assessment and Management during Medication-free Colonoscopy

Awareness of the effects of previous pain experiences and anxiety levels in patients, in particularly for females, should be taken into account. Before the procedure nurses must devote time to discover patients that are at risk of having a painful colonoscopy in order to preset them for medication. Colonoscopy patients' counseling should be developed toward more individual manner. Nurses should use the non-drug interventions as an element of pain management for colonoscopy patients. Nurses and endoscopists should participate in pain education and employ use of pain scales.

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