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PATIENT-PERCEIVED HEALTH-RELATED QUALITY OF LIFE DURING RECOVERY AFTER TOTAL HIP ARTHROPLASTY

– a 6-month Follow-up Study

by

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Hand in hand we come
Christopher Robin and I
to lay this book in your lap.
Say you're surprised?
Say you like it?
Say it's just what you wanted?
Because it's yours –
because we love you.

A.A. Milne. 1926. WINNIE-THE-POOH.

Liisa Montin
Patient-perceived health-related quality of life during recovery after total hip arthroplasty – a 6-month follow-up study
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ABSTRACT

This two-phase longitudinal follow-up study was conducted to examine the patient-perceived impact of total hip arthroplasty when it is measured as changes in patients' health-related quality of life. In descriptive phase I, the aim was twofold: first, to describe patients' experiences of being a patient, of care, and of the health care organisation, and, second to describe patient outcomes of total hip arthroplasty on the basis of previous research. In explorative phase II the aim was to evaluate patient-perceived health-related quality of life after surgery, and to what extent it is influenced by primary (physical function, pain, state anxiety) or economic (out-of-pocket-costs, service use) outcomes of total hip arthroplasty. The ultimate goal was to identify possible critical points of time as well as factors that may delay recovery and in that way worsen patients' health-related quality of life. This knowledge may have uses in nursing when planning postoperative patient care and support.

In phase I of the study 17 patients undergoing primary hip arthroplasty described their experiences in focused interviews twice after surgery. Inductive content analysis was used to analyse this data set. In addition, previous research papers (n = 17) were analysed using deductive content analysis to find out patient outcomes of THA, factors related to patient outcomes, and the research methods used. In phase II patients (n = 100) undergoing primary or revision hip arthroplasty evaluated the outcomes up to six months after surgery: health-related quality of life, primary, and economic outcomes. The data were collected by means of the Sickness Impact Profile, Finnish Version, Stait-Trait Anxiety Inventory, Numeric Rating Scale, and a purpose-designed Physical function questionnaire, Service use questionnaire and Out-of-pocket costs diary. The phase II data were analysed using statistical methods.

Patients' health-related quality of life was improved and pain relieved after surgery, and their physical function increased during recovery. Despite positive changes patients' anxiety remained at the preoperative level. Service use varied with recovery and patients' out-of-pocket costs showed wide variation. Improvements in physical function and relief from pain improved patients' health- related quality of life, whereas a worse postoperative health-related quality was associated with increased service use but not with out-of-pocket costs. Patients' individual characteristics should be taken more into consideration in nursing when planning postoperative, relevant and sufficient patient care for recovery and support, as patients need personally tailored short- and long-term advice, depending on several background factors (e.g. age, gender, preoperative pain, civil status, and type of surgery).

Keywords: health-related quality of life, nursing, patient-perceived, Sickness Impact Profile, total hip arthroplasty

Liisa Montin
Potilaiden käsitys terveyteen liittyvästä elämänlaadusta lonkan tekonivelleikkauksen jälkeisenä toipumisaikana – kuuden kuukauden seurantatutkimus
Hoitotieteen laitos, Lääketieteellinen tiedekunta, Turun yliopisto, Turku
Annales Universitasis Turkuensis D 765, Painosalama Oy, Turku, Finland 2007

TIIVISTELMÄ

Tässä kaksivaiheisessa seurantatutkimuksessa tarkasteltiin potilaiden käsitystä terveyteen liittyvästä elämänlaadusta lonkan tekonivelleikkauksen jälkeisenä toipumisaikana. Tutkimuksen ensimmäisessä vaiheessa tarkoituksena oli sekä kuvailla potilaiden kokemuksia potilaana olosta, saamastaan hoidosta ja terveyspalveluorganisaatiosta että analysoida aikaisempien tutkimusten perusteella leikkauksen tuloksia potilaan kannalta. Toisessa vaiheessa tarkoituksena oli arvioida potilaiden kokemaa elämänlaatua leikkauksen jälkeen, ja sitä vaikuttivatko primaaritulokset (fyysinen toimintakyky, kipu, ahdistus) tai taloudelliset seuraukset (potilaiden itsensä maksamat kustannukset, palvelujen käyttö) terveyteen liittyvään elämänlaatuun. Tutkimuksen tavoitteena oli löytää mahdolliset kriittiset ajankohdat tai tekijät, jotka saattavat hidastaa toipumista ja siten huonontaa potilaiden elämänlaatua. Tätä tietoa voidaan käyttää hoitotyössä kun suunnitellaan sopivaa hoitoa ja tukea toipumisajalle.

Tutkimuksen ensimmäisessä vaiheessa primaarileikkaukseen tulevat potilaat (n = 17) kuvailivat teemahaastatteluissa kokemuksiaan kahdesti leikkauksen jälkeen. Haastatteluaineisto analysoitiin induktiivisella sisällönanalyysilla. Lisäksi 17 tutkimusartikkelista analysoitiin deduktiivisella sisällönanalyysilla leikkauksen tuloksia potilaalle, tuloksiin vaikuttavia tekijöitä ja käytetyt tutkimusmetodit. Toisessa vaiheessa primaari- tai revisioleikkaukseen tulevat potilaat (n = 100) arvioivat leikkauksen tuloksia kuuden kuukauden ajan leikkauksen jälkeen: terveyteen liittyvää elämänlaatua, primaarituloksia ja taloudellisia seurauksia. Aineisto kerättiin erilaisilla mittareilla: Sickness Impact Profile, Finnish Version, Stait-Trait Anxiety Inventory, ja Numeric Rating Scale. Lisäksi käytettiin tätä tutkimusta varten tehtyjä kyselylomakkeita: Fyysinen toimintakyky-mittari, Palvelujen käyttö-mittari ja Kustannusmittari. Tutkimuksen toiseen vaiheen tulokset analysoitiin tilastollisilla menetelmillä.

Potilaiden terveyteen liittyvä elämänlaatu parani ja kipu lievittyi leikkauksen jälkeen ja fyysinen toimintakyky lisääntyi toipumisaikana. Positiivisista muutoksista huolimatta potilaat kokivat ahdistusta samassa määrin kuin ennen leikkaustakin. Palvelujen käyttö vaihteli toipumisajan kuluessa ja potilaiden maksamissa kustannuksissa oli suuria vaihteluita. Fyysisen toimintakyvyn lisääntyminen ja kivun lieveneminen paransivat terveyteen liittyvää elämänlaatua. Sen sijaan huonompi elämänlaatu toipumisaikana oli yhteydessä suurempaan palvelujen käyttöön, kun taas kustannuksilla ei ollut yhteyttä elämänlaatuun. Potilaiden ominaispiirteet tulisi ottaa enemmän huomioon suunniteltaessa sopivaa leikkauksenjälkeistä hoitoa ja tukea. Potilaat tarvitsevat yksilöllisiä ohjeita, sillä monet taustatekijät (esim. ikä, sukupuoli, preoperatiivinen kipu, siviilisääty, ja leikkaustyyppi) vaikuttavat toipumiseen.

Avainsanat: terveyteen liittyvä elämänlaatu, hoitotyö, potilaan käsitys, Sickness Impact Profile, lonkan tekonivelleikkaus

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LIST OF ABBREVIATIONS

ANOVA – Analysis of Variance; HRQOL – Health Related Quality of Life; LOS – Length of Stay; NRS – Numeric Rating Scale; OA – Osteoarthritis; SD – Standard Deviation; SIP – Sickness Impact Profile; THA - Total Hip Arthroplasty

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LIST OF ORIGINAL PUBLICATIONS

This thesis is based on the following publications which are referred to in the text by their Roman numerals I – V:

I Montin L, Suominen T & Leino-Kilpi H. 2002. The experiences of patients undergoing total hip replacement. Journal of Orthopaedic Nursing 6, 23-29.

II Montin L, Leino-Kilpi H, Suominen T & Lepistö J. A systematic review of empirical studies between 1966 and 2005 of patient outcomes of total hip arthroplasty and related factors. Journal of Clinical Nursing (accepted for publication).

III Montin L, Suominen T, Haaranen E, Katajisto J, Lepistö J & Leino-Kilpi H. The changes in health-related quality of life and related factors during the process of total hip arthroplasty. Submitted.

IV Montin L, Leino-Kilpi H, Katajisto J, Lepistö J, Kettunen J & Suominen T. Anxiety and health-related quality of life of patients undergoing total hip arthroplasty for osteoarthritis. Chronic Illness (accepted for publication).

V Montin L, Suominen T, Katajisto J, Lepistö J & Leino-Kilpi H. Economic outcomes from patients' perspective and health-related quality of life after total hip arthroplasty. Resubmitted.

The publications are printed with the kind permission of the copyright holders. The summary also includes previously unpublished material.

1 INTRODUCTION

The world's population is ageing. This is partly due to the fact that over the past 50 years average life expectancy has increased by almost 20 years, to around 65 years. In 2003 some 600 million people were over 60 years old and this number is expected to double by 2025. This will increase economic and social demands in all countries. (WHO 2003.) The Finnish population (5.2 million) also is ageing: in 2006 the proportion over 65 years of age was 16.5 %, and in 2030 it is estimated to be 26 %. Life expectancy at birth will also rise, as in 2030 the life expectancy of women at birth is predicted to be 85 years and that of men 80 years. (Statistics Finland.) Therefore in elderly people functional capacity, defined as the ability of the individual to perform particular defined tasks in the physical, social, psychological or cognitive domains (Leidy 1994, Lilja & Borell 1997), will be more and more important in determining their need for assistance (Heliövaara & Riihimäki 2005). To strengthen and maintain people's health and functional capacity also is the focus of Finnish healthcare policy (Prime Minister's Office 2004, Ministry of Social Affairs and Health 2006).

As the population of the world ages and medical advances lengthen average life expectancy, the prevalence of osteoarthritis (OA) will increase and thus become a larger health problem as it not only decreases physical function but also increases pain (Ehrlich 2003). Around 10 % of people over 60 years of age have severe clinical problems as a result of OA (WHO 2003). In Finland some 20 % of persons over age 75 have OA in the hip, which increases the need for help, use of health services, use of medications, need for orthopaedic surgery, and need for rehabilitation (Heliövaara & Riihimäki 2005). Osteoarthritis in the hip as well as causing pain and impairing physical function also reduces patients' psychosocial well-being (Laupacis et al. 1993) and leads to feeling of anxiety (Creamer et al. 2000).

Total hip arthroplasty (THA) has been shown to be an effective treatment for patients with OA in the hip as it relieves pain, restores function, and improves health-related quality of life (HRQOL) (Ethgen et al. 2004). By measuring individual changes in HRQOL it is possible to document the patient-perceived impact of treatment (Xu et al. 2005). Measuring HRQOL has been shown to provide important information for clinicians, responsible authorities, and policymakers in patient management and policy decisions (O' Boyle et al. 1992, Guyatt et al. 1993), to assist in patient counseling, and to give researchers a means of defining the success of surgery (Xu et al. 2005).

Since the 1960s, when the first hip arthroplasties were performed (Charnley 1961), advances have taken place in technologies and methods related to surgery and anesthesia, and in prosthetic materials. This has also shortened patients' hospital stay and led to their more rapid recovery. In the early days of this treatment patients' average stay in hospital was eight weeks (Charnley 1961), while nowadays it is only a few days.

As a consequence of increased health-care expenditures and for future health-care resources management an evaluation is needed of treatments and interventions utilised in health care and in nursing. The number of patients undergoing THA is increasing and evidence on patients' expectations and patient outcomes is needed in order to prepare patients adequately for surgery and for recovery in less and less time. Little of research has been done on orthopaedic nursing, especially from the patient's point of view, and knowledge on both short-term and long-term patient-perceived outcomes of THA as well as the effect of patient characteristics on those outcomes is needed in order to develop nursing practice.

In this study the interest was in patients' health-related quality of life after total hip arthroplasty. Health-related quality of life was chosen as it is a patientcentred concept through which it may be possible to examine the impacts of surgery broadly from the patient's point of view. The aim was to identify factors that may have associations with patients' health-related quality of life during recovery in order to produce knowledge of value to orthopaedic nursing and to nursing science.

2 REVIEW OF THE LITERATURE

The review of the literature for this study covered the period 1966 – 2007. Database searches were carried out during descriptive phase I and explorative phase II of the study, and updated in spring 2007, when also the Cochrane Library was used, although the search from this database did not elicit any research articles suitable for inclusion in this literature review.

The systematic review was carried out in phase I to describe as extensively as possible the outcomes that are relevant for patients undergoing THA (Paper II). The database searches for the systematic review were based on the Medline (1966 – 2005) and Cinahl (1982 – 2005) databases using the keywords “total hip arthroplasty”, “outcomes”, “osteoarthritis”. The search was limited to empirical research articles concerning patient outcomes, and published in English. The final data proved rather scarce, consisting of only 17 empirical studies, all published in the 1990s and 2000s, in which patient outcomes; HRQOL, physical function, and pain were described on a general level.

In phase II, the focus was narrowed to produce more precise descriptions of THA patients’ HRQOL and specific, primary outcomes of THA, i.e. physical function, pain, and anxiety. In addition, patient-perceived economic outcomes related to THA were examined. The literature searches showed that studies on HRQOL, also dealt with physical function and pain, as these concepts intertwine. Therefore, in part the same studies were examined with respect to different aspects. Because studies on the anxiety reported by patients undergoing THA were very few, anxiety was examined also among other patient groups undergoing elective surgical procedures.

The initial reviews in phase II are partly included in this review: in the description of patients’ HRQOL (Paper III), in the description of anxiety (Paper IV), and in the description of patient-perceived economic outcomes (Paper V). The following sections focus on patients undergoing THA, and the descriptions of outcomes of THA.

2.1 Patients undergoing total hip arthroplasty

Primary OA is the main indication for primary THA (Rantanen et al. 2006). Primary OA develops most commonly in the absence of a known cause, and consists of a generally progressive loss of articular cartilage. A diagnosis of OA requires the presence of symptoms and signs that may include joint pain, restriction of motion, crepitus with motion, joint effusions, and deformity. There is a strong association between the prevalence of primary OA and increasing age. However, OA is not simply the result of ageing and mechanical wear from joint use, nor is primary OA caused by inflammation. (Buckwalter & Mankin 1997, Arokoski et al. 2001.) Instead, an association has been shown between high body mass index and increased risk for later THA of primary OA (Flugsdrud et al. 2006). The severity of OA is not necessarily related to the severity of the symptoms; thus patients who have advanced joint degeneration may have relatively little pain and surprising mobility, while others who have moderate degeneration may have severe symptoms and limited range of motion (Buckwalter & Mankin 1997).

In total hip arthroplasty, the damaged head of the thigh bone is replaced with a metal or ceramic ball mounted on a stem, while the acetabulum is resurfaced with a cemented polyethylene or uncemented metal cup with a solid or separate liner (Charnley 1961). Fequently in active patients, a hip resurfacing arthroplasty is performed instead of a regular total hip arthroplasty, thereby allowing the head of the femur to be preserved (McMinn et al. 1996, Schmalzried et al. 1996).

The demand for arthroplasties is expected to increase. In the EU member states over 190 000 THAs are performed every year (Eurostat 2005), in the Nordic countries the corresponding number is some 50 000 THAs and in Finland over 9 000 (Health Statistics in the Nordic Countries 2004). It is predicted, that by 2030 some 11 000 primary THAs will be performed on an annual basis in Finland in the population over 40 years of age. In 2006 most hip arthroplasties were performed on men aged 61-70, whereas women receiving the same surgery were older, 71-80 years of age. Some 1 300 revision THAs are performed annually, most of them on men aged 71-80 (Rantanen et al. 2006). As the number of primary THAs grows, the number of revisions is also expected to increase.

2.2 Outcomes of total hip arthroplasty

Outcomes are defined as the results of care (Fries 1983, Jennings et al. 1999), or consequence of a medical treatment or nursing intervention (Urden 2001). Outcomes can be classified as patient-focused outcomes, provider-focused outcomes, and organization-focused outcomes. Patient-focused outcomes comprise diagnosis-specific indicators, and holistic indicators. Diagnosis-specific indicators do not address the patient as a whole person, but they focus on specific aspects of an illness. Holistic indicators, which are also known as specific outcomes (Marek 1989), relate to specific diseases, and they show how well the person is living with a particular problem. Thus, the focus is on the person's response, not on the illness. By evaluating holistic indicators, the effect of a given treatment on the patient can be measured. (Jennings et al. 1999.) The effect of THA can be measured by evaluating the primary outcomes that relate to OA, such as the patient's physical function, pain, and psychological function (Meenan et al. 1980, Liang et al. 1990). Other holistic outcome indicators, such as HRQOL emphasize the patient's interpretation of outcomes (Jennings et al. 1999). An economic aspect may be included among outcomes by measuring the use of resources (Marek 1989, Jennings et al. 1999, Urden 2001).

In the following subsections the focus is on patients' HRQOL, primary outcomes (physical function, pain, anxiety), and economic outcomes (service use, out-of-pocket costs) after THA.

2.2.1 Health-related quality of life as an outcome of total hip arthroplasty

Quality of life has been defined as individuals' perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. It is a wide-ranging concept incorporating in a complex way the target of person's physical health, psychological state, level of independence, social relationships, personal beliefs and the relationship of these to salient features of the environment. Quality of life cannot be simply equated with the terms of "health status", "life style", "life satisfaction", "mental state" or "well-being". (The WHOQOL Group 1996.) Quality of life is not the same as health status, which refers to physical, psychological and social wellbeing. Quality of life includes, for example such aspects as a person's financial resources, environment, and education. Health and illness alone do not determine the quality of life of patients. (O'Boyle et al. 1992.)

Definitions of quality of life can be classified into three major types. The first of these, global definitions, appear to be the most common type of definition, but because of their generality they reveal little about the components of quality of life or how the concept could be operationalized. The second type comprise definitions which break the concept down into components or dimensions. These definitions are more useful for empirical work. The third type, focused definitions, refer to only one or a small number of the components of quality of life, most commonly only to the components of health/functional ability. If authors are referring only to the dimensions health and functional status, they must either make this explicit, or use the concept 'health-related quality of life' instead of the concept 'quality of life'. (Farquhar 1995.) On the other hand, when a patient is ill, most all aspects of life, including the economic and environmental can become health-related (Guyatt et al. 1993).

Following THA, patients' HRQOL has been shown to improve (Hozack et al. 1997, Ridge & Goodson 2000, Jones et al. 2001, Laupacis et al. 2002, Ethgen et al. 2004). Improvements were seen up to two years (Ritter et al. 1995), although a slight reduction was seen already after one year (Laupacis et al. 2002). In an other study, postoperative HRQOL was found to be related to its preoperative baseline values (Xu et al. 2005). In previous studies, the level of HRQOL was maintained for at least four (Rorabeck et al. 1996), and seven years (Laupacis et al. 2002). Improvements in HRQOL were seen in psychosocial recovery at six weeks (Knutsson & Bergbom Engberg 1999) and at three months (McMurray et al. 2002), whereas physical recovery was seen not until after six months (Knutsson & Bergbom Engberg 1999, McMurray et al. 2002). Dramatic improvements were found in the categories sleep and rest (Rorabeck et al. 1994, Knutsson & Bergbom Engberg 1999, Ridge & Goodson 2000).

Patient characteristics, like age alone, were not associated with HRQOL (March et al. 1999, Jones et al. 2001, McMurray et al. 2002, Ethgen et al. 2004), but higher age and preoperative pain predicted poor function postoperatively (Nilsdotter et al. 2003). Female patients seemed to be in worse physical condition preoperatively compared with men (Lieberman et al. 1997), and their physical recovery also took longer (McMurray et al. 2002). A prolonged waiting time of more than six months may impair patients' HRQOL (Garbuz et al. 2006), although also the opposite results have been found (Mahon et al. 2002).

Health-related quality of life among THA patients includes not only pain and physical functioning, but also social functioning, mental health, vitality and general health. Therefore a general health survey should be used together with a disease-specific measurement to obtain more exact assessment (Guyatt et al. 1993, McGuigan et al. 1995, Lieberman et al. 1997). The generic instruments most frequently used to measure HRQOL are the Nottingham Health Profile (NHP, Hunt et al. 1981), Medical Outcomes Study Short-Form 36 (SF-36, Ware & Sherbourne 1992), and Sickness Impact Profile (SIP, Bergner et al. 1981) while the corresponding disease-specific instruments are the Harris Hip Score (HHS, Harris 1969), and Western Ontario and McMaster University Osteoarthritis Index (WOMAC, Bellamy et al. 1989). (Table 1 Paper II.)

It seems that little is known about patients' own perceptions or experiences concerning their HRQOL. It has been recognized that the assessment of treatment outcome should focus more on the perceived health of patients (Gartland 1988, Xu et al. 2005), especially as primary OA can reduce an individual's perceived HRQOL (Shields et al. 1999).

2.2.2 Primary outcomes of total hip arthroplasty

The review below covers primary outcomes, which are defined here as those specific desired outcomes that relate to symptoms of osteoarthritis and measure the effects of THA on patients' physical function, pain, and anxiety.

Physical function

After primary THA, patients' physical function has been shown to improve (Ethgen et al. 2004), whereas slightly lower functional outcomes have been found after revision surgery (Saleh et al. 2003, Ethgen et al. 2004). Poor preoperative function predicts poor functional outcomes (Young et al. 1998, Fortin et al. 2002) and therefore performing surgery before patients' function has declined may result in better outcomes (Fortin et al. 2002). A prolonged waiting time of more than six months also decreased postoperative function (Garbuz et al. 2006).

Patients' walking capacity before surgery influenced postoperative walking capacity during a ten-years follow-up (Röder et al. 2007). Patients who had pain with walking, or needed assistance with walking before surgery were more likely to have pain or disability at one year after surgery (Holtzman et al. 2002). The best functional outcomes have been reported among patients who are between 45 and 75 years of age, weigh under 70 kg, have social support, good preoperative function, and no comorbidities; however, the interactions between such patient factors need to determined (Young et al. 1998). Although increased age was not related to patients' postoperative function (Jones et al. 2001), the effect of age may be confounded by other factors, such as comorbidity, activity level, postoperative functional goals, and type of disease (Young et al. 1998).

Physical function among THA patients was measured, for example, by assessing mobility, communication, and activities of daily living (Marek 1989, Urden 2001) or walking capacity and hip flexion (Röder et al. 2007). Physical function as well as HRQOL among THA patients was measured by using both a generic instrument, such as the Medical Outcomes Study Short-Form 36 (SF-36, Ware & Sherbourne 1992), and a specific instrument, such as the Merle d'Aubigné and Postel hip score (Merle d'Aubigne & Postel 1954), Harris Hip Score (HHS, Harris 1969), Western Ontario and Mcmaster University Osteoarthritis Index (WOMAC, Bellamy et al. 1989), or Oxford Hip Score (OHS, Dawson et al. 1996) (Table 1 in Paper II) as these instruments have subscales for physical function.

Pain

After THA, patients reported that pain relief was more important than improvements in HRQOL, although HRQOL also improved (Knutsson & Bergbom Engberg 1999). In addition, no association between pain and HRQOL was found (Ridge & Goodson 2000), although other research has shown that preoperative pain may determine patients' postoperative HRQOL (Street et al. 2005).

The HRQOL of patients was poor before surgery if preoperative pain caused them sleeping problems; however, these problems decreased after surgery (Knutsson & Bergbom Engberg 1999, Ridge & Goodson 2000), thereby improving HRQOL. However, some patients had pain and some could not lie on their side postoperatively at six months (Knutsson & Bergbom Engberg 1999). Pain was successfully relieved after surgery (Healy et al. 1998, Holtzman et al. 2002, Ethgen et al. 2004), also among patients 80 years or older (Jones et al. 2001), although some younger patients reported that pain was due to lower use of painkillers (Pellino 1997). Advanced age is not a contraindication for cementless THA, which has been shown to decrease pain effectively (Keisu et al. 2001, Berend et al. 2004), whereas an anatomically designed prosthesis (Ragab et al. 1999) as well as cementless hydroxyapatite-coated THA (Theiss & Ball 2003) can provide low prevalences of pain in younger, active patients.

Conflicting results have been obtained on the issue of whether patients' preoperative pain predicts their level of postoperative pain. Preoperative pain has been shown to increase postoperative pain when measured immediately after surgery (Thomas et al.

1998, Strömberg & Oman 2006), at one year (Garbuz et al. 2006), at two years (Fortin et al. 2002) and also after revision surgery (Davis et al. 2006). However, no association with level of preoperative pain or pain alleviation was found during a follow-up period of ten years (Röder et al. 2007). Other patient characteristics predicting postoperative pain among THA patients were female gender and younger age (Thomas et al. 1998).

Pain among THA patients has been measured by using either a generic instrument, such as the Medical Outcomes Study Short-Form 36 (SF-36, Ware & Sherbourne 1992), or a specific instrument, such as the Harris Hip Score (HHS, Harris 1969), as these instruments also have dimensions measuring pain. Visual Analog Scale (VAS, Thomeé et al. 1995) has been used to measure pain only (Healy et al. 2000, Antall & Kresevic 2004, Ogonda et al. 2005).

Anxiety

After THA, improvements in the psychosocial dimension of HRQOL were seen sooner than in the physical dimension (Knutsson & Bergbom Engberg 1999), although improvements were seen in both dimensions (Rorabeck et al. 1996, Ridge & Goodson 2000, Laupacis et al. 2002). Patients who were more disabled before surgery reported greater gains in HRQOL and also a greater reduction in anxiety (Mahon et al. 2002). After surgery, mentally positive experiences have been found to enhance functional recovery (Travis & McAuley 1998). Patients waiting for elective surgery have reported anxiety (Caumo et al. 2001a, b), which can be an unpleasant situational emotional state or a relatively stable personality trait. The higher the level of trait anxiety, the more probable it is that the individual will experience more state anxiety in a threatening situation. (Spielberger 1983.)

Anxiety has been shown to impair function in patients with OA (Young et al. 1998). Although state anxiety was related to functional impairment among patients with OA in the hip, it was also found that personality traits influence pain and functional impairment (Summers et al. 1988). State anxiety was found to be postoperatively the only significant predictor of pain among hip replacement patients (Feeney 2004). Also preoperative anxiety predicted higher postoperative pain (Thomas et al. 1998). Women with preoperative anxiety did not respond as well to THA compared with other patients (Ritter & McAdoo 1979).

Anxiety among THA patients has been measured, for example, by using Spielberger's State-Trait Anxiety Inventory (STAI, Spielberger 1983) (Bondy et al. 1999, Doering et al. 2000, Giraudet-Le Quintrec et al. 2003, Feeney 2004, Pellino et al. 2005), and the Profile of Mood States instrument (POMS, Afflect et al. 1999) (Antall & Kresevic 2004).

2.2.3 Economic outcomes of total hip arthroplasty from the patient's perspective

Economic outcomes can be defined as any outcome that can be quantified to reflect the costs of healthcare and health management. Examples of economic outcomes are the use of home nursing, hospice use, emergency visits, the use of health care services, out-of-pocket costs, referrals, cost per patient day/episode of care, morbidity, and mortality. (Urden 2001.) The following sections focus on patients' use of services and out-of-pocket costs as these relate to THA, since they are crucial to individuals when deciding on surgery and planning service use during recovery. Out-of-pocket costs are defined here as the costs related to their hip operation that patients have to pay themselves.

Service use

After THA, patients used health care services in the form of routine visits to orthopaedic clinic (Laupacis et al. 1994, McMurray et al. 2002), physiotherapy (Laupacis et al. 1994) and home visits by nurses (Laupacis et al. 1994, McMurray et al. 2002). Patients also reported use of nonhealth care services pertaining to housework (Holtzman et al. 2002).

Preoperatively, OA in a hip seemed to increase patients' need for assistance. Older women, in particular, received assistance from family and friends with housework, shopping, heavy domestic duties, carrying heavy items, and with driving and transportation. Poor physical function and pain were related to the need for assistance. (Lapsley et al. 2001.) There is little research on service use after THA, although some results have shown that poor function and pain preoperatively seemed to increase patients' need for assistance in daily activities more often than among with those in better preoperative condition (Fortin et al. 2002, Holtzman et al. 2002). In some previous studies patients' use of services was determined by asking patients to note down all the services they had used related to their hip operation (Laupacis et al. 1994, Goossens et al. 2000).

Out-of-pocket costs

THA-related costs mostly comprise the cost of implants (Lavernia et al. 1995, Metz & Freiberg 1998, Rissanen et al. 1998, Scheerlinck et al. 2004) and length of hospital stay (LOS) (Meyers et al. 1996, Scheerlinck et al. 2004). Shorter LOS (Meyers et al. 1996, Weingarten et al. 1998) may reduce costs directly, while clinical pathways (Healy et al. 1998, Kim et al. 2003), the patient management system (Fisher et al. 1997), and implant standardisation (Healy et al. 1998) may reduce LOS and in turn costs. On the other hand, patients without residential support had longer LOS (McMurray et al. 2002), as did waiting for rehabilitation (Scheerlinck et al. 2004). However, discharge destination did not predict out-of-pocket costs during the first year postoperatively (Tribe et al. 2005).

Some results have shown an association between type of surgery and costs. For example, a bilateral simultaneous sequential THA (Reuben et al. 1998) reduced costs, while revision THA was significantly more expensive than primary THA, because of longer LOS and costs associated with implants (Lavernia et al. 1995, Bozic et al. 2005). In a gender comparison of out-of-pocket costs female patients had twice the out-of-pocket costs of males (Tribe et al. 2005).

Cost diaries have shown to be an effective research tool to record THA patients' out-of pocket costs (Laupacis et al. 1994, Goossens et al. 2000, Lapsley et al. 2001, March et al. 2002, Fielden et al. 2005, Tribe et al. 2005). In these studies costs included direct health care costs, such as specialist care, physiotherapy, hospitalisation fee and medication, direct nonhealth care costs, such as home help service and travel costs, and indirect costs, such as time off work. It was concluded that to get more exact information, patients should be asked more explicitly for costs, instead of calculating costs according to service use. (Goossens et al. 2000.)

2.3 Summary

According to this review of the literature improvements in patients' HRQOL after THA have been found in the both short and long term. Preoperative HRQOL was related to postoperative values, and the psychosocial dimension of HRQOL postoperatively improved before improvements in the physical dimension were seen. HRQOL is a subjective experience, which is thought to include all the aspects of life related to health - physical, psychological, social, and economic - and which emphasizes the individual patient's interpretation of his or her outcome, as patients with the same clinical criteria may respond differently. Because HRQOL is a multifaceted concept there is no unambigious method of measuring it, and therefore many different, both generic and disease-specific instruments, have been used in combination. However, the assessment of HRQOL needs to focus more on patients' perceptions.

Patients' pain was relieved and physical function improved after surgery. Patients also reported that pain relief came before anything else. Preoperatively pain also disturbed sleep and so decreased HRQOL. It appears that preoperative pain may increase postoperative pain and thus may reduce postoperative HRQOL. It was also found that patients having postoperative state anxiety reported more preoperative pain than patients without state anxiety.

Economic outcomes were mainly hip-related services which patients had used and paid for after surgery, although the use of services was calculated according to their mean use and costs estimated accordingly. What patients had actually spent was not investigated.

Poor preoperative function seemed to be preoperatively noteworthy in increasing anxiety and service use, whereas postoperatively it was related to higher pain and poorer function. Other patient characteristics such as age or gender alone did not prejudice the outcome, but together they seem to have an effect.

This review of the literature showed that the outcomes of THA need to be measured at several different times. Although some changes, like pain relief, may be measured in a short period of time, a longitudinal view of outcomes may provide patients with realistic information about the effects of surgery, and in that way help them to make informed decisions, as well as inform clinicians and policymakers.

3 PURPOSE OF THE STUDY AND RESEARCH QUESTIONS

The purpose of this two-phase, longitudinal follow-up study was to examine the patient-perceived impact of total hip arthroplasty (THA), measured as changes in patients' health-related quality of life (HRQOL). The ultimate goal was to determine the possible critical points of time and factors that may delay recovery and thus worsen patients' HRQOL, in order to improve nursing practice, especially when planning care and support for patients during recovery. The study design is described in Figure 1.

DESCRIPTIVE PHASE I

In descriptive phase I the aim was to describe patients' experiences and patient outcomes of THA. More specifically, the research questions were:

1. What are the experiences of patients of being a patient, of care, and of the health care organisation before and after THA? (Paper I)
2. What are the patient outcomes of THA, factors related to patient outcomes, and the research methods used according to previous research? (Paper II)

EXPLORATIVE PHASE II

In explorative phase II the aim was to evaluate patient-perceived HRQOL after THA, and to what extend it is influenced by primary or economic outcomes of THA. The following more focused research questions were addressed:

3. What changes in health-related quality of life are experienced by patients undergoing THA? (Paper III)
4. What are the primary outcomes of THA?
    - What is patients' physical function during recovery and is it associated with health-related quality of life? (Summary)
    - What changes are there in patients' level of pain after total hip arthroplasty and are these changes associated with health-related quality of life? (Paper III, IV, V)
    - What changes are there in patients' level of state anxiety after THA and are these changes associated with health-related quality of life? (Paper IV)
5. What are the economic outcomes of THA as reported by patients?

- What services do patients use, what are their out-of-pocket costs during recovery, and are these associated with health-related quality of life? (Paper V)

The following hypotheses were tested:

- Patients' health-related quality of life improves after total hip arthroplasty.
- There will be positive changes in primary outcomes after total hip arthroplasty, and these outcomes will improve patients' HRQOL.
- There will be economic outcomes for patients after total hip arthroplasty, and these outcomes will be related to changes in patients' HRQOL.

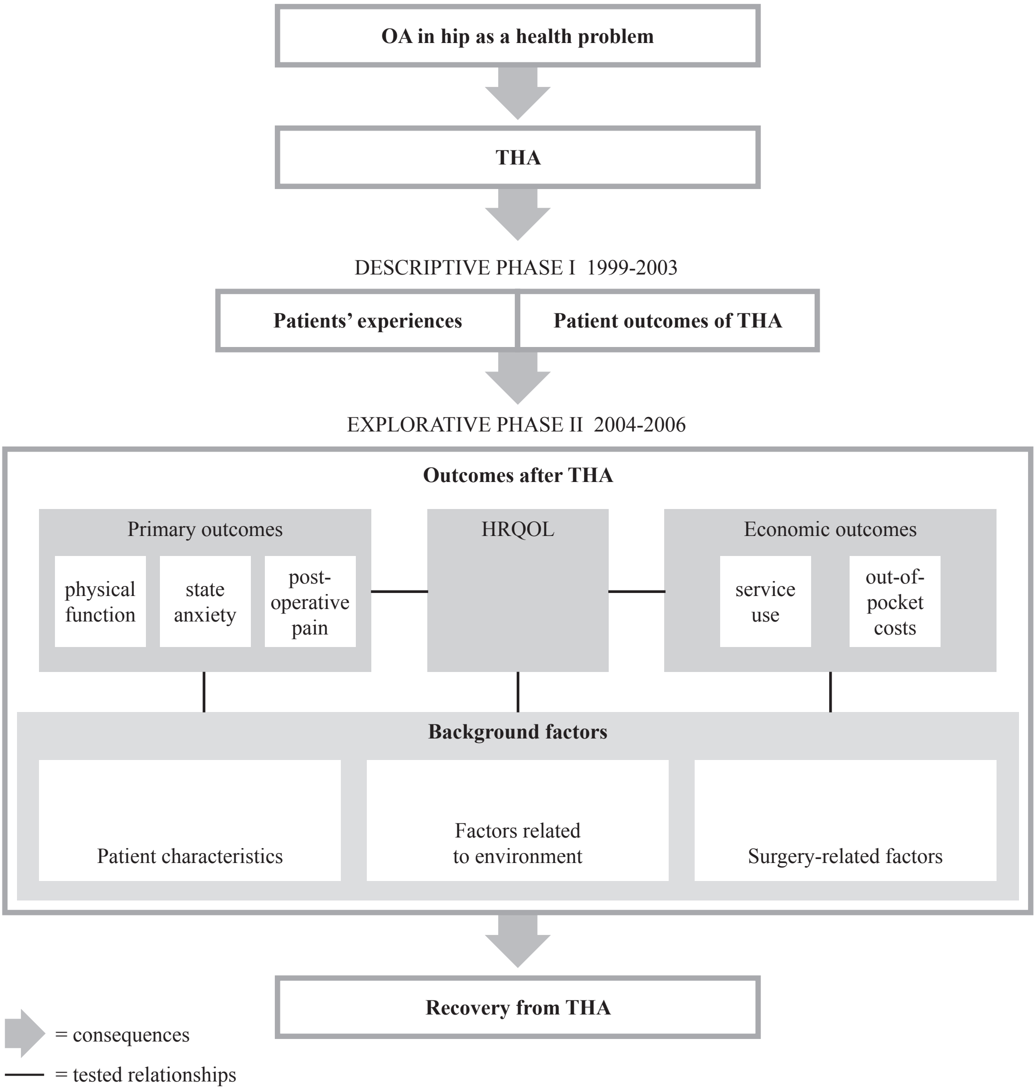

Figure 1. The study design.

4 METHODOLOGY

The purpose of this descriptive, explorative, and longitudinal, follow-up study was to evaluate the impact of total hip arthroplasty on patients' HRQOL. The study was carried out in two phases in one orthopaedic hospital between 1999 and 2006 (Figure 1). The methods used are shown in Table 1.

Table 1. Methods of the two-phase longitudinal study.

Descriptive phase I, descriptive design				
Paper	**Data collection method**	**Focus of data collection method**	**Sample**	**Methods of analysis**
I	focused interviews	patients' experiences	n = 17 THA patients	Inductive content analysis
II	MEDLINE (1966-2005) and CINAHL (1982-2005) databases	patient outcomes, instruments, research methods	n = 17 research papers	Systematic analysis, deductive content analysis
Explorative phase II, descriptive, explorative, longitudinal design				
Paper	**Instrument**	**Focus of instrument**	**Sample**	**Methods of analysis**
III, IV, V	Sickness Impact Profile (SIP)	health-related quality of life	n = 100 THA patients	Statistical analysis
IV	State Trait Anxiety Inventory (STAI)	anxiety		
Reported in summary	Physical function questionnaire	physical function		
III, IV, V	Numeric Rating Scale (NRS)	pain		
V	Service use questionnaire	service use		
V	Out-of-pocket costs diary	out-of-pocket costs		

4.1 Sample

In descriptive phase I, patients (n = 17) selected according to specific criteria participated in the study (Paper I). Patients were eligible if they were scheduled for primary arthroplasty, their mother tongue was Finnish, and they were willing to participate. Of the 17 participants nine were women and eight men, and their mean age was 66 years (range 22-79 years) (Table 2). In the systematic literature review the data (n = 17 empirical research papers) included all the articles that met the inclusion criteria: an empirical research article concerning patient outcomes published in English.

In explorative phase II, primary or revision hip arthroplasty patients (n = 100) (Table 2) participated in the study between October 2004 and March 2006. Patients were eligible for the study if they had osteoarthritis of the hip, had no comorbid diseases, and had volunteered for the study. A power analysis was performed to ascertain the necessary sample size. The analysis showed that 92 patients were needed to provide 80 % power to detect a difference of 8,5 points (p = 0.05). However, one hundred patients were included in the sample to ensure a sufficiently large sample to compensate for possible drop-out. The sample consisted of 54 women and 46 men, and their ages ranged from 37 to 87 years (mean 63.9 years) (Tables 1, 2 Paper III, Table 1 Paper IV). The response rate was 87 % at six months.

Table 2. Sociodemographic data on patients at both phases of the study.

Variables	**Descriptive phase I (n = 17)** mean, (± SD, min-max)	n	**Explorative phase II (n = 100)** mean, (± SD, min-max)	n
Age (in years)	66.3 (± 16.3, 22-79)	17	63.9 (± 11.6, 37-87)	100
female	65.0 (± 16.7, 22-78)	9	66.4 (± 10.3, 40-87)	54
male	67.8 (± 16.8, 30-79)	8	60.9 (± 12.5, 37-82)	46
Length of hospital stay (in days)	10.4 (± 3.8, 7-21)	17	8.9 (± 2.4, 5-18)	100
Time on waiting list for this hospital (in months)	1.8 (± 1.7, 0.2-6)	17	1.6 (± 1.3, 0-7)	100
Type of surgery				
primary unilateral	-	13	-	66
primary bilateral	-	4	-	17
revision	-	-	-	9
primary unilateral, previous THA on the contra-lateral hip	-	-	-	8
Discharge destination				
home	-	9	-	86
elsewhere, e.g. health care center	-	8	-	14

4.2 Data collection methods

In phase I the data were collected in focused interviews, where the participants were asked in their own words to describe their experiences of being a patient, of the care they received and of the health care organization. Sociodemographic background information was gathered at the time of the first interview (Appendix 1). In the systematic literature review the data were gathered from the Medline and Cinahl databases.

In phase II of the study six different instruments were used to collect the data: the Sickness Impact Profile (SIP), Finnish Version; the State-Trait Anxiety Inventory (STAI); Physical function questionnaire; Numeric Rating Scale (NRS); Service use questionnaire; and Out-of-pocket costs diary. The number of background variables in phase II was 20 (Appendix 1) and they were grouped as follows: patient characteristics (age, gender, civil status, BMI, preoperative pain level), environmental factors (living arrangements, time on waiting list, climbs stairs daily, lift available, domicile, smoking history, discharge destination) and surgery-related factors (complications, type of surgery, type of prosthesis, blood loss, duration time of operation, LOS). One item refered to number of diagnoses, which was only used to verify the homogenity of the sample. Whether patients' need for assistance at home after surgery had been planned in hospital was asked at one month post surgery in the Service use questionnaire.

The Sickness Impact Profile (SIP), Finnish Version

The Sickness Impact Profile (SIP, Bergner et al. 1981) is a generic instrument, which measures patients´ perceived health-related dysfunction. The SIP contains 136 items, which are divided into 12 categories grouped into three dimensions. The Physical dimension contains the categories Ambulation (12 items), Mobility (10 items), Body Care and Movement (23 items). In the Psychosocial dimension the categories are Communication (9 items), Alertness Behavior (10 items), Emotional Behavior (9 items), Social Interaction (20 items). The third dimension, Independent Categories consists of Sleep and Rest (7 items), Eating (9 items), Work (9 items), Home Management (10 items), Recreation and Pastimes (8 items) (Bergner et al. 1981). The validity and reliability of the SIP has been well demonstrated (Bergner et al. 1981, Katz et al. 1992, 1995).

The SIP can be either interview- or self-administered. Participants are asked to check the items that are related to their health and describe them on that day. Each item is assigned a numerical value, with higher values indicating greater dysfunction. Thus the higher the total score, the more dysfunction the patient has. The score ranges between 0 = no dysfunction and 100 = maximal dysfunction. Scoring can also be done on the level of categories and dimensions, as the Independent Categories have to be scored separately. (Sickness Impact Profile, user's manual and interpretation guide 1996.)

The SIP has been used earlier to measure HRQOL among THA patients (Laupacis et al. 1993, 2002, Rorabeck et al. 1994, 1996, Knutsson & Bergbom Engberg 1999, Ridge & Goodson 2000). The present study was the first time the SIP has been used in nursing studies in Finland. The Finnish version of the SIP including 136 items was back-translated and pretested with total hip arthroplasty patients (n = 17) to test its equivalence (Hilton & Skrutkowski 2002). (Paper III, Appendix 2.) However, one item concerning suicidal thoughts was excluded from the instrument on the request of the ethical research committee of the hospital district, and thus in the present study the instrument contained 135 items.

The State-Trait Anxiety Inventory (STAI)

Patients' level of anxiety was measured by means of the State-Trait Anxiety Inventory (STAI) (Spielberger 1983). The STAI is a generic instrument which has been used in previous research to measure anxiety among THA patients (Bondy et al. 1999, Doering et al. 2000, Giraudet-Le Quintrec et al. 2003, Feeney 2004, Pellino et al. 2005). The reliability and validity of the STAI has been demonstrated (Spielberger 1983, Heikkilä et al. 1998, Koivula et al. 2001, Kiviniemi 2006). A Finnish version of the STAI was used in this study. This version has earlier been used among women undergoing mammography screening (Aro 1996) and planned caesarean women (Kiviniemi 2006) (Appendix 3).

The instrument comprises two separate scales, both consisting of 20 statements, which measure patients' state and trait anxiety on a 4-point Likert scale. The S-Anxiety scale evaluates the intensity of feelings (1 = not at all, 2 = somewhat, 3 = moderately so, 4 = very much so). The T-Anxiety scale assesses how respondents generally feel (1 = almost never, 2 = sometimes, 3 = often, 4 = almost always). Scores for both scales can vary from a minimum of 20 to a maximum of 80. (Spielberger 1983.) (Paper IV.)

Physical function questionnaire

Patients' physical function was measured after surgery by using a purpose-designed questionnaire that was based on the results of phase I and the earlier literature. The questionnaire consists of 24 statements concerning mobility (8 items), sleep (8 items), and pain (8 items). The response scale is a 4-point Likert scale (1 = strongly agree, 2 = partly agree, 3 = partly disagree, 4 = strongly disagree) (Appendix 4) The questionnaire was piloted (n = 5), and no changes were made on the basis of the pilot. In addition, in one question patients evaluated their pain level on a ***Numeric Rating Scale*** (NRS, Downie et al. 1978, Jensen et al. 1989) in which 0 = no pain at all and 5 = the severest pain possible. The NRS is a valid instrument to measure pain intensity when compared with other instruments for the same purpose (Kremer et al. 1981, Paice & Cohen 1997).

Service use questionnaire

Patients' service use during recovery was measured with purpose-designed questionnaire that was partly based on the results of phase I and partly on the Finnish health care system. The frequency of service use (home nursing, physiotherapy, home help services, and transportation) was measured on a 4-point Likert scale (1 = every day, 2 = every week, 3 = occasionally, 4 = not at all) (Appendix 5). The questionnaire was piloted (n = 5) to test its clarity and suitability to collect the data, and no changes were made after the pilot. (Paper V.)

Out-of-pocket costs diary

Patients' out-of-pocket costs were measured by using a cost diary that was designed specially for this study (Appendix 6). Cost diaries have been used earlier to measure patients' costs related to THA (Laupacis et al. 1994, Fielden et al. 2005, Tribe et al. 2005). Patients recorded all hip-related health care and nonhealth care costs for up to six months after surgery, including hospital costs. These out-of-pocket costs were costs that patients had to pay themselves after reimbursement from the national health insurance fund. On the basis of the pilot (n = 5), no changes were made to the cost diary. (Paper V.)

4.3 Data collection

In phase I the researcher interviewed the participants (n = 17) twice during winter 1999 - 2000 (Paper I). The first interview occurred on the fourth postoperative day on the ward and it took about one hour to complete. The background information was gathered at the same time. The second interview was conducted at the time of a postoperative visit to an outpatient clinic at 8 – 12 weeks after surgery and took about half an hour to complete. A systematic analysis was conducted using the Medline and Cinahl databases.

In phase II patients' outcomes were measured five times during the follow-up: a day before surgery (n = 100) and at one (n = 98), two (n = 95), three (n = 88), and six (n = 87) months after surgery. The research secretary collected the data. Table 3 summarises the data collection measurement occasions, instruments, and sample sizes in phase II.

Table 3. Data collection measurement occasions, instruments, and sample sizes in Phase II.

Instrument	**preoperative one day before surgery**	**postoperative at one month**	**postoperative at two months**	**postoperative at three months**	**postoperative at six months**
Background variables	n = 100	-	-	-	-
Sickness Impact Profile (SIP)	n = 100	-	-	n = 88	n = 87
State-Trait Anxiety Inventory (STAI)	n = 100	n = 95	-	n = 88	n = 87
Physical function questionnaire	-	n = 98	n = 95	n = 88	n = 87
Numeric Rating Scale (NRS)	n = 100	n = 96	n = 95	n = 88	n = 87
Service use questionnaire	-	n = 98	n = 95	n = 88	n = 87
Out-of-pocket costs diary	-	n = 96	n = 95	n = 88	n = 87

Patients self-administered the SIP, Finnish Version, and the STAI a day before surgery at the hospital. The SIP, Finnish Version, was mailed to patients at three and six months after surgery. Patients administered it at home and returned it by mail in prepaid envelopes to research secretary. (Paper III.) The STAI was mailed to patients at one, three, and six months after surgery. Patients completed it at home and returned it by mail to research secretary. (Paper IV.)

The data on patients' service use, out-of-pocket costs, physical function and pain were collected at one, two, three, and six months after surgery by phone. The questionnaires on service use and physical function as well as the cost diaries were mailed to the participants beforehand so that they had the possibility to record all the relevant information.

The research secretary gathered the sociodemographic background data from those who agreed to participate the day before surgery. The surgery-related factors were collected from patient records after surgery.

4.4 Data analysis

In phase I the taperecorded interviews were transcribed verbatim. The transcripts were then analysed using the method of inductive content analysis, where the concepts are derived from the data (Marshall & Rossman 1995, Burns & Grove 2005). In this study the unit of analysis was a single word, several words or a thought that was clearly related to the interview themes. Next, similar expressions were grouped into subcategories which in turn were grouped into upper categories. (Paper I.) Deductive content analysis was used in the systematic literature review according to the research problems: patient outcomes of THA, factors related to patient outcomes, and the research methods used.

In phase II, SPSS software for Windows (version 12.0) was employed for the statistical analysis. The background variables, HRQOL (SIP), anxiety (STAI), physical function, pain (NRS), service use, and out-of-pocket costs were described and summarized by using descriptive statistics, means, standard deviations and frequencies.

The total SIP is scored according to the number and type of items that are endorsed and computed by summing the scale values for the items and dividing by the total theoretical maximum score, and then multiplying by 100. Thus the score is expressed as a percentage, ranging from 0 (no dysfunction) to 100 (maximal dysfunction). (Sickness Impact Profile, user's manual and interpretation guide 1996.) In the present study the results of the total SIP are reported at the mean level, as has also been done in previous research (Rorabeck et al. 1996, Knutsson & Bergbom Engberg 1999, Ridge & Goodson 2000, Laupacis et al. 2002). (Paper III.)

Before counting the S-Anxiety and T-Anxiety scales the negatively expressed items were reversed. In accordance with the manual (Spielberger 1983) the incomplete answers were excluded before the analysis. The scales were then categorized into three classes: low anxiety (20-39), moderate anxiety (40-59) and strong anxiety (60-80) (Heikkilä et al. 1998, Koivula et al. 2001, Kiviniemi 2006). (Paper IV.)

Analysis of Variance (ANOVA) for repeated measures was used to test the differences between HRQOL and anxiety (Paper III, IV) and the Friedman and Wilcoxon nonparametric tests were used to test the differences between service use (Paper V) on each measurement occasions. The Friedman test was also used to test the differences between pain measured before and after surgery (Summary). Bonferroni corrections were used to minimize type I error of paired Wilcoxon tests.

The Mann-Whitney U, Kruskal-Wallis and the Spearman coefficient of correlation were used to compare the associations between the background variables and HRQOL, anxiety, and out-of-pocket costs (Paper III, IV, V). Also multifactor ANOVA with covariates (MANOVA) was used to evaluate if any background factors were significant when compared with anxiety (Paper IV). The Spearman coefficient of correlation and Fisher's test were used to test associations between the background variables and service use (Paper V). Associations between background variables and physical function were measured by using the Chi-square test and Spearman coefficient of correlation (Summary). The physical function variables were examined separately as the low reliability coefficients did not indicate consistency with respect to the total scores in each measurement.

The relationships between anxiety, physical function, pain, service use, and out-of-pocket costs with HRQOL were measured by using the Spearman coefficient of correlation. The level of significance was set at < 0.05 and only statistically significant results are reported.

4.5 Ethical questions

The primary principles of research ethics were adhered to throughout this study (ETENE 2001a, 2001b, 2002, ICN 2003, Burns & Grove 2005). The permissions to carry out this study and to use the data collection instruments are presented first, followed by the ethical questions concerning informed consent, voluntary participation, anonymity, confidentiality and the protection of subjects from discomfort and harm.

In phase I, the hospital ethics committee approved the study (Paper I). In phase II (Papers III, IV, V) the ethical research committee of the hospital district approved the study. In addition permission was also granted by the hospital ethics committee to access patient records to gather the surgery-related data. Permission to use the SIP was obtained from the copyright holder, Medical Outcomes Trust, as was permission to publish the SIP, Finnish Version, including all 136 items, as an appendix to this thesis. Permission to use the STAI was granted by the copyright holder Mind Garden Incorporate, and permission to use the Finnish version of STAI was received from Aro (1996).

In phase I and phase II patients were informed both orally and in writing about the aims of the study (Appendix 7) and all those who participated gave their written informed consent. They were aware that their participation was voluntary; they could refuse to participate or discontinue their participation at any time without no effect on their treatment. Anonymity and confidentiality were maintained, as in phase I the researcher collected the data and she was the only person who had knowledge of patients' personal data. In phase II the research secretary contacted the participants several times during the data collection and only she had access to their personal data. Subjects' anonymity was protected during the data collection and data analysis in phase II by giving each subject a code number.

Longitudinal designs require subject commitment over a long period of time (Burns & Grove 2005), and thus the data collection may cause temporary discomfort as it takes time. In phase II this was avoided by contacting the participants at the appointed time and taking time for social amenities with subjects taking into account that the participants' time is valuable.

5 RESULTS

The results are reported according to the phases of the study. The first section describes the results of descriptive phase I: patients' experiences of being a patient, of care, and of the health care organisation before and after THA (Paper I); and furthermore patient outcomes of THA based on a systematic review of the literature (Paper II). In the second section the results of explorative phase II are presented as follows: changes in HRQOL after THA (Paper III); primary outcomes after THA (Paper IV, Summary); and economic outcomes after THA (Paper V).

5.1 Patients' experiences and patient outcomes

The experience of being a patient were divided into physical, psychological and social experiences before, during and after hospitalization. The main physical experiences during the different stages were related to pain, sleep, and mobility. "My physical condition is not the same as it used to be before", and "especially at nights it was impossible to sleep on this side, the pain kept waking me up" were excerpts from the data illustrating physical experiences before hospitalization. During hospitalization pain was mainly wound pain, but more intense than the participants had expected and they thought they had not asked for enough painkillers. After hospitalization some participants still had muscular pain, reporting that "it was difficult to sleep, I think it was all due to the pain" and "I have not slept well until I dared to sleep on my side". Psychological experiences included different resources patients had and thoughts concerning their surgery and the future. Social experiences included changes in social life and social roles. Before surgery patients experienced difficulties in performing their daily activities and did not take part in their usual leisure activities, whereas after hospitalization they once again engaged in their daily tasks and visited friends. (Paper I.)

Experiences of care during hospitalization mainly concerned how different professionals acted and treated them: "They know what to do, you can only sense it, but when the nurse comes she knows". The participants felt that their care was well planned and that they received enough information; on the other hand they criticized the health-care system regarding when they received surgery. (Paper I.)

Experiences of the health care organization concerned the availability of services and how the organization worked. The participants were satisfied with the continuity of care, as the same surgeon visited them throughout their hospital stay. After discharge it was easy to contact the ward, as in spite of the adequacy of the information they received the participants were uncertain what they were allowed to do. (Paper I.)

The results of the systematic review of the literature showed that patient outcomes of THA were pain relief, improved physical function, and improved HRQOL. Only poor function before surgery affected patient outcomes, as poorly functioning patients were more likely to have postoperative pain and low physical function. (Paper II.)

5.2 Outcomes after total hip arthroplasty

This section describes the changes in patients' HRQOL and primary outcomes as well as economic outcomes after surgery.

5.2.1 Changes in health-related quality of life after total hip arthroplasty

Patients' HRQOL showed a clear improvement during the follow-up, as the differences at three and six months were statistically significant when compared with preoperative levels. Patients' mean total HRQOL before surgery was 13.4 (SD 9.7, median 11.5), which means that osteoarthritis in the hip caused slight dysfunction; however at three months post surgery it had improved to the level of 7.2 (SD 8.5, median 3.4), and at six months post surgery it had improved to the level of 6.0 (SD 7.7, 2.7). Significant improvements were seen also in the dimensions and categories of HRQOL after surgery (Tables 3, 4 Paper III). Thus the hypothesis that HRQOL would improve after surgery was supported in this study.

Preoperative pain seemed to decrease total HRQOL not only before surgery ($p < 0.001$) but also at three ($p = 0.003$) and six ($p = 0.002$) months. Female patients had more pain before surgery than male patients ($p = 0.016$) and were in worse physical health. Also, compared to younger patients, older patients had more preoperative pain ($p = 0.023$) and lower self-evaluated preoperative physical and total HRQOL. Complications seemed to worsen physical ($p < 0.001$) and psychosocial ($p = 0.018$) HRQOL at three months. (Tables 5, 6 Paper III.) (Figure 2.)

5.2.2 Primary outcomes after total hip arthroplasty

Physical function

The results for physical function indicate that patients' physical function after surgery was quite good (Appendix 8). Around 70 patients reported they were able to walk well, also outdoors at one month, although it was even more common to walk outdoors at three and six months. Around 80 patients had followed the hospital's advice concerning walking throughout recovery and the advice was regarded as easy to follow. Nearly all patients reported they had used walking aids during the first month, with use decreasing thereafter. On the other hand some 30 patients were still using them at six months. Patients regarded walking aids as useful. During the first two months under 20 patients had consulted health care professionals concerning walking, but this amount increased slightly at three and six months. Five patients reported that pain hindered their walking during recovery, while vast majority, around 60 patients, reported no hinderance.

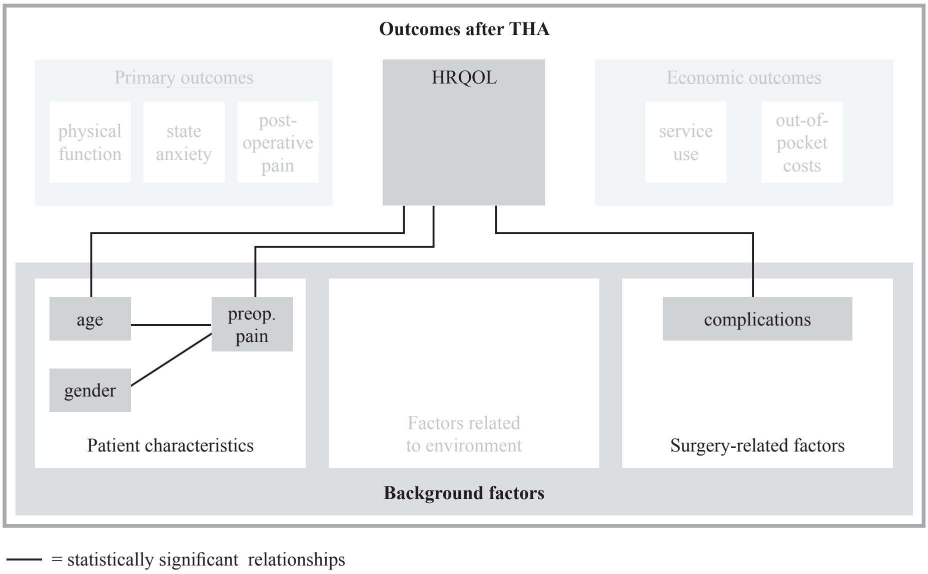

Figure 2. Statistically significant relationships between background factors and postoperative HRQOL.

Patients' sleep and ability to fall asleep was rather good after surgery. Over 60 patients had slept and fallen asleep well at night during the follow-up, whereas under 10 patients reported difficulty sleeping. Around 70 patients had followed the hospital's advice concerning sleeping positions throughout recovery and this advice was regarded as easy to follow. Over 60 patients reported that they had found a good sleeping position during the first two months, whereas 25 patients partly agreed, but this had improved at three and six months. Pillows were useful for 70 patients in finding a good sleeping position during the first month, whereas at two and three months some 50 patients did not regard them as useful, but again at six months pillows were used more often. Four patients had consulted health care professionals over problems with sleeping at six months and at the same time nine patients reported that pain had hindered their sleep.

Some 70 patients had a rather painless hip on each measurement occasions and did not need extra painkillers, although around ten patients needed extra painkillers throughout their recovery. The hospital's advice concerning pain relief was well followed and was also regarded as easy to follow. Under ten patients had used methods other than painkillers for pain relief and those methods were useful. Under ten patients had consulted health care professionals concerning pain relief during recovery, however seven patients reported that pain hindered their daily activities at six months.

Increased physical function improved patients' HRQOL at three and six months (Table 4). Patients who could walk well, including outdoors, had better HRQOL, whereas use of walking aids was associated with worse HRQOL. Patients without pain in walking had better HRQOL than patients who were able to sleep well or whose hip was rather painless. It was hypothesised that increased physical function would improve patients' HRQOL after surgery and this was supported.

Patient characteristics: age, gender, civil status, BMI, and preoperative pain, environmental factors: discharge destination and living conditions, and surgery-related factors: type of operation and complications were all related to physical function (Appendix 9, Figure 3). Older patients reported that it was more difficult to walk outdoors during the first three months, although at the same time they had also used walking aids more often than younger patients, and regarded aids as useful. Despite of their impairments in walking, older patients had consulted professionals less concerning walking at one month compared with younger patients, although they also reported that the hospital's advice concerning walking and pain relief was not easy to follow.

Table 4. Physical function compared with total HRQOL at three and six months.

	total HRQOL at 3 months			**total HRQOL at 6 months**	
Item	**Spearman correlation of coefficient**	**p-value**	**Item**	**Spearman correlation of coefficient**	**p-value**
Mobility at 3 months			**Mobility at 6 months**		
I have been able to walk well	0.478	<0.001	I have been able to walk well	0.545	<0.001
I have also walked outdoors	0.488	<0.001	I have also walked outdoors	0.385	<0.001
I have used walking aids	-0.429	<0.001	I have used walking aids	-0.261	0.015
Walking aids have been useful	-0.455	<0.001	Walking aids have been useful	-0.331	0.004
			I have consulted health care professionals concerning walking	-0.239	0.027
Pain has hindered my walking	-0.249	0.020	Pain has hindered my walking	-0.467	<0.001
Sleep at 3 months			**Sleep at 6 months**		
I have been able to sleep well	0.322	0.002	I have been able to sleep well	0.335	0.001
It has been easy to fall asleep at nights	0.228	0.033	It has been easy to fall asleep at nights	0.312	0.003
			Pillows have been useful	-0.304	0.008
			I have consulted health care professionals concerning sleeping	-0.257	0.019
Pain has hindered my sleep	-0.309	-0.309	Pain has hindered my sleep	-0.531	<0.001
Pain at 3 months			**Pain at 6 months**		
My hip has been rather painless	0.279	0.009	My hip has been rather painless	0.441	<0.001
I have not need extra painkillers	0.221	0.038	I have not need extra painkillers	0.232	0.032
I have consulted health care professionals concerning pain relief	-0.244	0.022	I have consulted health care professionals concerning pain relief	-0.408	<0.001
			Pain has hindered my daily activities	-0.373	<0.001

Female patients had not walked outdoors as much as male patients at one month. Male patients also were able to walk outdoors more often than female at three months. Female patients reported the hospital's advice concerning walking at one month easy to follow, used walking aids, and also regarded them as useful more often at two months than did male patients. Female patients did not find a good sleeping position at one month, and it was not easy for them to fall asleep at night at two months, although they found pillows useful. Female more often than male patients had used methods other than painkillers for pain relief at two months. At six months female more often than male patients had followed the hospital's advice concerning sleeping positions and pain relief, and consulted health care professionals concerning walking.

Widows reported difficulties following the hospital's advice concerning walking at two months, and had also used walking aids more often than other patients. At six months widows were not able to walk as well as other patients. Overweight patients had not walked outdoors as much as other patients at two months, and at the same time they had consulted health care professionals concerning walking and also reported that pain hindered their daily activities. Further, at six months they had consulted health care professionals concerning walking and sleeping. The more preoperative pain patients had the worse they walked and slept at one month, and the more walking aids they used at two months, although they regarded walking aids as useful.

At one month patients who were discharged directly home had followed the hospital's advice concerning walking, and walked outdoors more than patients who had first been discharged elsewhere. Patients living alone had difficulty following the hospital's advice concerning walking at two months, while at the same time they reported that walking aids were useful for them. At six months patients who lived with a partner were able to walk well, including outdoors, and their hip was relatively painless more often than patients living alone.

Patients undergoing primary unilateral THA were more often able to walk well during the first three months compared with patients undergoing other types of surgery, but at six months patients who had received a bilateral arthroplasty were most often able to walk well, including outdoors. Patients who consulted health care professionals concerning walking at three months tended to be patients undergoing a bilateral arthrolasty, whereas at six months they tended to be patients undergoing revision surgery. Primary THA patients found more often a good sleeping position at two months compared with other patients, neither did pain hinder their sleep at two and three months as often. Painkillers were best for primary unilateral THA patients at one month, and they reported a painless hip more often than other patients at three and six months. Revision THA patients most often reported pain in the hip at three months, whereas patients undergoing primary unilateral THA who had had previous THA on the contra-lateral hip reported using methods other than painkillers to relieve pain. At six months pain more often hindered the daily activities of these patients compared with other patients.

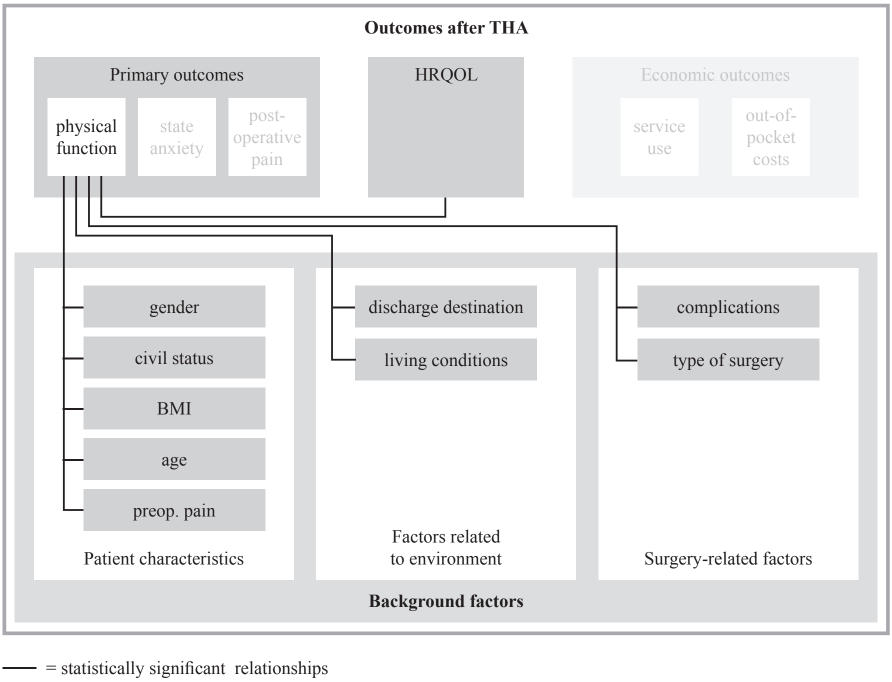

Figure 3. Statistically significant relationships between physical function and postoperative HRQOL, and between physical function and background factors.

Pain

Patients’ pain was considerably relieved after surgery, the difference at one month being statisitically significant ($p < 0.001$) when compared with the preoperative level. After one month pain continued to decrease during the follow-up, but the differences were no longer significant. Patients’ mean evaluation of their preoperative pain level was 3.1 (SD 1.1, median 3.0) whereas at six months it had fallen to the level of 0.5 (SD 1.1, median 0.0) when 72 % of patients (n = 84) reported no pain at all (Table 5).

Preoperative pain was found to worsen patients’ HRQOL also after surgery, as also was postoperative pain at three ($p = 0.002$) and six ($p < 0.001$) months (Table 6). In other words, the less pain patients reported after surgery the better was their HRQOL. According to the results of this study patients’ pain was relieved, which improved their HRQOL after surgery, so supporting the hypothesis.

Table 5. Pain level before and after surgery.

Pain	n	Mean	Min	Max	± SD	Median
before surgery	100	3.19	0	5	1.19	3.00
at 1 month	97	0.65	0	4	1.01	0.00
at 2 months	95	0.61	0	5	1.03	0.00
at 3 months	88	0.58	0	5	0.99	0.00
at 6 months	84	0.50	0	5	1.01	0.00

Table 6. Pre- and postoperative pain compared with total HRQOL at three and six months.

	HRQOL at 3 months		HRQOL at 6 months	
	Spearman correlation coefficient	p-value	Spearman correlation coefficient	p-value
Preoperative pain	0.318	0.003	0.324	0.002
Postoperative pain				
at 3 months	0.321	0.002	0.294	0.006
at 6 months			0.519	< 0.001

Preoperative pain, gender, civil status, type of surgery, and type of prosthesis were related to patients' postoperative pain (Figure 4). The more intense preoperative pain was, the more pain patients reported at one month after surgery (p = 0.028). Female patients reported more pain than males at one (p = 0.043), two (p = 0.008) and three (p = 0.042) months, but no more at six months; however female patients also had more (p = 0.013) preoperative pain than male patients. Widows had more pain (0.041) compared with married patients at six months. Patients undergoing revision surgery reported more pain at two (p = 0.012), three (p = 0.006) and six (p = 0.006) months compared with patients undergoing primary surgery. In addition, patients who received a special hip implant reported more pain at two (p = 0.042) and three (p = 0.012) months than patients with a cemented implant, and more pain (p = 0.030) at six months than patients who received a hip resurfacing implant.

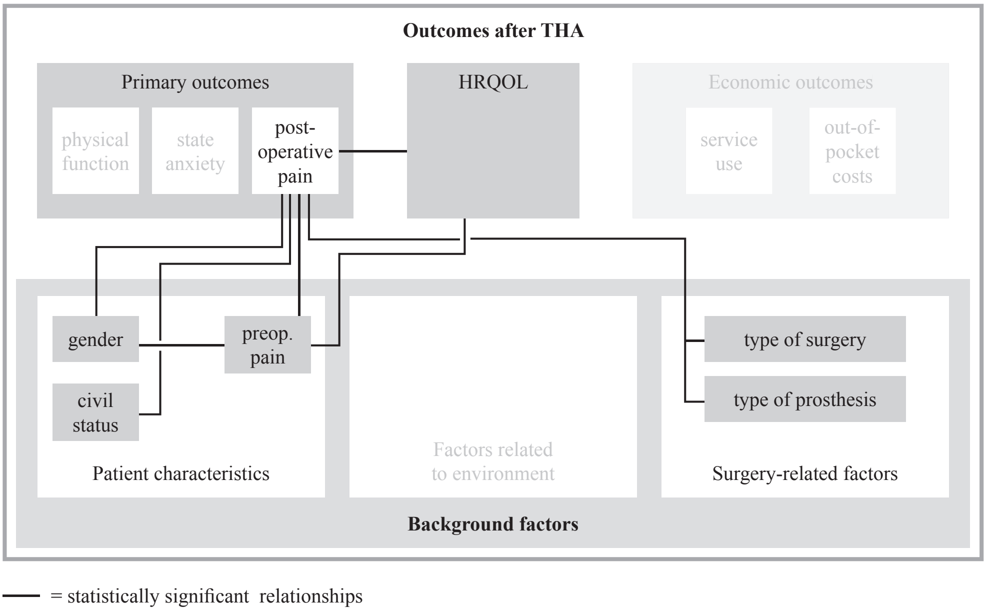

Figure 4. Statistically significant relationships between postoperative pain and postoperative HRQOL, and between postoperative pain and background factors.

State anxiety

Patients' level of state anxiety did not decrease after surgery compared with the level before surgery, as state anxiety remained at a moderate level, the slight changes observed during the follow-up were non-significant, and over 80 patients reported moderate state anxiety at each measurement occasion (Table 2 Paper IV).

Postoperative state anxiety was not statistically significantly related to postoperative HRQOL, but patients who reported more trait anxiety reported a worse HRQOL before surgery and during recovery (Paper IV). It was hypothesised that state anxiety would decrease after surgery and this would improve patients' HRQOL after surgery. This was not supported; in fact state anxiety did not even correlate significantly with HRQOL and thus did not influence it at all.

Patients who reported more trait anxiety before surgery were older ($p < 0.001$) or had more preoperative pain ($p = 0.003$), whereas overweight patients ($BMI \geq 30$) reported more state anxiety ($p = 0.030$) as did older patients ($p = 0.028$). After surgery patients who stayed longer in hospital reported less state anxiety at one ($p = 0.001$), three ($p = 0.005$) and six months ($p = 0.001$). (Paper IV.) (Figure 5.)

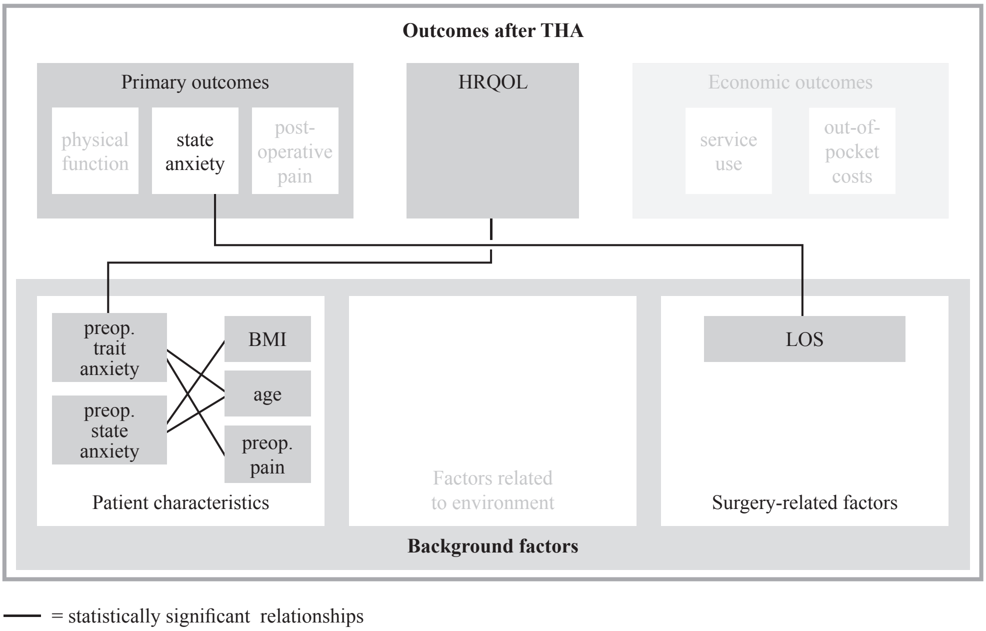

Figure 5. Statistically significant relationships between postoperative state anxiety and postoperative HRQOL, and between postoperative state anxiety and background factors.

5.2.3 Economic outcomes after total hip arthroplasty from patients' perspective

Service use

Patients' use of services varied during recovery (Table 2 Paper V). Home help services were equally used during recovery, whereas home nursing was used more at one and two months. Physiotherapy was used more often after one month, but transportation was used more at one month than later during the follow-up. (Paper V.)

Although HRQOL improved, it was related to service use at each measurement occasion (Table 6 Paper V). The worse the patients' HRQOL was after surgery, the more home nursing, home help services, and transportation was used. Thus, the hypothesis that service use as an economic outcome would be related to changes in HRQOL was supported.

Older patients used more home help services but significantly less physiotherapy and less transportation than younger patients (Table 3 Paper V). Preoperative pain increased home help service use and transportation. Women used more home help services, more transportation, and more home nursing than men; however, women were older than men. Also, widows used more home nursing. Discharge destination affected service use, as patients who were referred, for example, to their health care center used more home nursing and home help services than those directly discharged home. If patients' need of assistance was planned in hospital, they used more home nursing and more transportation during the first months. (Paper V.) (Figure 6.)

Out-of-pocket costs

Over 90 % of total out-of-pocket costs were health-care costs, and the highest of health care costs were hospital costs, mean about 5000 € (Table 5 Paper V). This amount varied according to whether patients had a financial obligation from their municipalities and in that case paid only the hospital fee, or as private patients paid all hospital costs themselves and claimed only part of the costs from the national health insurance fund. (Paper V.)

When total costs were compared with patients' HRQOL after surgery no significant correlations were found. On the basis of these results costs as an economic outcome were not related to the changes of HRQOL and the hypothesis is not supported.

Older patients had greater costs than younger patients, whereas patients who were discharged directly home had lower costs compared with patients who were first discharged elsewhere (Paper V), (Figure 6).

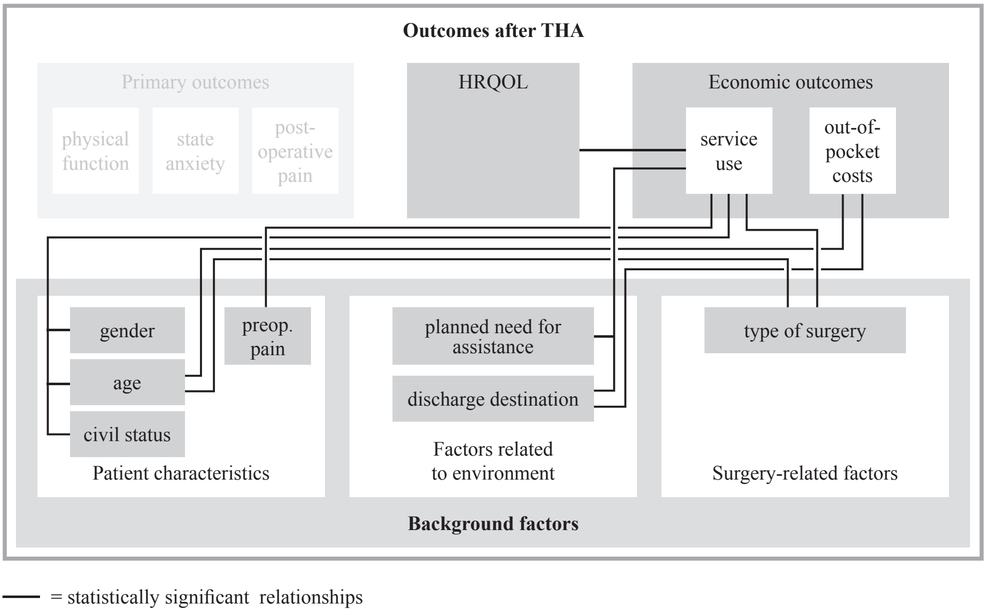

Figure 6. Statistically significant relationships between economic outcomes and postoperative HRQOL, and between economic outcomes and background factors.

6 DISCUSSION

The purpose of this two-phase study was to examine the patient-perceived impact of total hip arthroplasty (THA) when it is measured as changes in patients' health-related quality of life (HRQOL). Descriptive phase I was conducted to describe patients' experiences related to THA and the systematic review of the literature produced knowledge of patient outcomes. Explorative phase II provided answers to how patients' HRQOL changed after THA and how primary and economic outcomes were related to it. This discussion begins by looking at the validity and reliability of this study and then comparing the results with those of earlier research. Finally, challenges for nursing practice and education, and suggestions for nursing research are presented.

6.1 Validity and reliability of the study

The adequacy of the research was examined by assessing the validity and reliability of the research process. Validity is a measure of the truth and accuracy of a study related to the phenomenon of interest, whereas reliability is concerned with how consistently the measurement technique measures the concept of interest. Validity, as well as reliability, is not an all-or-nothing, either-or question, but rather a matter of degree. (Nummenmaa et al. 1997, Burns & Grove 2005.) The validity and reliability of this study is first investigated in relation to the data collection methods used and in relation to the data, data collection and data analysis, and, finally, in relation to the results.

6.1.1 Validity and reliability of the data collection methods

In phase I the data were collected in focused interviews, which were useful in seeking to understand how the patients organize ideas on a particular topic (Burns & Grove 2005). The interview method and interview themes were pilot-tested before the data collection. The interview themes were found to be wide-ranging enough as they produced rich data concerning patients' experiences. In phase I a systematic analysis was conducted of studies of patient outcomes of THA by using two databases - Medline and Cinahl - as these are relevant for nursing and medical research.

In phase II six different instruments were used. Validity refers to the degree to which an instrument measures what it is intended to measure and is usually reported as content validity, construct validity, and criterion validity (Polit & Beck 2004, Burns & Grove 2005). The reliability of an instrument can be assessed in terms of its internal consistency (Cronbach alpha coefficient), which examines how homogeneously all the items measure the same construct (Knapp 1991, Burns & Grove 2005). The SIP

(Bergner et al. 1981) has been used in previous studies to measure the HRQOL of THA patients (Laupacis et al. 1993, 2002, Rorabeck et al. 1994, 1996, Knutsson & Bergbom Engberg 1999, Ridge & Goodson 2000) and its content validity has been well demonstrated (Bergner et al. 1981, Katz et al. 1992, 1995). The SIP, Finnish Version was first translated from English into Finnish and then back and piloted in phase I with 17 total hip arthroplasty patients to test its equivalence (Hilton & Skrutkowski 2002). On the basis of the results no changes were made. When assessing the reliability of the SIP, Finnish Version the Cronbach's alpha coefficient ranged between 0.6 and 0.8, which indicates that the instrument was internally consistent (Burns & Grove 2005), at least in the present study. However, this was the first time the SIP has been used in nursing studies in Finland and thus corresponding values do not exist.

The STAI (Spielberger 1983) has been used earlier to measure anxiety among THA patients (Bondy et al. 1999, Doering et al. 2000, Giraudet-Le Quintrec et al. 2003, Pellino et al. 2005) and, in Finland, in mammography screening (Aro 1996), among women having caesarean delivery (Kiviniemi 2006) and among coronary patients (Koivula et. al. 2001, 2002) but not among Finnish THA patients. Kiviniemi (2006) reported a Cronbach's alpha coefficient of 0.92 – 0.95 for the state anxiety scale and 0.89 for the trait anxiety scale. Thus, the STAI was regarded as a valid measure of anxiety also among THA patients, and was not pilot-tested before the data collection. The Finnish Version of the STAI used in the present study was used earlier by Aro (1996) and Kiviniemi (2006). In the present study the Cronbach's alpha coefficient for the trait anxiety in the STAI was 0.54 and for state anxiety it ranged between 0.34 and 0.48. These values are low (Knapp & Brown 1995, Burns & Grove 2005); however values for corresponding samples have not earlier been reported in Finnish studies, and therefore further research with larger samples from different hospitals is needed to test the reliability of the STAI among patients undergoing THA.

Construct validity determines whether the instrument actually measures the theoretical construct it is intended to measure (Burns & Grove 2005). Both the SIP and STAI were chosen because they have undergone long development and have been shown to be valid instruments (Bergner et al. 1981, Katz et al. 1992, 1995, Spielberger 1983). Thus their structures were not tested in the present study. The NRS (Downie et al. 1978, Jensen et al. 1989) has been reported to be a valid instrument for measuring pain in previous studies (Kremer et al. 1981, Paice & Cohen 1997), and in the present study it was also found to work well.

The Physical function questionnaire, Out-of-pocket costs diary, and Service use questionnaire were purpose-designed for this study. The content validity of the Physical function questionnaire was based on the results of phase I and the previous literature. The content validity of the Out-of-pocket costs diary as well as Service use questionnaire were based on literature and on what exists in the Finnish health care system. All the purpose designed questionnaires were piloted by THA patients (n = 5) to test their clarity and suitability for collecting the data, and no changes were made on the basis of the pilot test results. However, this was the first time these questionnaires were used and although they worked in this sample, they should be further developed for use among other patient groups.

6.1.2 Validity related to the data, data collection and data analyses

In phase I the data were obtained from patients undergoing primary THA who were familiar with the phenomenon, as the study was carried out to obtain a deep understanding of THA patients' experiences (Paper I). The researcher tested the use of the tape recorder to familiarize herself with the method and to avoid errors during interviews, interviewed the participants herself, and acquainted herself with the data. Throughout the research process the researcher tried not to let her own perceptions affect the data, data analysis or findings. The articles in the systematic review of the literature concerning patient outcomes of THA were selected from two well known databases and they fulfilled the inclusion criteria (Paper II). The analysis was conducted according to patient outcomes of THA, factors related to those outcomes, and the research methods used. However, the literature drawn from the databases was dependent on the keywords and the combinations of them used. In the present study the researcher analysed the research articles herself; however, the reliability of the study might have been further increased if other researchers had also analysed them.

In phase II the participants were also patients undergoing primary or revision THA who met the inclusion criteria (Paper III, IV, V). The results of a power analysis (Cohen 1988, Burns & Grove 2005) yielded a required total sample size of 92 patients to ensure a statistically significant 20 % difference at the 0.05 level. This calculation was based on a weak effect size near 0.15. The same calculation with a moderate effect size of 0.3 yielded a minimum required number of at least 16 cases in each group, which in the present study would mean 64 patients. However, the study samples were above that number in all the repeated measures analyses. The response rate at six months was 87 %, which can be considered a good result, as the drop-out rate in longitudinal designs and in mailed questionnaires can be high and reduce the validity of the results (Burns & Grove 2005). The data were collected during the follow-up by the same research secretary who became acquainted with the participants, and this may have been the reason for the low drop-out as social amenities may be effective to maintain the subjects (Burns & Grove 2005).

6.1.3 Validity and reliability related to the results

In phase I the sample was small; however, the aim was not to generalize the findings. The results of phase II may be generalizable to patients undergoing primary or revision THA in Finland (Paper III, IV, V). Although the study population was slightly younger than THA patients on average in Finland (Rantanen et al. 2006) and the data were collected in only one specialised hospital, the sample was representative as the patients were from all parts of Finland, they underwent different types of surgery, received different types of prostheses and used different types of services nation-wide. Thus, the results can be generalized at least to hospitals which annually perform large numbers of THAs.

6.2 Discussion of the results

The main results of this study were significant improvements in patients' HRQOL after surgery, and although it seems that osteoarthritis did not substantially produce dysfunction before surgery, patients had difficulties in performing their daily activities and were unsure what they would be able to do in the future. Positive changes, especially in primary outcomes, increased patients' function and they were once again responsible for their daily activities. The results are discussed according to the research questions.

1. When patients described their experiences, they underlined the importance of pain which had hindered their walking or sleeping, especially before but also slightly after surgery, as has also been reported in previous studies (Knutsson & Bergbom Engberg 1999, Ridge & Goodson 2000, Saleh et al. 2003, Ethgen et al. 2004). After surgery, some patients still had sleeping problems owing to pain, and they thought the reason was because they did not ask for enough painkillers (see Pellino 1997). Patients worried about the results of surgery and about their future; however, positive experiences during recovery made them feel useful again (see Travis & McAuley 1998).

2. The systematic review of the literature showed the scarcity of research on patient outcomes, although pain relief, increased physical function, and improved HRQOL are of crucial importance to patients.

3. Patients' HRQOL improved after surgery; this result is in keeping with the results of previous studies (Hozack et al. 1997, Knutsson and Bergbom Engberg 1999, Ridge & Goodson 2000, Jones et al. 2001, Laupacis et al. 2002, Ethgen et al. 2004, Ritter et al. 1995). The present study showed that preoperative pain impaired HRQOL both before and after surgery, as was also concluded by Street et al. (2005). However, contradictory results have also been reported (Ridge & Goodson 2000). In particular, female and older patients reported worse HRQOL before surgery than younger patients, as has also been found in previous studies (Lieberman et al. 1997, McMurray et al. 2002, Nilsdotter et al. 2003). Improvements were seen in all categories of the HRQOL, especially in sleep, social life, and house work, although patients' alertness behaviour within the psychosocial dimension of HRQOL remained at the same level during the follow-up period. These improvements are in line with the experiences described by patients in phase I of this study.

4. As primary outcomes, pain relief and physical function increased during recovery, although patients still felt state anxiety after surgery. Patients' physical function improved throughout the recovery period when measured as mobility, sleep, and pain, as also reported by previous studies (Saleh et al. 2003, Ethgen et al. 2004). The advice given by the hospital was easy to follow and was well followed. However, after three months, younger patients in particular had consulted health care professionals concerning their walking, sleeping or daily activities. They reported that pain disturbed these functions, and thus the increased use of walking aids or pillows at six months is understandable. It seems that the advice given was useful and adequate as long as there

were no problems. However, patients reported that they were not sure what they were allowed to do. Attention should be paid to patients' age as delay in recovery or pain at three or six months may concern younger patients, who want to return to work. It is noteworthy that although older patients were not able to walk outdoors as well as younger patients and they also used walking aids longer, they did not consult health care professionals about walking.

Pain relief was noticeable after surgery (see Healy et al. 1998, Jones et al. 2001, Holtzman et al. 2002, Ethgen et al. 2004). However, the more preoperative pain patients had, the more postoperative pain they reported. This result is supported by previous studies (Fortin et al. 2002, Davis et al. 2006, Garbuz et al. 2006, Strömberg & Oman 2006), although results showing no association between pre- and postoperative pain have also been reported (Röder et al. 2007). Decreased postoperative pain improved patients HRQOL, as also found by Knutsson and Bergbom Engberg (1999).

Patients showed psychological discomfort before surgery as they mentioned their concerns about the future and they reported trait and state anxiety. However, their state anxiety did not decrease after surgery nor did their alertness behaviour as a category in the HRQOL improve during the follow-up. On the other hand, patients' trait anxiety did not increase their state anxiety after surgery, as has been supposed (Spielberger 1983). Moreover, state anxiety did not worsen their HRQOL after surgery; however, preoperative trait anxiety worsened their HRQOL even after surgery. On the basis of these results, recovery may cause anxiety, particularly if patients have delays in recovery or unrealistic expectations of the results of surgery, or if they are anxious by nature and thus have more trait anxiety. The fact that longer hospital stay decreased state anxiety may mean that during longer hospitalization patients felt more secure about how they would manage at home.

5. Despite the positive changes that occurred during recovery the surgery also had unavoidable economic outcomes. Service use after surgery covered the use of formal health care and nonhealth care services, and thus the amounts of services received from informal caregivers remained unexplained. It is also unclear whether patients could have benefited from more services, since they did not contact health care professionals to obtain any extra help and reported that after hospitalization they were able to resume their daily tasks. Female patients used more home help than men, but were they responsible for housework anyway? Older patients used less physiotherapy than younger patients who might be more active and ask for this service. On the other hand, older people also reported poorer walking ability and used walking aids more. Should they have been more actively directed to physiotherapy in order to improve their physical function and thereby assure their ability to live at home in the future? Pre- and postoperative pain increased service use after surgery and also patients who assessed their HRQOL as poor used more services compared with patients whose HRQOL was better. Over 70 % of patients reported that their need for service use was not planned in the hospital, yet despite this they did not report a need to contact health care professionals to obtain help. Thus, either the planning of services was not recognized or the preparation for recovery time was regarded as adequate (see McMurray et al. 2002).

Patients' hospital costs in particular varied considerably, and therefore whether or not the principle of equality in receiving treatment is met can be questioned. Older patients had more out-of-pocket costs, but they also used more home help services, while patients who were discharged home used services less and thus had lower out-of-pocket costs. A comparison between these results and those of previous studies is impossible because of the different health care systems in different countries and because the costs are mostly measured more from the organizational point of view.

In the present study, background factors like preoperative pain, age, and gender were associated separately or in interaction with HRQOL, physical function, pain, anxiety, service use, and out-of-pocket costs. Similar effects of these factors in relation to these outcomes have also been reported in previous studies (Lieberman et al. 1997, Knutsson and Bergbom Engberg 1999, Ridge & Goodson 2000, Lapsley et al. 2001, Fortin et al. 2002, Holtzman et al. 2002, Nilsdotter et al. 2003, Davis et al. 2006, Garbuz et al. 2006, Strömberg & Oman 2006). Social support may have been relevant during recovery as widows reported more pain and poorer walking. Young et al. (1998) also underlined the importance of social support for functional outcomes. Patiens undergoing other than primary arthroplasty seemed to have more postoperative pain, as also reported by Davis et al. (2006). Alternatively, although these patients did not report significantly more preoperative pain they might have had worse physical function before surgery.

The changes in patients' HRQOL were measured by the SIP, Finnish Version. Although this instrument includes items describing activities related to everyday living, some dimensions are missing, such as pain assessment, or items broadly concerning sex life, spiritual life, or economic situation. However, the outcomes of THA were measured in more ways and thus multiple associations between physical function, postoperative pain and service use and HRQOL were revealed.

6.3 Discussion of research ethics

Ethical research principles were followed throughout the study. Patients were well informed about the aims of the study, and their anonymity was maintained during the data collection, data analyses and reporting. For copyright reasons the STAI is not published as an appendix to this dissertation.

6.4 Challenges for nursing practice and education

The number of patients undergoing THA will increase in the future (Eurostat 2005) as the population is ageing and therefore OA in the hip as a main indication for surgery will increase as well. There also is a tendency to shorten patients' hospital stay, which means that in most cases patients will be discharged directly home after only a few days. These patients need nursing, especially because they are for the most part elderly, have multiple problems both before and after surgery, and therefore also have very different educational needs. The results of this study identify challenges both for nursing practice and nursing education.

In nursing practice the challenges concern patients' individuality and educational needs.

1. Orthopaedic nurses should understand the individuality of patients as patients have different expectations concerning the outcomes of THA.

2. Patients' individual characteristics and needs should be taken more into consideration when preparing patients for surgery and recovery. In particular older women may need additional attention regarding recovery and management at home, since they tend to use more services after surgery.

3. Nurses need to educate patients individually, adequately and sufficiently in less and less time. Therefore patient education should be evidence-based in content and nurses also should have the possibility to educate patients during the waiting time for surgery.

4. Patients' preoperative pain should be relieved more effectively and patients should also get advice on other methods of pain relief together with painkillers.

5. Patients should be made aware of the facts that recovery takes time, although positive changes will already be seen during first months, and that individual changes are common as well.

6. When planning patient education for recovery, advice should be targeted at different patient groups, such as patients undergoing primary or revision surgery, or patients who are discharged directly to their home or elsewhere, as all these groups have different needs. Advice should also include adequate, evidence-based information after three months about what patients are allowed to do, thereby responding to patients' needs over a longer period.

In nursing education the holistic nature of orthopaedic nursing should be underlined.

1. Nursing students should have knowledge not only of nursing interventions concerning postoperative care, but also the patient as a whole person with individual needs.

2. Therefore evidence-based knowledge on THA patients' expectations and educational needs should be incorporated in nursing education to increase nurses' professional competence, as this patient group will grow in the future.

6.5 Suggestions for nursing research

On the basis of the previous literature there is a lack of nursing research on the effects of different outcomes on THA patients' HRQOL from the patient point of view. Further research among THA patients is needed concerning the content of orthopaedic nursing, research methods, and research instruments.

1. Patients' postoperative state anxiety should be further studied in order to find out why it did not decrease during recovery and how it might be relieved by nursing interventions. It may be possible to identify some of the elements related to patients' anxiety by application of qualitative methods.

2. The results of this study showed that knowledge on long-term results is needed in nursing and therefore it would be worthwhile contacting the participants of this present study once more in order to find out how permanent the improvements in pain relief, physical function and HRQOL have been, and if there was a lack of advice later on.

3. The dependence between outcomes and background factors, which were separately investigated in the present study, should be further examined in the same model, using interaction effects together in association with HRQOL as well as the effect of background factors on HRQOL. This evidence would be important in order to understand the broad concept of HRQOL among THA patients.

4. Further research could then focus on developing a theoretical model which would include the relationships between background factors and different outcomes of THA and HRQOL. The model could be used as a framework to understand and develop the care of THA patients.

5. The instrument measuring anxiety should be further tested among THA patients in larger samples and in different types of hospitals in order to improve the low reliability values.

6. The instrument measuring HRQOL was valid and suitable for patients undergoing THA in the present study. It could be used further among THA patients and in the future possibly also among other patients.

This study was conducted to examine the impact of total hip arthroplasty on health-related quality of life from the patient point of view in order to develop nursing practice and nursing science. This was achieved by using several different research and data collection methods. The results provide evidence that patients' health-related quality of life consists of many different areas which can not be separated from each other.

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APPENDICES

Turun yliopisto, Hoitotieteen laitos
Lonkkaproteesileikkauksen vaikutus potilaan terveyteen liittyvään elämänlaatuun

Appendix 1 1(3)

ID _________

TAUSTAMUUTTUJAT

Ikä ____ v

Sukupuoli ____ mies____ nainen

Kotikunta ____________________

Odotusaika leikkaukseen ____ viikkoa

Maksutapa ____ itsemaksava ____ kunta maksaa

Hoitoon hakeutuminen ____ itse ____lähetteellä

Molemmat lonkat leikataan samalla kerralla ____ kyllä ____ ei

Sairaalassaoloajan pituus ____ vrk

Jatkohoito ____ kotiin ____ terveyskeskussairaalaan

____ muualle, mihin?________________

Anestesiamuoto ____ yleisanestesia _____ epiduraalipuudutus

Turun yliopisto, Hoitotieteen laitos
Lonkkaproteesileikkauksen vaikutus potilaan terveyteen liittyvään elämänlaatuun

Appendix 1 2(3)

(Haastattelu) ID _____ (tutkija täyttää)

TAUSTAMUUTTUJAT

Potilaalta haastattelussa kysyttävät tiedot ennen leikkausta sairaalassa. Tieto merkitään sille varattuun tilaan tai ympyröidään oikea vastausvaihtoehto. Olkaa hyvä ja vastatkaa seuraaviin kysymyksiin.

1. ikä _____ vuotta

2. sukupuoli 1 mies 2 nainen

3. siviilisääty 1 naimisissa 3 leski
2 naimaton 4 eronnut

4. asuu yksin 1 kyllä 2 ei

5. päivittäin kuljettava portaita 1 kyllä 2 ei

6. onko käytössä hissi 1 kyllä 2 ei

7. asuinkunta ___________________

8. paino _____ kg, pituus _____ cm

9. jonotusaika 1 tähän sairaalaan _____v _____kk
2 muuhun sairaalaan samasta syystä _____v _____kk

10. tupakointi tällä hetkellä 1 kyllä 2 ei

11. tämän hetkinen kivun määrä arvioituna asteikolla 0 - 5
(0 = ei lainkaan kipua, 5 = pahin mahdollinen kipu)

tämän hetkinen oma arvio kivusta _______

Potilasasiakirjoista kerättävät tiedot:

12. leikkauksenjälkeiset komplikaatiot 1 kyllä, mikä ___________________________
2 ei

13. dg numero _____

14. leikkaus
1 primaarileikkaus, yksi lonkka
2 primaarileikkaus, toinen lonkka leikattu aikaisemmin
3 primaarileikkaus, molemmat lonkat
4 uusintaleikkaus

15. leikkausvuodon määrä ______________ ml

16. proteesimalli
1 tavallinen
2 pinnoite
3 muu erikoismalli

17. leikkauksen kesto __________ min

18. sairaalassaoloajan pituus _____________ vrk (mukana tulo- ja lähtöpäivä)

19. kotiutuminen
1 kotiin
2 ei kotiin

20. sairaalassa ollessa suunniteltiin mahdollinen kodin ulkopuolisen avun saanti

1 kyllä
2 ei

(kysymys 20 kysytään 1 kk:n kuluttua leikkauksesta kysyttäessä palvelujen käyttöä)

State Trait Anxiety Inventory (STAI) for adults is not published in this dissertation due to copyright.

REFERENCES

Spielberger CD. 1983. State-Trait Anxiety Inventory for Adults (Form Y). Manual, Test, Scoring Key. Redwood City, California: Mind Garden Inc.

http://www.mindgarden.com/index.htm

Turun yliopisto, Hoitotieteen laitos Appendix 4 1(3)
Lonkkaproteesileikkauksen vaikutus potilaan terveyteen liittyvään elämänlaatuun ID _____ (tutkija täyttää)

FYYSINEN TOIMINTAKYKY-MITTARI (haastattelu 1, 2, 3 ja 6 kuukauden kuluttua leikkauksesta)

Hyvä kyselyyn vastaaja!
Olemme kiinnostuneita saamaan tietoa leikkauksen jälkeisestä voinnistanne. Seuraavat väittämät koskevat liikkumista, lepoa ja kipua. Olkaa hyvä ja kuunnelkaa väittämät huolellisesti ja valitkaa yksi parhaiten vointianne kuvaava vaihtoehto. Väittämiin vastatessanne ajatelkaa viimeisen kuukauden / kolmen kuukauden ajanjaksoa.

	täysin samaa mieltä	osittain samaa mieltä	osittain eri mieltä	täysin eri mieltä
1. Olen pystynyt liikkumaan hyvin	1	2	3	4
2. Olen liikkunut myös ulkona	1	2	3	4
3. Olen noudattanut sairaalasta saamiani ohjeita, jotka koskevat liikuntaa	1	2	3	4
4. Sairaalasta saamiani liikuntaa koskevia ohjeita on ollut helppo noudattaa	1	2	3	4
5. Olen käyttänyt saamiani apuvälineitä liikkumiseen	1	2	3	4
6. Liikkumiseen saamani apuvälineet ovat olleet hyvä apu minulle	1	2	3	4
7. Olen ottanut yhteyttä terveydenhuollon ammattilaiseen liikuntaa koskevissa asioissa	1	2	3	4
8. Kipu on haitannut liikkumistani	1	2	3	4

Turun yliopisto, Hoitotieteen laitos

Appendix 4 2(3)

Lonkkaproteesileikkauksen vaikutus potilaan terveyteen liittyvään elämänlaatuun

	täysin samaa mieltä	osittain samaa mieltä	osittain eri mieltä	täysin eri mieltä
9. Olen nukkunut öisin hyvin	1	2	3	4
10. Minun on helppo nukahtaa iltaisin	1	2	3	4
11. Olen noudattanut sairaalasta saamiani ohjeita, jotka koskevat nukkuma-asentoja	1	2	3	4
12. Sairaalasta saamiani nukkumista koskevia ohjeita on ollut helppo noudattaa	1	2	3	4
13. Olen saanut hyvän nukkuma-asennon	1	2	3	4
14. Tyynyt ovat olleet hyvä apu minulle	1	2	3	4
15. Olen ottanut yhteyttä terveydenhuollon ammattilaiseen lepoa ja nukkumista koskevia asioissa	1	2	3	4
16. Kipu on haitannut untani	1	2	3	4
17. Lonkkani on ollut mielestäni melko kivuton	1	2	3	4
18. Olen pärjännyt ilman ylimääräisiä kipulääkkeitä	1	2	3	4
19. Olen noudattanut kivun hoidossa sairaalasta saamiani ohjeita	1	2	3	4

Turun yliopisto, Hoitotieteen laitos Appendix 4 3(3)

Lonkkaproteesileikkauksen vaikutus potilaan terveyteen liittyvään elämänlaatuun

	täysin samaa mieltä	osittain samaa mieltä	osittain eri mieltä	täysin eri mieltä
20. Sairaalasta saamiani kivun hoitoa koskevia ohjeita on ollut helppo noudattaa	1	2	3	4
21. Olen lievittänyt kipua myös muilla keinoin kuin lääkkeillä	1	2	3	4
22. Muu kuin lääkehoito on ollut hyvä apu minulle	1	2	3	4
23. Olen ottanut yhteyttä terveydenhuollon ammattilaiseen kivun hoitoa koskevissa asioissa	1	2	3	4
24. Kipu on haitannut päivittäistä toimintaani	1	2	3	4

25. Arvioikaa tämän hetkinen kivun määrä käyttäen asteikkoa 0 - 5
(0 = ei lainkaan kipua, 5 = pahin mahdollinen kipu)

tämän hetkinen oma arvio kivusta _______

Turun yliopisto, Hoitotieteen laitos Appendix 5 1(1)

Lonkkaproteesileikkauksen vaikutus potilaan terveyteen liittyvään elämänlaatuun ID _____ (tutkija täyttää)

PALVELUJEN KÄYTTÖ -MITTARI (haastattelu 1, 2, 3 ja 6 kuukauden kuluttua leikkauksesta)

Seuraavat väittämät koskevat mahdollisesti käyttämiänne kodin ulkopuolisia palveluja. Olkaa hyvä ja valitkaa mielestänne sopivin vastausvaihtoehto. Kysymyksiin vastatessanne ajatelkaa viimeisen kuukauden / kolmen kuukauden ajanjaksoa.

	joka päivä	joka viikko	silloin tällöin	ei lainkaan
1. Olen käyttänyt ulkopuolista kodinhoitoapua (esim. siivous, kauppa-asiat, ruuanlaitto)	1	2	3	4
2. Olen käyttänyt kotisairaanhoidon palveluja	1	2	3	4
3. Olen käyttänyt fysioterapeutin palveluja	1	2	3	4
4. Olen käyttänyt kuljetuspalveluja	1	2	3	4
5. Olen ottanut yhteyttä terveyden- tai sosiaalihuollon ammattilaiseen saadakseni kodin ulkopuolista apua	1	2	3	4

6. Sairaalassa ollessa suunniteltiin mahdollinen kodin ulkopuolisen avun saanti

1 kyllä
2 ei

(Kysymys numero 6 kysytään vain kuukausi leikkauksen jälkeen ja kuuluu taustamuuttujiin)

Turun yliopisto, Hoitotieteen laitos Appendix 6 1(1)

Lonkkaproteesileikkauksen vaikutus potilaan terveyteen liittyvään elämänlaatuun ID _____ (tutkija täyttää)

KUSTANNUSMITTARI (haastattelu 1, 2, 3 ja 6 kuukauden kuluttua leikkauksesta)

Seuraavat kysymykset koskevat leikkauksesta ja mahdollisesta jatkohoitopaikasta syntyneitä kustannuksia sekä muita kotiutumisen jälkeen syntyneitä kustannuksia. Olkaa hyvä ja merkitkää seuraavan kuukauden / kolmen kuukauden aikana syntyvät kustannukset.

1. potilaan maksama sairaalamaksu / poliklinikkamaksu _____________ €

2. potilaan maksama maksu mahdollisesta jatkohoidosta _____________ €
   (esim. toisessa sairaalassa tms.)

3. kotiutumisen jälkeen ostetut kipulääkkeet _____________ €

4. kodinhoitoapu _____________ €
   (esim. siivous, kauppa-asiat, ruuanlaitto)

5. kotisairaanhoito _____________ €

6. fysioterapia _____________ €

7. kuljetuspalvelut
   (esim. taksimaksut, potilaan oma osuus) _____________ €

8. muut mahdolliset kulut, mitkä _____________________________________

   _____________ €

9. kustannukset yhteensä _____________ € (tutkija täyttää)

Appendix 7 1(3)

HYVÄ VASTAANOTTAJA

Olen hoitotieteen opiskelija Turun yliopiston hoitotieteen laitokselta ja teen tutkimusta lonkkaproteesipotilaista. Tutkimus kuuluu opinnäytetyönä terveystieteiden maisterin tutkintoon. Teidät on valittu lonkkaproteesipotilaiden hoidonvarausjonosta mukaan tutkimukseen, jossa tarkoituksena on kuvailla potilaiden kokemuksia hoidon eri vaiheissa. Tutkimukseen on valittu 20 lonkkaproteesipotilasta. Tutkimuksesta saatavan tiedon avulla kehitetään lonkkaproteesipotilaiden hoitokäytäntöjä ja hoidon laatua.

Pyydän kohteliaimmin Teitä osallistumaan tutkimukseen. Osallistuminen merkitsee sitä, että haastattelen Teitä ennen kotiutumistanne noin tunnin ajan. Toinen haastattelukerta on jälkitarkastuksen yhteydessä poliklinikalla ja se kestää noin ½ tuntia. Haastattelut nauhoitetaan luvallanne. Lisäksi pyytäisin Teitä täyttämään lyhyehkön kyselylomakkeen haastattelukerroilla. Tutkimukseen osallistuminen on vapaaehtoista ja halutessanne voitte koska tahansa jäädä pois tutkimuksesta.

Tutkimustuloksia tarkastellessani henkilöllisyytenne ei tule ilmi, tietoja käsitellään luottamuksellisesti ja tiedot ovat vain tutkijan käytössä. Olen saanut tutkimusluvan sairaalan eettiseltä toimikunnalta. Tutkimuksen ohjaajina toimivat THT, professori Helena Leino-Kilpi ja THT, dosentti Tarja Suominen Turun yliopiston hoitotieteen laitokselta.

Tutkimuksesta kieltäytyminen ei vaikuta mitenkään hoitoonne, mutta olisi erittäin tärkeää saada mukaan myös Teidän mielipiteenne. Toivon myönteistä suhtautumista tähän tutkimuspyyntöön, ja tarvittaessa voitte ottaa yhteytä puhelimitse.

Ystävällisin terveisin

Liisa Montin	Helena Leino-Kilpi	Tarja Suominen
Erik.sairaanhoitaja	THT, professori	THT, dosentti
TtM-opiskelija	Hoitotieteen laitos	Hoitotieteen laitos
Hoitotieteen laitos	Turun yliopisto	Turun yliopisto
Turun yliopisto		
xxx (yhteystiedot poistettu)	Puh. 02-333 8404	Puh. 02-333 8576

Turun yliopisto, Hoitotieteen laitos Appendix 7 2(3)
Lonkkaproteesileikkauksen vaikutus potilaan terveyteen liittyvään elämänlaatuun

(Tämä saatekirje annetaan potilaille kun pyydetään heitä osallistumaan tutkimukseen heidän tultuaan sairaalaan)

ARVOISA VASTAANOTTAJA!

Opiskelen Turun yliopiston hoitotieteen laitoksella ja väitöskirjani aihe on lonkkaproteesileikkauksen vaikutus potilaan terveyteen liittyvään elämänlaatuun. Tavoitteena on saadun uuden tiedon avulla auttaa potilaita paremmin toipumaan leikkauksesta sekä sairaalassa että kotona leikkauksen jälkeen. Suomessa tehdään vuosittain lähes 5000 lonkkaproteesileikkausta ja määrän odotetaan kasvavan edelleen. Siksi on tärkeä tutkia lonkkaproteesileikkauksen vaikutuksia potilaan näkökulmasta.

Pyydän kohteliaimmin, että Te lonkkaproteesipotilaana osallistuisitte tähän tutkimukseen. Tutkimukseen osallistuminen merkitsee, että vointianne kysytään yhteensä viisi kertaa seuraavasti:

- Ennen leikkausta sairaalassa Teitä haastatellaan ja pyydetään vastaamaan kyselylomakkeeseen.
- Kuukauden kuluttua leikkauksesta Teitä haastatellaan toisen kerran puhelimitse etukäteen sovittuna ajankohtana. Samalla Teitä pyydetään täyttämään ja postittamaan sairaalasta lähtiessä saamanne kyselylomake.
- Kolmannen kerran Teitä haastatellaan puhelimitse kahden kuukauden kuluttua leikkauksesta.
- Jälkitarkastuksen yhteydessä sairaalan poliklinikalla Teitä sekä haastatellaan että pyydetään vastaamaan kyselylomakkeeseen.
- Viimeisen kerran Teitä haastatellaan puhelimitse puolen vuoden kuluttua leikkauksesta kanssanne etukäteen sovittuna ajankohtana. Samalla Teitä pyydetään täyttämään ja postittamaan jälkitarkastuksen yhteydessä saamanne kyselylomake. Kaikki postimaksut on maksettu puolestanne.

Tutkimukseen osallistuminen on vapaaehtoista eikä siitä kieltäytyminen vaikuta mitenkään hoitoonne. Vastaukset käsitellään luottamuksellisesti eikä henkilöllisyytenne tule tutkimuksessa esille.

Tieteellinen tutkimus ORTON on myöntänyt tutkimukselle luvan. Tutkimuksen ohjaajina ovat Turun yliopiston hoitotieteen laitoksella professori Helena Leino-Kilpi (p. 02-333 8404) ja vs. professori Tarja Suominen sekä LKT Jyri Lepistö Sairaala ORTONista (p. 09-47481).

Etukäteen avustanne kiittäen
Liisa Montin, TtM, esh
xxx (yhteystiedot poistettu)

(Tutkimukseen osallistujille osoitettu saatekirje, joka annetaan mukaan sairaalasta lähtiessä)

Arvoisa vastaanottaja!

Kiitos osallistumisestanne tutkimuksen ensimmäiseen haastatteluun sairaalassa. Seuraavan kerran teitä haastatellaan puhelimitse kuukauden kuluttua leikkauksesta _____. _____ .

Haastattelussa Teiltä tullaan kysymään vointianne koskevia asioita. Samalla Teitä muistutetaan täyttämään ja palauttamaan postitse sairaalasta lähtiessä saamanne kyselylomake.

Olemme kiinnostuneita myös kuluista, joita leikkaus Teille aiheutti. Pyydämmekin Teitä merkitsemään muistiin kaikki sairaalasta paluunne jälkeen Teille syntyneet kustannukset, jotka johtuvat lonkkaleikkauksestanne (esimerkiksi särkylääkkeet, taksikulut jne.). Kustannuksia kysytään haastattelussa Teiltä suullisesti. Haastattelun lopuksi kanssanne sovitaan seuraava haastatteluaika.

Vastaan mielelläni mahdollisiin tutkimusta koskeviin kysymyksiinne. Toivotan Teille oikein hyvää toipumisaikaa.

Ystävällisin terveisin

Liisa Montin
TtM, esh
xxx (yhteystiedot poistettu)

Appendix 8 1(1)

Table. Results of physical function

	at 1 month					at 2 months					at 3 months					at 6 months				
	n = 98					n = 95					n = 88					n = 87				
item	strongly agree n	partly agree n	partly disagree n	strongly disagree n	mis-sing n	strongly agree n	partly agree n	partly disagree n	strongly disagree n	mis-sing n	strongly agree n	partly agree n	partly disagree n	strongly disagree n	mis-sing n	strongly agree n	partly agree n	partly disagree n	strongly disagree n	mis-sing n
1. I have been able to walk well	69	24	2	2	1	69	17	7	2	-	64	18	5	-	1	65	15	3	2	2
2. I have also walked outdoors	60	10	7	21	-	69	10	7	9	-	76	6	1	5	-	75	7	1	2	2
3. I have followed hospital's advice concerning walking	87	10	1	-	-	85	9	1	-	-	79	9	-	-	-	75	10	2	-	-
4. It was easy to follow advice concerning walking	90	6	2	-	-	85	7	1	2	-	81	6	1	-	-	77	7	3	-	1
5. I have used walking aids	88	7	1	2	-	42	10	6	37	-	31	8	4	44	1	31	9	4	42	1
6. Walking aids have been useful	95	1	-	2	-	56	2	-	2	2	40	3	1	38	6	36	6	3	28	14
7. I have consulted health care professionals concerning walking	10	2	-	86	-	18	-	1	75	1	29	1	-	57	1	23	5	2	56	1
8. Pain has hindered my walking	5	12	11	69	1	4	12	17	62	-	5	11	15	56	1	5	9	8	64	1
9. I have been able to sleep well	52	22	16	8	-	62	21	10	2	-	68	14	6	-	-	64	14	8	1	-
10. It has been easy to fall asleep at nights	61	17	13	7	-	69	16	6	4	-	70	13	3	2	-	69	12	5	1	-
11. I have followed hospital's advice concerning sleeping positions	87	9	1	-	1	85	7	1	2	-	80	6	-	2	-	69	10	2	3	3
12. It was easy to follow advice concerning sleeping	84	11	3	-	-	79	13	1	2	-	79	7	-	1	1	70	9	3	1	4
13. I have found a good sleeping position	61	25	10	2	-	67	25	2	1	-	70	16	-	2	-	69	11	4	-	3
14. Pillows have been useful	73	13	6	6	-	31	12	-	48	4	18	5	2	57	6	31	6	7	30	13
15. I have consulted health care professionals concerning sleeping	1	1	95	97	1	1	-	-	91	3	1	1	1	81	4	4	-	3	76	4
16. Pain has hindered my sleep	7	11	5	73	2	4	10	8	71	2	-	6	5	75	2	9	4	8	65	1
17. My hip has been rather painless	76	12	8	2	-	72	17	4	2	-	67	15	5	1	-	72	8	5	2	-
18. I have not need extra painkillers	60	14	10	14	-	61	16	5	13	-	56	18	4	10	-	65	8	4	9	1
19. I have followed hospital's advice concerning pain relief	90	4	-	4	-	90	2	1	2	-	84	1	-	3	-	76	7	-	1	3
20. It was easy to follow advice concerning pain relief	94	3	-	1	-	92	2	-	1	-	83	2	-	2	1	75	7	-	3	2
21. I have also used other methods than painkillers in pain relief	7	2	1	88	-	8	3	1	83	-	9	4	4	69	2	6	5	2	71	3
22. Other methods have been useful	8	3	1	86	-	11	4	-	80	-	15	4	3	63	3	13	12	3	55	4
23. I have consulted health care professionals concerning pain relief	4	2	-	92	-	3	-	-	90	2	2	-	1	84	1	9	2	1	74	1
24. Pain has hindered my daily activities	8	4	7	79	-	4	9	5	77	-	2	5	4	76	1	7	5	2	72	1

Appendix 9 1(2)

Table. Preoperative pain and age compared with physical function

Items	**Preoperative pain**		**Age**	
	Spearman correlation of coefficient	**p-value**	**Spearman correlation of coefficient**	**p-value**
Mobility at 1 month				
I have been able to walk well	0.285	0.005		
I have also walked outdoors			0.330	0.001
It was easy to follow advice concerning walking			0.237	0.019
I have used walking aids			-0.215	0.034
Mobility at 2 months				
I have also walked outdoors			0.357	<0.001
I have used walking aids	-0.301	0.003	-0.379	<0.001
Walking aids have been useful	-0.304	0.003	-0.357	<0.001
I have consulted health care professionals concerning walking			0.280	0.006
Mobility at 3 months				
I have also walked outdoors			0.299	0.005
I have used walking aids			-0.281	0.008
Walking aids have been useful			-0.340	0.002
Mobility at 6 months				
I have been able to walk well			0.297	0.006
Sleep at 1 month				
Pain has hindered my sleep	-0.242	0.017		
Sleep at 6 months				
I have followed hospital's advice concerning sleeping positions			-0.335	0.002
Pain at 6 months				
It was easy to follow advice concerning pain relief			0.216	0.032

Table. Patient characteristics, environmental, and surgery related factors compared with physical function

	Patient characteristics			**Environmental factors**		**Surgery related factors**	
	BMI	**gender**	**civil status**	**discharge destination**	**living conditions**	**complications**	**type of surgery**
	p-value	**p-value**	**p-value**	**p-value**	**p-value**	**p-value**	**p-value**
Mobility at 1 month							
I have been able to walk well						0.004	0.010
I have also walked outdoors		0.042					
I have followed hospital's advice concerning walking				0.004			
It was easy to follow advice concerning walking		0.013					
Pain has hindered my walking						0.001	
Mobility at 2 months							
I have been able to walk well	0.005					0.026	0.010
I have also walked outdoors				0.028		0.019	
It was easy to follow advice concerning walking			0.006		0.003		
I have used walking aids		0.001	0.005				
Walking aids have been useful		< 0.001			0.028		
I have consulted health care professionals concerning walking	0.012						
Pain has hindered my walking						0.001	
Mobility at 3 months							
I have been able to walk well		0.033				0.008	0.012
I have also walked outdoors						0.010	
I have consulted health care professionals concerning walking							0.001
Pain has hindered my walking						0.001	
Mobility at 6 months							
I have been able to walk well			0.040		0.005		0.003
I have also walked outdoors					0.014		0.003
I have used walking aids						0.021	
I have consulted health care professionals concerning walking	0.024	0.019					
Pain has hindered my walking					0.011		0.003
Sleep at 1 month							
I have found a good sleeping position		0.020					
Sleep at 2 months							
It has been easy to fall asleep at nights		0.023				0.017	
I have followed hospital's advice concerning sleeping positions						0.029	
I have found a good sleeping position						0.009	0.021
Pillows have been useful		0.007					
Pain has hindered my sleep						0.009	0.040
Sleep at 3 months							
Pain has hindered my sleep							0.011
Sleep at 6 months							
I have followed hospital's advice concerning sleeping positions		0.013					
I have consulted health care professionals concerning sleeping	0.008						
Pain at 1 month							
My hip has been rather painless						0.003	
I have also used other methods than painkillers in pain relief						0.027	
Other methods have been useful						0.039	0.032
Pain at 2 months							
My hip has been rather painless						0.003	
I have followed hospital's advice concerning pain relief						0.036	
I have also used other methods than painkillers in pain relief		0.023	0.005				
Pain has hindered my daily activities	0.039					0.026	
Pain at 3 months							
My hip has been relatively painless						0.002	0.004
I have not need extra painkillers						0.027	
Other methods have been useful							< 0.001
Pain has hindered my daily activities						0.027	
Pain at 6 months							
My hip has been rather painless						0.004	< 0.001
I have followed hospital's advice concerning pain relief		0.003					
It was easy to follow advice concerning pain relief		0.022					
Pain has hindered my daily activities							0.009