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Postoperative patient education in physiotherapy after hip arthroplasty at the hospital stage.

Patients' perspective

Abstract

Objective

The objective of this study was to explore postoperative patient education in physiotherapy from THA patients' perspectives. It has been a little-studied area of research. The usefulness of rehabilitation protocols after THA has been debated over years, and clear guidelines are partly missing for physiotherapy after hip arthroplasty.

Methods

The data for this qualitative study was collected from nine patients with hip arthroplasty by using individual interviews at the hospital after surgery. The interviews were audio-recorded and analysed by using a phenomenographic method.

Results

Four different categories of postoperative patient education in physiotherapy after hip arthroplasty were produced: Trust while at hospital, Preparing for going home, Managing at home and Getting fit. These categories were analysed through the following themes: moving, exercising and interaction between the patient and the physiotherapist.

Conclusion

The postoperative patient education in physiotherapy was constructed hierarchically. According to the patients' conceptions, the combination of moving and exercising elements that focused on recovery at home after the operation was essential. This requires a trusting relationship between the patient and the physiotherapist. Two critical aspects can be identified: 1. How the role of moving could shift towards preparing for going home and 2. Widening the perspective from preparing for going home to managing at home.

Keywords: postoperative patient education in physiotherapy, hip arthroplasty, phenomenography, patients' perspectives

Introduction

Total hip arthroplasty (THA) is a widely used surgical treatment for patients with osteoarthritis of the hip. The mean age for patients undergoing primary THA has increased, and their length of stay (LOS) in hospital has decreased during the last decade (Cram et al., 2011). It is a challenge to patient education and professionals' education skills. Rehabilitation conducted at home by a health professional after the operation may be insufficient (McHugh and Luker, 2012), and patients are left with the responsibility to exercise by themselves in accordance with the instructions they get from the hospital.

Although hip arthroplasty has positive effects in terms of pain relief and functioning, some patients do not recover as expected, and limitations in functioning may exist (Bertocci et al., 2004; Frost et al., 2006). According to a systematic review of physical recovery after THA, perceived physical functioning showed considerable recovery 6-8 months after surgery. Furthermore, functional capacity to perform activities measured with gait analysis showed moderate recovery (Vissers et al., 2011). According to patients' experiences 6-8 months after total hip arthroplasty, patients were disappointed at the time when recovery was taking place (McHugh & Luker 2012). They felt disabled and had difficulties to perform some activities of daily living. The majority of them had received very little information from health care professionals.

The immediate postoperative rehabilitation goal is to achieve a sufficient level of independence in daily living activities with the help of early and intensive physiotherapy (Jones et al., 2007). Multimodal pain control can improve patients' participation in progressive rehabilitation (Sharma et al., 2009). Earlier studies have shown that early intensive ambulation and rehabilitation after the operation can speed up recovery (Khan et al. 2009; Larsen et al 2009). However, bed exercises in addition to common physiotherapy at the hospital stage do not add value to recovery nor shorten the length of stay in hospital (Jesudason and Stiller, 2002). Instead, stepping exercises after THA may facilitate the muscular recovery of the hip abductors and knee extensors in the early postoperative phase (Tsukagoshi et al., 2012). According to Husby et al. (2009), early maximal strength training starting one week postoperatively is an efficient way to regain muscular strength compared with conventional rehabilitation.

There are only few studies about physiotherapy at the hospital stage. Studies do not provide evidence about the effectiveness of later physiotherapy at home on the outcome of surgery. Physiotherapeutic exercise after discharge has the potential to benefit patients, but studies fail to evaluate the value of post discharge exercise programs (Minns Lowe et al., 2009). The usefulness of rehabilitation protocols is debated (Brander and Stulberg, 2006), standardised practices and clear guidelines are missing in physiotherapy after hip arthroplasty, and practices are inconsistent all over the world (Di Monaco et al., 2009).

There is also a lack of studies focusing on hip arthroplasty patients' perspectives on physiotherapy. The aim of this study is to find out patients' conceptions of patient education in physiotherapy after hip arthroplasty at the hospital stage. The main goal of this study is to produce information to develop physiotherapy to meet the needs of patients with hip arthroplasty.

Methods

Design and patients

This study is the second part of a research project that explores patient education in physiotherapy (Jäppinen et al, 2015). It is a qualitative study using a phenomenographic method.

The patients were selected direct from a hip arthroplasty operation list and initially approached by a clinical team. (Fig.1). First, the clinical team approached 15 patients by phone. A total of 10 patients were willing to participate in the study. After patient permission was granted, the researchers contacted them. In order to analyse qualitative data, the number of patients (n=10) was decided in advance by the research team. The patients were selected in accordance with the following criteria: (1) Age between ≥ 60 and ≤ 80 years; (2) Finnish-speaking and (3) undergoing the first total hip arthroplasty in a Southern Finnish hospital.

The mean age of the patients was 69, range 7 years (63–79). There were two males and eight females, all of whom lived in the surrounding area.

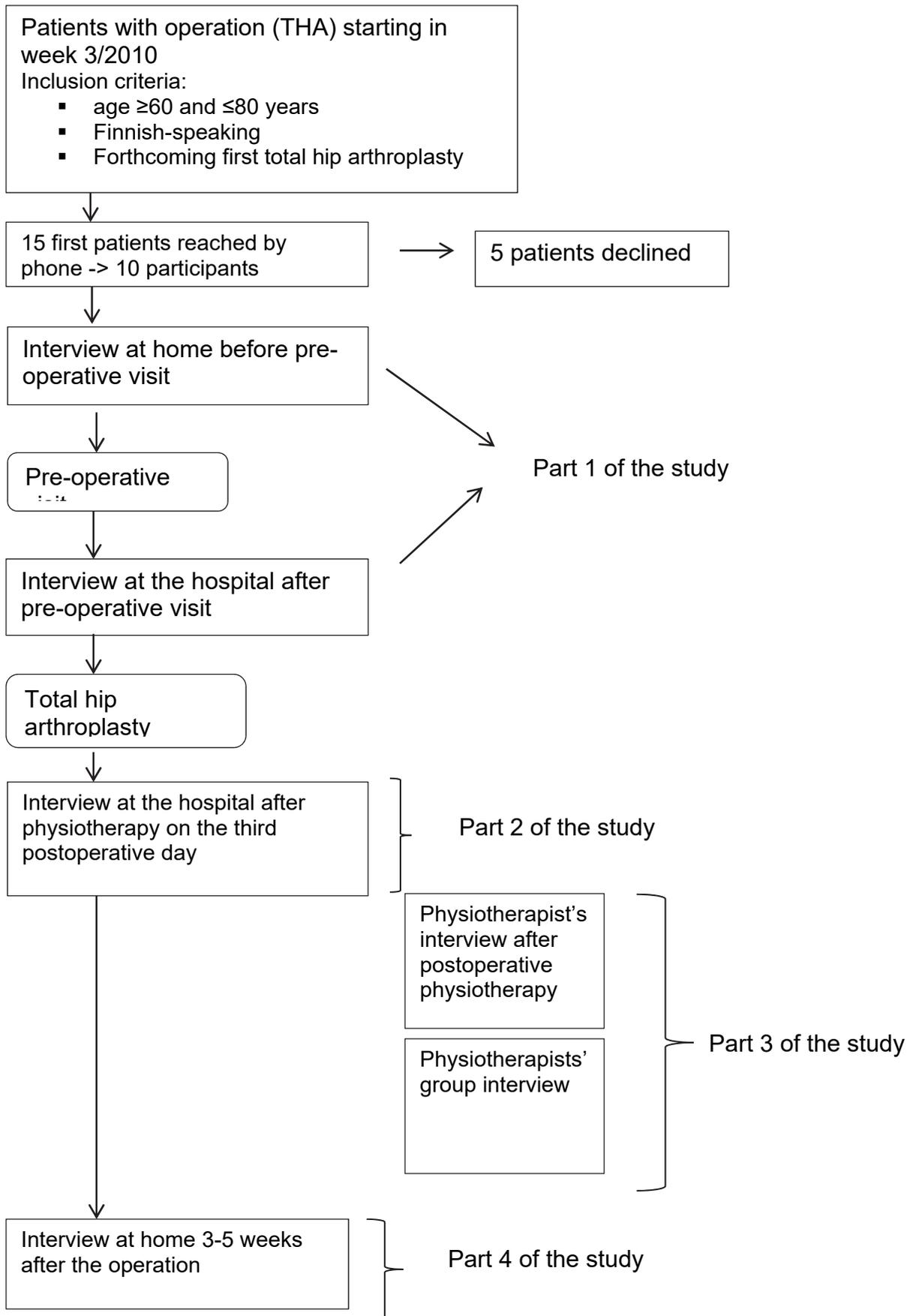


Figure 1
Study design and sampling flow chart

Ten patients (patient identification A-J) agreed to participate in the whole study. All patients provided a written consent for interviewing and for the use of the data in publications. They were interviewed four times along the operation process; home before any procedure, after pre-operative visit, at hospital after the operation and 3-5 weeks after the operation at home.

This study contains the interviews of nine patients at the hospital on the third postoperative day (one patient had left home on the second postoperative day and could not be interviewed).

Data collection

The data for this qualitative study was collected during spring 2010. Data collection for the whole study was carried out in collaboration with higher education students. The first and the last author were responsible for the study design, research process, and guided interviews.

The data was collected using individual interviews. The interviews explored the patients' views on what postoperative physiotherapy and physiotherapeutic patient education meant to them, their experiences concerning their physical condition and expectations about going home and managing there after THA. The interviews were audio recorded and transcribed verbatim. The data consisted 68 A 4-pages of transcriptions (font=Times New Roman 12, spacing =1.5).

Data analysis

The data was analysed by using a phenomenographic method (Åkerlind, 2005a), which has its roots in pedagogical research (Marton, 1986). The focus in phenomenographic research is on the variation in human meanings, conceptions and awareness of experiencing a phenomenon (Marton and Booth, 1997). The advantage of using a phenomenographic method is the possibility to identify different conceptions and find out the hierarchical structure of the conceptions (Åkerlind, 2005a; Åkerlind, 2008). Data was also collected on descriptions of the THA patients' individual experiences, and it was analysed to achieve a picture of the patients' collective experience of postoperative patient education in physiotherapy.

In the beginning, the focus was to identify the patients' views and understanding of postoperative patient education in physiotherapy in relation to the operation and recovery. Then we looked for differences and similarities in order to form descriptive categories. These categories were organised hierarchically and inclusively. In further analyses, we focused on the critical aspects and the variation of the themes formed by these four categories that expanded to the awareness of postoperative patient education in physiotherapy. During the analysis process, we analysed the consistency between the original data and our findings to confirm the results and minimise the influence of our own viewpoints (Åkerlind, 2005a). The process of the phenomenographic data analysis is presented in Figure 2. Phases one and two were performed by the first author. Phases three and four were performed in collaboration between the members of the research team.

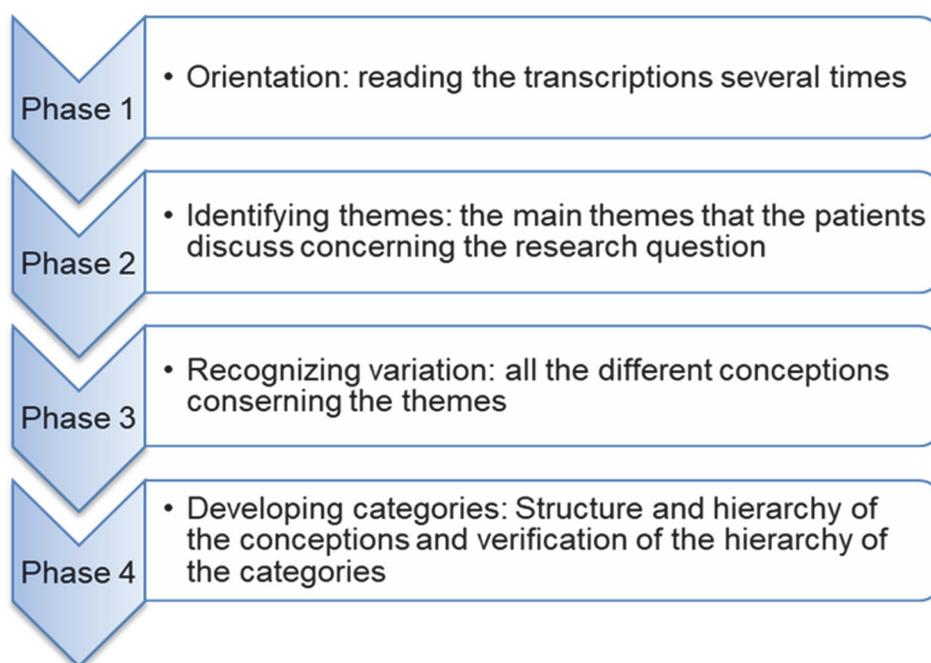


Figure 2
Process of phenomenographic data analysis

Ethical issues

Ethical approval for the study was obtained from the Ethical Committee of the healthcare district where the data collection took place, and the Department of Surgery of the hospital also approved this study. All the patients were informed about the aims and objectives of the study orally, and they provided written consent for interviews and for

the use of the data in publications. The patients were informed that they could withdraw from the study at any time and that the anonymity of the patients was ensured.

Results

Categories and themes

The categories of postoperative patient education in physiotherapy were seen in the variation of themes that the patients used in the interviews. These themes were: 1. Moving, 2. Exercising 3. Interaction between the patient and the physiotherapist.

In the “Moving” theme, the patients expressed their perceptions on moving during the hospital stay and guidance for that, follow-up at the hospital stage and ensuring that their bodies were working as expected before going home. This theme also included advice on how to manage at home and get fit. The “Exercising” theme indicated the patients’ views on the exercises during the hospital stay and at home, the amount and type of exercises, guidance for doing them correctly and encouragement to exercise by themselves. In the “Interaction between patient and physiotherapist” theme, the patients described their relationships to their physiotherapists and the physiotherapists’ skills, such as listening skills, feed-back and encouragement skills, and their ability to treat patients as individuals.

Four different categories of the postoperative patient education in physiotherapy after hip arthroplasty were produced. These categories were constructed hierarchically. The narrowest was **Trust while at hospital. Preparing for going home** was the second category, and the third was **Managing at home**. The widest category, **Getting fit**, contains all other three categories (Table 1).

Table 1

Patients' conceptions on postoperative patient education in physiotherapy after hip arthroplasty at the hospital stage

| Hierarchy of categories | | | | |
|--------------------------------|--|--|--|--|
| | I Trust while at hospital | II Preparing for going home | III Managing at home | IV Getting fit |
| Variation of themes | | | | |
| Moving | Confidence of moving and acting in the correct way | Confidence of recovering predictable way | Getting advice for managing at home | Guidance from physiotherapist to support getting fit |
| Exercising | Vision of how to practise/exercise properly | Getting home, exercise programme | Written instructions to support exercising at home | Confidence in exercise in order to recover. |
| Interaction | Physiotherapist's listening skills | Individualistic interaction | Interaction and guidance adding to self-confidence | Encouragement to practice |

Description of the categories

Category I: Trust while at hospital

The focus of this category was on the hospital stage, immediately after the operation. In this category, the moving was shown as confidence to move in a correct way. The interviewers emphasised that it was important to be certain that you could move and act and also to be guided by the physiotherapist how to move normally. Good follow-up during the postoperative days at the hospital stage was also valued:

'They have followed me up very well and I have been informed about every stage. I would not need anything more.'(A)

The exercising theme in this category could be described as the vision of how to practise/exercise properly. The patients talked about gaining knowledge on how to use muscles and do stretching, what is the optimal position of the joint and the whole upright body:

‘The main thing is that you do it in the right way.’ (B)

In the “Interaction” theme, the focus was on the relationship between the patient and the physiotherapist. The patients mentioned physiotherapists’ listening skills and clear advice on how to move and what they were allowed to do, for example precautions about the range of motions and weight-bearing. Unhurried interaction was also mentioned:

‘Very restful, and the physiotherapist easily realises what the patient needs and notices if the patient cannot do something or does it in a wrong way or if the patient finds it difficult to understand all.’

(C)

Category II: Preparing for going home

The focus of the second category concerned preparations for going home after the postoperative hospital stage. In the “Moving” theme, the patients experienced that they gained confidence concerning their ability to recover in the predictable way. They saw themselves as competent to manage for example on the stairs, and this gave them a good feeling about going home:

‘I have a confident feeling now that I am going home.’(J)

In the “Exercising home” theme, an exercise programme with good guidance was essential. The patients especially talked about in-depth guidance. They felt that physiotherapists had time and knowledge to teach them and to give feedback on their performance. They valued the fact that the physiotherapists showed them how to do the exercises, corrected them if they did it in a wrong way or gave positive feedback if they did it right. Advice was given repeatedly during the hospital stay. Some patients felt that the exercise programme was not progressive enough or that there should have been more stages or alternatives in it:

'To be heard first and then get good guidance. You are monitored to ensure that you are doing the exercises exactly in the right way, not halfway or so-and-so.'(E)

The interaction between the patient and the physiotherapist was seen as individualistic. The patients mentioned that it was important that the physiotherapists paid attention to a patient as a unique person. For example, pain, other musculoskeletal problems and fears were taken into account:

'I told her that I have "stairs phobia", and she took that into account. She did not despise it verbally like you can't have that. So I give her points for that.'(B)

Category III: Managing at home

The focus in this category was on the confidence to act in order to manage at home by oneself after the short hospital stay. In the "Moving" theme, the patients talked about getting tips and advice that supported support managing at home. Advice on how to travel in a car, walk on stairs, control balance when standing and take things from a locker were mentioned. The patients told that they had made arrangements in order to handle difficult activities such as shopping, cleaning and taking out rubbish during the winter time. Help from relatives was essential. In this theme, the awareness of what you are able and allowed to do at home was still important:

'...so these small tips that will help me then to manage at home.'(C)

In the "Exercising" theme, written instructions like how to facilitate muscle recovery or to stretch muscles and joints were relevant as supporting exercising at home. The patients felt that guidance helped them believe that they could manage and cope in the future:

'Those written instructions are very clear. You can find everything in them.'(D)

The "Interaction" theme comprised the interaction and guidance. Adding self-confidence and repairing feed-back was appreciated. Feed-back on their actions and conceptions

extended the patients' understanding, and the time that the physiotherapist could offer in order to give feed-back were valued:

'I would not go home without this last guidance. I realised that my leg was working as it should work at this point of time and I got some small exercises too.....so it was a catch-all encounter and you feel good when going home, because she told me that this and that are going well' (A)

Category IV: Getting fit

In the fourth, wider category "Getting fit", the focus continued to be on managing at home and on the importance of patients own actions, such as moving and practising and one's own responsibility for recovery. In the "Moving" theme, the patients talked about the importance of physiotherapeutic patient education and guidance in order to become independent and get into a good condition:

'...so I am not going to be helped by others. I have to manage by myself. If I am going to live ten more years, I do not want to walk with crutches. I mean, no way.'(F)

In the "Exercising" theme, the patients expressed their confidence in the exercises provided by physiotherapists and the type and amount of exercises to recover from THA. They also mentioned their confidence and ability to exercise by themselves in the future in order to become as healthy and normal as before:

'The goal is that you will be in a good condition, able to walk and be healthy, that you can be as you were in the past or as near it as possible.'(F)

The "Interaction" theme could be described as encouragement to do exercise and manage in the future. The patients talked about getting support for aiming high in the recovery process, but still the important thing was the patients' own motivation:

'...and just that you got verification that you can do more than being 'rigid as tree'.' (J)

Summary of the results and key aspects

Our study revealed that the patients had wide-ranging conceptions on postoperative education in physiotherapy. The key aspects were found in the varying themes, and they formed the critical aspects between the descriptive categories (Åkerlind, 2005b). Two critical aspects could be identified (Figure 4). The first critical aspect was how the role of moving could shift towards preparing for going home (Category II).

The second critical aspect was in widening the perspective from preparing for going home (Category II) to managing at home (Category III). Then, the key issues were exercising and getting written instructions to support exercising at home and such guidance from physiotherapist that added to self-confidence.

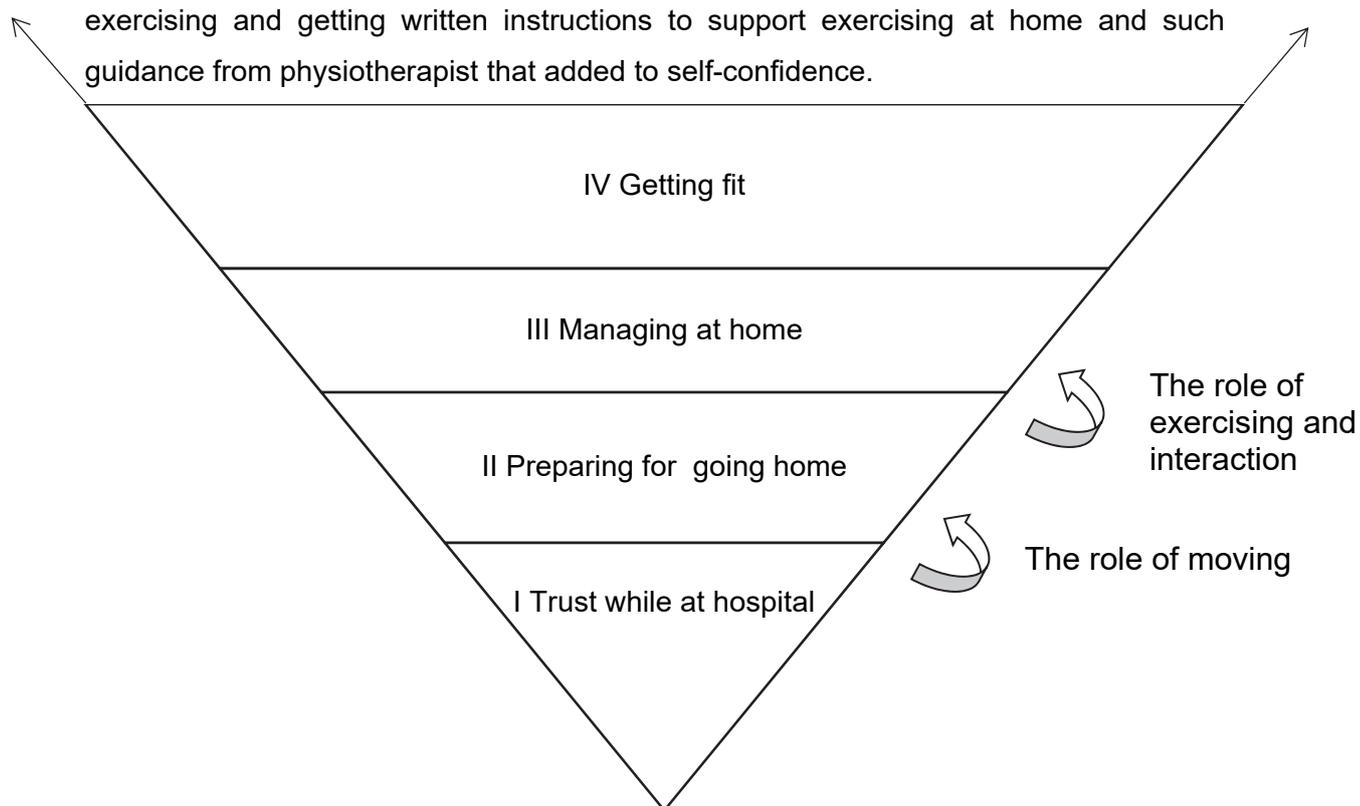


Figure 3

Patients' conceptions on postoperative patient education in physiotherapy and the critical aspects between the categories.

Discussion

The results showed that postoperative patient education in physiotherapy was constructed hierarchically starting from the support of the patients' trust while at hospital and continuing to enable them to get fit/normal. The patients' conceptions on postoperative physiotherapy highlighted the role of moving in order to go home, and after that, the focus was on interaction and exercising. As other studies state, a key factor in

recovery is the ability to rapidly regain an adequate level of functional independence in daily activities during the short hospital stay (Brander and Stulberg, 2006; Jones 2007). Postoperative rehabilitation also focuses on teaching precautions concerning the range of motions and weight-bearing and on how to use aids as well as on patient and family counselling (Brander and Stulberg, 2006).

In this study, the important aspect is how patients can achieve the third category, managing at home. What elements can confirm that impression in the patients' minds? In our study, physiotherapists' tips and advice were mentioned as potential support for managing at home. Guidance during physiotherapy sessions was perhaps more focused on the home situation. In our study, the patients talked little about activities in daily living (ADL), which was somewhat unexpected for us. The result is in line with Grotle et al's study (2010) in Norway, in which they concluded that little attention was paid to patients' activity at home or at work despite the reality that patients had problems with ADL at home. They found out that rehabilitation teams were mainly involved with physiotherapists and nurses and seldom with occupational therapists and social workers. This can also be the one reason why the patients in our study talked little about problems at home. The cultural context of the hospital differs from home and probably does not encourage the patients to discuss problems in daily living. The results support the idea that we need to enhance physiotherapeutic patient education after discharge and to increase co-operation with other professionals working at patients' homes, even though many patients are supposed to manage by themselves at home. In future, technology solutions and the use of information and communication technology (ICT) must be made available to physiotherapists to allow them to complete patient education after the hospital stage.

An earlier study on patient satisfaction with physiotherapy following THA reported that about 67 % of patients were satisfied, and among other things, they valued hands-on time spent with the physiotherapist (Issa et al., 2013). This time is limited when early and safe discharge is the cost-effective target. According to Husted et al. (2011), the median length of stay after THA in the fast-track surgery was 2 days. Patients with walking aids and difficulties in climbing stairs before the operation needed to stay at hospital for a longer time (van Aalst et al., 2014). The patients in our study talked about the time and knowledge that physiotherapists offered them during the counselling and practising

sessions. Similarly, Montin et al. (2002) stated that patients appreciated the time that nurses spent with patients and nurses' ability to listen to them.

Getting fit was the widest category in our study. McHugh and Luker (2012) found out that all patients in their study had also this need. On the other hand, increasing age, lower education and living alone have found to be associated with a physically inactive lifestyle after THA (Stevens et al., 2007). Therefore, patient education in physiotherapy and follow-up should be directed specifically to these THA patients in order to avoid symptoms caused by an inactive lifestyle.

The patients in our study valued written instructions on how to exercise at home. A review from Coulter et al. (2013) identified benefits in gait speed and strength due to physiotherapeutic rehabilitation, but it could not find a difference between physiotherapist-guided programmes and physiotherapist-prescribed home exercise programmes performed independently. Therefore, they recommend either of them. In our study, the patients looked for more progressive home exercise programmes and wondered how to get them as having a follow-up with a physiotherapist was not a common practice. For example, Husby (2010) stated that rehabilitation programmes are often inefficient in improving muscle strength and aerobic endurance performance in patients with THA. This made us wonder if exercise programmes would be demanding enough in the future. The emphasis on walking ability derives from the hospital's caring process in which the aim is early discharge.

Limitations and strengths

This study has its limitations. The sample is only nine patients. Reasonable restrictions on the number of interviews can be made in a phenomenographic analysis in order to handle data and identify the logical structure within the context of different meanings (Åkerlind, 2005a). The findings are related to the regional and national context of the Finnish healthcare system and patients of 60-80 years of age. The patients were volunteers and they probably had positive expectations towards patient education in physiotherapy, the operation and their recovery. With these limitations in mind, it is important to note that this qualitative study explored postoperative patient education in physiotherapy from patients' viewpoint. It has been a little-studied area of research, and this research brings in-depth knowledge about the postoperative patient education in physiotherapy from patients' perspective and can be utilised in developing physiotherapy.

Conclusion

The objective of this study was to produce useful insights regarding postoperative patient education in physiotherapy after hip arthroplasty. The four categories of postoperative patient education in physiotherapy reflect broad and differing views. According to patients' conceptions, a combination of moving and exercising elements that focused on recovery at home after operation was essential. This requires a trusting relationship between the patient and the physiotherapist. According to our results, two critical aspects can be identified: 1. How the role of moving could shift towards preparing for going home and 2. Widening the perspective from preparing for going home to managing at home. These findings can be used as a basis for planning postoperative patient education in physiotherapy to enable safe discharge, further exercise and active lifestyle at home.

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References:

Bertocci GE, Munin MC, Frost KL, Burdett R, Wassinger CA, Fitzgerald SG(2004): Isokinetic performance after total hip replacement. *American Journal of Physical Medicine and Rehabilitation* 83:1–9. DOI: 10.1097/01.PHM.0000098047.26314.93

Brander V, Stulberg SD (2006). Rehabilitation after hip- and knee-joint replacement: an experience- and evidence-based approach to care. *American Journal of Physical Medicine & Rehabilitation* 11: S98–S118. DOI: 10.1097/01.phm.0000245569.70723.9d

Coulter CL, Scarvell JM, Neeman TM, Smith PN (2013). Physiotherapist-directed rehabilitation exercises in the outpatient or home setting improve strength, gait speed and cadence after elective total hip replacement: a systematic review. *Journal of physiotherapy* 59:219-226. doi:10.1016/S1836-9553(13)70198-X

Cram P, Lu X, Kaboli P, Vaughan-Sarrazin M, Cai X, Wolf B, Li Y (2011). Clinical Characteristics and Outcomes of Medicare Patients Undergoing Total Hip Arthroplasty, 1991-2008. *The Journal of the American Medical Association* 305:1560-7.

Di Monaco M, Vallero F, Tappero R, Cavanna A (2009). Rehabilitation after total hip arthroplasty: a systematic review of controlled trials on physical exercise programs. *European Journal of Physical and Rehabilitation Medicine* 45:303-17.

Ferrara PE, Rabini A, Aprile I, Maggi L, Piazzini DB, Magliocchetti Lombi G, Amabile E, Tancredi G, Aulisa AG, Padua L, Bertolini C (2008). Effect of pre-operative physiotherapy in patients with end-stage osteoarthritis undergoing hip arthroplasty. *Clinical Rehabilitation* 22:977-986.

Frost KL, Bertocci GE, Wassinger CA, Munin MC, Burdett RG, Fitzgerald SG (2006) Isometric performance following total hip arthroplasty and rehabilitation. *Journal of Rehabilitation Research & Development* 4:435-444

Grotle M, Garratt AM, Klokke M, Løchting I, Uhlig T, Hagen KB.(2014) What's in Team Rehabilitation Care After Arthroplasty for Osteoarthritis?

Results From a Multicenter, Longitudinal Study Assessing Structure, Process, and Outcome. *Physical Therapy* 90:121-131. doi: 10.2522/ptj.20080295

Husby VS, Helgerud J, Bjørgen S, Husby OS, Benum P, Hoff J. (2009) Early maximal strength training is an efficient treatment for patients operated with total hip arthroplasty. *Archives of Physical and Medical Rehabilitation* 90:1658-67.

Husby VS (2010). Rehabilitation of patients undergoing total hip arthroplasty. With focus on muscle strength, walking and aerobic endurance performance. Thesis for the degree of Philosophiae Doctor. Norwegian University of Science and Technology, Faculty of Medicine, Department of Circulation and Medical Imaging. p. 39

Husted H, Lunn TH, Troelsen A, Gaarn-Larsen L, Kristensen BB, Kehlet H (2011). Why still in hospital after fast-track hip and knee arthroplasty? *Acta Orthopaedica* 6: 679–684.

Issa K, Naziri Q, Johnson AJ, Memon T, Dattilo J, Harwin SF, Mont MA (2013). Evaluation of Patient Satisfaction With Physical Therapy Following Primary THA. *ORTHOPEDICS* 5:538-542

Jesudason C & Stiller K (2002). Are bed exercises necessary following hip arthroplasty? *Australian Journal of Physiotherapy* 48:73-81.

Jones AC, Beaupre LA, Johnston DWC, Suarez-Almazor MA (2007). Total Joint Arthroplasties: Current Concepts of Patient Outcomes after Surgery. *Rheumatic Diseases Clinics of North America* 33: 71–86

Jäppinen A-M, Hämäläinen H, Kettunen T & Piirainen, A. (2015). Patients conceptions of preoperative physiotherapeutic patient education before hip arthroplasty. *European Journal of Physiotherapy*, 17 (3), 148-157. doi:10.3109/21679169.2015.1061051

Khan F, Ng L, Gonzales S, Hale T, Turner-Stokes L (2009). Multidisciplinary rehabilitation programmes following joint replacement at the hip and knee in chronic arthropathy [review]. *The Cochrane Library* 1:1-36.

Larsen K, Hansen T, Thomasen P, Christiansen T, Søballe K (2009). Cost-Effectiveness of Accelerated Perioperative Care and Rehabilitation After Total Hip and Knee Arthroplasty. *The Journal of Bone and Joint Surgery. American* volume 91:761-772. doi: 10.2106/JBJS.G.01472.

Marton F (1986). Phenomenography – A research approach to investigating different understandings of reality. *Journal of Thought* 3, 28–49.

Marton F & Booth S (1997). *Learning and awareness*. Mahwah, NJ: Lawrence Erlbaum Associates, Publishers. p.125

McHugh GA & Luker KA (2012). Individuals' expectations and challenges following total hip replacement: a qualitative study. *Disability & Rehabilitation* 16: 1351–1357

Minns Lowe CJ, Barker KL, Dewey ME, Sackley CM (2009). Effectiveness of physiotherapy exercise following hip arthroplasty for osteoarthritis: a systematic review of clinical trials. *BMC Musculoskeletal Disorders* 10:98. doi:10.1186/1471-2474-10-98

Montin L, Suominen T, Leino-Kilpi H (2002). The experiences of patients undergoing total hip replacement. *Journal of Orthopaedic Nursing* 1:23-29.

Sharma V, Morgan PM, Cheng EY (2009). Factors Influencing Early Rehabilitation After THA. A Systematic Review. *Clin Orthop Relat Res* 467:1400–1411
DOI 10.1007/s11999-009-0750-9

Stevens M, Wagenmakers R, Groothoff JW, Bulstra SK, van den Akker-Scheek I, Zijlstra W (2007). Physical activity behaviour after total hip arthroplasty (THA): A prediction based on patient characteristics. *Patient Education and Counseling* 69: 196–199

Tsukagoshi R, Tateuchi H, Fukumoto Y, Okumura H, Ichihashi N (2012). Stepping exercises improve muscle strength in the early postoperative phase after total hip arthroplasty: a retrospective study. *American Journal of Physical Medicine & Rehabilitation*; 91:43Y52.

van Aalst MJH, Oosterhof J, Nijhuis-van der Sanden MWG, Schreurs BW (2014). Can the length of hospital stay after total hip arthroplasty be predicted by preoperative physical function characteristics? *American Journal of Physical Medicine & Rehabilitation* 93:486-492.

Vissers MM, Bussmann JB, Verhaar JAN, Arends LR, Furlan AD, Reijman M (2011). Recovery of Physical Functioning After Total Hip Arthroplasty: Systematic Review and Meta-Analysis of the Literature. *Physical therapy* 5: 615-629

Åkerlind G (2005a). Variation and commonality in phenomenographic research methods. *Higher Education Research and Development* 4:321-334.

Åkerlind, G (2005b). Learning about phenomenography: Interviewing, data analysis and qualitative research paradigm. In: Bowden JD, Green P (eds) *Doing developmental phenomenography*. Melbourne, RMIT University Press, p. 63-73.

Åkerlind G (2008). A phenomenographic approach to developing academics' understanding of the nature of teaching and learning. *Teach High Educ* 6:633-44.