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Early recovery following lower limb arthroplasty: qualitative interviews with patients undergoing elective hip and knee replacement surgery. Initial phase in the development of a patient-reported outcome measure (PROM).

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Abstract

Aims and objectives: The aim of this study was to explore the patients' perspective of surgery and early recovery when undergoing lower limb (hip or knee) arthroplasty.

Background: Lower limb arthroplasty is a commonly performed procedure for symptomatic arthritis which has not responded to conservative medical treatment. Each patients' perspective of the surgical process and early recovery period impacts on their quality of life.

Design: Open, semi-structured qualitative interviews were utilised to allow for a deeper understanding of the patient perspective when undergoing a hip or knee arthroplasty.

Methods: Following ethical approval, thirty patients were interviewed between August and November 2016 during the perioperative period while undergoing an elective hip or knee arthroplasty (n=30). The interviews were performed between the day of surgery and a nine week postoperative clinic appointment. Data were analysed using an in depth narrative thematic analysis method. NVivo qualitative data analysis software was used.

Results: Seven main themes evolved from the interviews: 'improving function and mobility', 'pain', 'experiences of healthcare', 'support from others', 'involvement and understanding of care decisions', 'behaviour and coping' and 'fatigue and sleeping'.

Conclusions: The early postoperative recovery period is of vital importance to all surgical patients. This is no different for the orthopaedic patient. However, identifying key self-reported areas of importance from patients can guide clinical focus for healthcare professionals.

Relevance to clinical practice: To have specific patient-reported information regarding key areas of importance during the perioperative phase is invaluable when caring for the orthopaedic surgical patient. It gives insight and understanding to this increasing population group. This study has also served as a starting point in the development of a questionnaire which may be used to assess interventions in the lower limb arthroplasty population. These results will influence both items and content of the questionnaire.

Keywords: surgery, arthroplasty, total hip replacement, total knee replacement, unicompartmental knee replacement, patients' perspective, quality of recovery, postoperative recovery, nursing research, qualitative study.

Summary box:

<p>'What does this paper contribute to the wider global clinical community?'</p> <ul style="list-style-type: none">• Specific patient-reported information is invaluable when caring for patients. It gives insight and understanding into the patient perspective and experience of orthopaedic surgery.• The study reported in the paper is unique because it focuses on early recovery, which has not been the core of previous qualitative or patient-reported outcomes work in this area.• It provides a starting point for further work to develop an early recovery questionnaire which may be used to assess the efficacy of interventions.

Introduction

Lower limb arthroplasty, particularly of the hip or knee, is an effective surgical treatment option for patients with severe symptomatic arthritis who have not responded to medical management (National Joint Registry 2016). Arthroplasty, or joint replacement, comes from

the Greek 'arthron', meaning joint, and 'plassein', meaning to mould. In these procedures, the damaged arthritic parts of the joint are surgically removed and replaced using metal, plastic or ceramic prostheses. These procedures have been gaining in numbers over the last fifty years and as the incidence of arthritis in the aging population is increasing. The World Health Organisation has acknowledged osteoarthritis as one of the developed world's 'ten most disabling conditions'. Currently, it is believed that worldwide the overall international incidence is around 10% in men and 18% in women over 60 (World Health Organization 2017).

Estimates in the United Kingdom (UK) are that around 40% of adults over 65 have the condition (Dawson, Linsell et al. 2004). Currently around 67,000 total knee arthroplasties (TKA) and 65,000 total hip arthroplasties (THA) are performed in England, Northern Ireland and Wales annually (National Joint Registry 2016). These procedures account for around 800,000 hospital days per year with the average length of stay (LOS) in the UK being around five days (Mertes, Raut et al. 2013). In the United States of America (USA), around 690,000 TKA (Williams, Wolford et al. 2015) and 326,000 THA (Wolford, Palso et al. 2015) are performed annually, with this number expected to grow exponentially until the year 2030 (Kurtz, Ong et al. 2007).

The main purposes of both TKA and THA surgery are to restore movement and function, improve quality of life and decrease pain (Stewart, Greenfield et al. 1989). The aim of this study is to explore patients' perspective when undergoing lower limb (hip and knee) joint replacement. Phases of recovery can be divided into early (from the day of surgery through six weeks), medium (up to six months) and long term (more than six months). Patients typically take between six months and one year to 'fully' recover. Much research has been carried out looking at recovery over the medium to long term, but there is a paucity of work in the early postoperative period (Aarons, Hall et al. 1996).

Background

Patient recovery following surgery is multi-factorial. Optimising recovery holds significant benefits for patients, healthcare professionals and healthcare payers. In particular, enhanced recovery protocols (ERPs), which were first proposed in 1997 by Kehlet et al. to reduce the surgical stress response, have evolved to address the many factors involved in a patient's short-term recovery from surgery (Kehlet 1997, Kehlet and Wilmore 2008).

By utilising multimodal techniques, ranging from pre-operative education to surgical site local anaesthetic wound infiltration, ERPs have been demonstrated to significantly reduce perioperative pain and opiate consumption and are associated with significant cost savings to the healthcare system through a reduced length of stay (LOS) and associated healthcare costs (Hamilton, Athanassoglou et al. 2016, Hamilton, Athanassoglou et al. 2017). In addition, the short-term benefits seen with the use of ERPs have been reported to translate into reduced long-term patient morbidity and mortality as well as improved functional outcomes (Ibrahim, Twaij et al. 2013, Nicholson, Lowe et al. 2014, Wylde, Lenguerrand et al. 2015). Introduction of day of surgery physiotherapy and mobilisation have also been found to decrease LOS (McCann-Spry, Pelton et al. 2016).

Optimising patient care through use of an ERP is beneficial for the arthroplasty patient. By using multimodal pain management techniques, as mentioned above, and decreasing opiate usage, it is hoped that the ERP will reduce pain, recovery and LOS. However, a recent study found that despite these interventions, as many as 44% of ERP participants remained in hospital on day five. They were found to experience a number of problems, including wound leakage, medical issues and physiotherapy concerns (Kerr, Armstrong et al. 2017). It is important to acknowledge that reduced LOS is not necessarily an indication of a positive outcome and can be achieved by the use of increased opiate medication. In addition, LOS is a

poor surrogate for and does not represent patient experience. Particularly in an older population group, a one-size-fits-all programme of care may not be suitable. Customization of these ERPs is required.

Patient-reported outcome measures (PROMs) have been routinely used since 2009 within the National Health Service (NHS) to measure long-term health improvement in patients undergoing hip and knee arthroplasty (Digital NHS 2016). They are also collected on NHS patients receiving varicose vein and hernia surgery. These PROMs are most often used at mid to long term recovery periods of six months and longer.

As an early part of this research, a systematic review of currently used measures for assessing recovery following lower limb joint replacement was performed (Strickland, Hamilton et al. 2016). It was discovered that these tools lack the sensitivity to accurately evaluate the quality of recovery in the perioperative period, as they are predominantly based on the patients' signs and symptoms as perceived by the medical team looking after the patient, rather than evaluating the patient's experience using a PROM. This led to beginning qualitative work with a view to developing an early recovery PROM.

The need for work in this area has been recognized by the James Lind Alliance. This patient-focussed research initiative have established top ten research priorities for patient groups, including hip and knee replacement patients. They reported that the number one priority for this group was the identification and measurement of patient and clinical outcomes (James Lind Alliance 2014).

In background work prior to commencing the interviews for this study, a patient public involvement (PPI) session was conducted. This included patients, carers and member of the public and was conducted on January 13th 2015. The purpose of this session was to gain insight from those who have personally experienced or are about to experience joint

replacement surgery. By speaking to family members, the perspective of those who have cared for patients undergoing joint replacement surgery was also considered. This was carried out in order to enhance the research and ensure that the proposed studies would answer questions that really matter to patients.

Although often discussed, the precise definition and period of recovery remains somewhat ambiguous. In general, it depends on the type of surgery and a holistic view of being returned to a pre-disease and pre-surgery state of health and recuperation (Allvin, Berg et al. 2007).

The focus of this study was to look at the outcomes and experiences of the perioperative period with particular emphasis on early recovery.

Methods

Design: The study employed a qualitative design. Open, semi-structured interviews (Mays and Pope 2008) were utilised to allow for a deeper understanding of the patient perspective when going through hip or knee replacement.

Setting and sample: The study was conducted at a 160-bedded specialist Orthopaedic hospital within the NHS, England, UK. The hospital performs elective orthopaedic surgeries. A purposive sampling framework was used as much as possible for interviews to ensure that patients undergoing total hip or knee replacement were recruited. Inclusion criteria for the study included being willing and able to give informed consent, being aged 18 years or above and being able to communicate in English. All participants were recruited from the orthopaedic clinic at the hospital. All participants were purposively sampled (Malterud 2001) as being treated with hip or knee with joint replacement surgery. 30 patients were recruited to the study (16 women and 14 men; aged 45-92) (Table 1: participant characteristics).

Ethical consideration: Ethics approval was applied for and received (Reference 16/NW/0236) from the Health Research Authority (HRA) research ethics committee (REC) North West - Liverpool East Research Ethics Committee.

Data collection: Following ethical approval and informed consent, interviews were performed to identify factors that patients view as important to their surgical recovery.

Patients were interviewed once during their perioperative care: on the morning of surgery (pre-operative), within the first week after surgery (immediate postoperative) or up to nine weeks following surgery (early postoperative). Interviewing patients at different times across the perioperative continuum provided a group that could both comment on what was acutely happening to them and also reflect back to the recent past and time of surgery to include all possible ideas. Interviews were open, semi-structured in nature with prompts (Polit and Beck 2012). The prompts encouraged exploration of patients' perceptions on the history, diagnosis and progression of their arthritis (Figure 1: Interview prompts). Treatment and surgical procedures were also explored. Interview prompts were informed by the clinical experience of the research team and patient input. Interviews were audio recorded. The duration was around 30 minutes for each interview. On completion of each interview, field notes were recorded to document particular details about the process. These notes included reflection on participant responses, physical situation and the researcher's personal reflections. The interviews were then transcribed and anonymised.

Analysis: Data were analysed using an in depth narrative thematic analysis method (Riessman 2008). Analysis was performed using NVivo software (NVivo qualitative data analysis Software; QSR International Pty Ltd. Version 11, 2015). Analysis was performed on an ongoing basis and as part of an iterative process as the interviews were being completed. The sample size was guided by the time at which subsequent interviews did not produce any new themes. From previous studies, the point of data saturation was estimated and found to

be 30 interviews (Dawson, Fitzpatrick et al. 1996, Dawson, Fitzpatrick et al. 1998). Independent analysis of the interviews was performed by a member of the research team. Anonymised transcripts were used. Initial coding of the interviews was performed independently by two reviewers to ensure thorough coverage of the work. Interviews were coded based on the patients' words and context (Figure 2: coding sheet). Topics that are important to patients in recovery were recorded. Themes evolved from recurring words and ideas from the patients (Graneheim and Lundman 2004). This important part of the analysis was initially performed independently by two researchers and discussed. Any unresolved concerns were taken to a third researcher for further resolution.

Rigour: Validity and reliability are important issues to address in both quantitative and qualitative research (Noble and Smith 2015). As such, acknowledging the potential for interviewer bias in this area of research is necessary. To minimise the risk of bias, the interviewer examined their own motivation prior to commencing the project. During the study, the researcher made extensive field notes. Reflection following the interviews on both methods and practice was utilised. This was to allow the interviewer the possibility of improving the interview technique throughout the process. A second author independently coded the interview transcripts. Confirmatory analysis of this type assists in ensuring the reliability of the work. The reporting of this study was carried out in accordance with recognized guidelines and standards for qualitative research (O'Brien, Harris et al. 2014).

Results

Seven main themes evolved from the interviews: 'improving function and mobility', 'pain', 'experiences of healthcare', 'support from others', 'involvement and understanding of care decisions', 'behaviour and coping' and 'fatigue and sleeping'. The results are simply grouped in themes. They are not in order of importance or significance.

Improving function and mobility:

A key area of importance for all respondents (n=30) recovering from joint replacement was that of getting back to the level of function and mobility they experienced prior to the onset of hip or knee joint arthritis. Patients referred to working towards a return to 'normal' function as they saw it. All participants discussed in detail how a sometimes gradual, sometimes sudden loss of mobility and limb function had been a very limiting problem in the immediate preoperative period. As a result of these preoperative challenges, participants were content when they saw improvements early in the postoperative phase: 'I was back to normal soon after it was done. I am not one to hang around' (Participant 3), 'They got me out of bed first thing on the Saturday morning and I walked with the Zimmer frame and that was it, away I went' (Participant 16) and 'I felt absolutely fine day one' (Participant 10). Other participants, however, reported a slower return of function and strength in the days following surgery: 'I gradually increased the distance and that was fine' (Participant 15) and 'I can do the stairs now. I struggle but I do it' (Participant 17).

Participants were hopeful and excited about the possibility of being able to return to activity in general and specifically previously limited areas of interest. These pursuits included cycling, playing with grandchildren, family vacations, walking, jobs and other sources of employment which were also negatively affected by the loss of function and inability to move around in the preoperative period.

Participants who were in the early days of recovery during hospitalization reported varying degrees of movement, ranging from ‘I couldn’t at the moment stand on it and walk—say from the bed to the bathroom, which means I couldn’t do that at home either’ (Participant 11) to ‘I am up and about and walking and can go to the loo and that’s the main part’ (Participant 27).

Even in the early days, participants seemed optimistic about their potential and improving function. ‘Hopefully I’ll start walking better and being able to do more’ (Participant 18), ‘I think that if I can go up the stairs I can go home then’ (Participant 28) and ‘I do feel a lot better and that is brilliant’ (Participant 19).

Participants reported pleasure at regaining their sense of independence as mobility returned following an extended period of time being reliant on crutches or other aids. ‘I now have just one walking stick and I can manage and I like it because it makes me feel free-er’ (Participant 22).

Pain:

Pain was discussed by all participants (n=30) in this study. The amount of pain experienced with the disease in the preoperative phase was also discussed. Pain was reported with all activities of daily living, but especially with functional mobility. Participants discussed having to give up jobs and make lifestyle changes due to the pain. Some reported no longer being able to do anything that was enjoyable to them. Gardening, getting in and out of bed, driving, going to art galleries and even sitting to read had become uncomfortable. Most participants were relieved to be having the surgery after having sometimes years of unrelenting pain. ‘Excruciating pain. I don’t think the operation could have caused more pain [laughs]’ (Participant 5).

Pain was seen as part of the disease of arthritis and an understood part of the recovery process by respondents. 'You already have pain but you're given analgesia for it. You are bound to have some pain aren't you; I mean you have to accept some' (Participant 6).

When reporting and emphasising the amount of pain they had experienced, participants often use repetition of a phrase to reinforce and give power to their statement (Riessman 2008).

'Pain. I've had pain, oh god I've had pain, so much pain' (Participant 19).

Participants were used to dealing with pain and although some reported surprise at having pain in the immediate postoperative phase, the majority of patients found it to be as anticipated: 'My pain was as I expected it and I know how to manage it' (Participant 28).

Participants reported a significant reduction in pain following surgery. 'The pain I had all the time to the pain now is very good' (Participant 19) and 'It aches occasionally. It aches to walk, but normally it's OK. It's just going downstairs' (Participant 7).

Experiences of healthcare:

All participants spoke about the experience of care they had received during treatment. A mix of positive, negative and sometimes concerning encounters were retold. In the narratives, some participants were experiencing hospitalization for the first time (n=7), while others drew on previous hospital and surgical experiences (n=23). When undergoing a procedure for the first time, patient concerns revolved around fear of the unknown. 'I was worried obviously for the first one because it was all so different and new but, when it came to the second one, I knew the pattern and the routine. So, yeah, more or less, yeah pleased' (Participant 3). Participants took comfort if they knew the hospital and the surroundings. Then it felt less alien to them. 'I know this hospital very well and that's why I chose it to have my surgeries' (Participant 29). Already having been through a similar procedure

brought a similar sense of comfort to participants, unless a prior experience had been negative. 'I sort of knew what to expect and I have got good quads anyway and so you grit your teeth and go for it' (Participant 9). Participants felt that their individual attitude made a difference in their recovery. 'I had three cancer operations within 11 weeks of each other, two breast and bowel and I survived those because I am a very positive sort of person' (Participant 5).

Patients reported varying experiences of both surgery and the anaesthetic. 'It was such a benign proceeding that on both occasions I had a cup of tea in the recovery room' (Participant 10) and 'Perfect. It was just like a good sleep and just waking up sort of thing' (Participant 16). 'I was sick on the Tuesday because I'd been laid down for a while. They asked if I could sit up and I said I was feeling woozy and the next minute I was sick' (Participant 4).

Some participants reported a delay in being sent to theatre which made for a very uncomfortable experience (Participant 25) due to being hungry and thirsty.

Others expressed concern at being awake and numb, with a spinal anaesthetic during the surgery. 'You could hear them banging and crashing at the end and things' (Participant 11) and 'it's slightly disconcerting that you can hear the operation particularly when you can hear something that's like a workshop. You can hear the banging of the new joint' (Participant 21).

For some, the experience of waking up immediately after surgery in the recovery room and being numb from the waist down was frightening. 'I woke up in recovery with a mask on and I kind of panicked. I went to lift my leg up and couldn't because it was numb' (Participant 30). Some participants reported feeling reassured by having confidence in the healthcare providers 'the consultant is such a wonderful man' (Participant 28) and 'I certainly was looked after very well' (Participant 22) and had concern when they did not: 'I didn't like the anaesthetist [Whispers]' (Participant 28). Participants were overall happy with the care and

attention they received but did acknowledge the challenges of staffing in a busy NHS hospital. ‘If you are in a ward I mean they are working really hard and I have got no complaints but you do have to take your turn’ (Participant 18).

Support from others:

Participants reported a wide range of support, including: family, friends, formal and informal carers. Some reported being more concerned about how their family would cope during their hospitalisation and surgery than with their own concerns regarding surgery and recovery.

Spouses, partners, adult children and grand-children were reported as being key supports in the perioperative period. This was particularly important in the immediate discharge phase following surgery. As time moved on and the participants were improving in recovery, some of the care and attention was not always welcome. ‘They are just there looking after you. My husband especially asking “are you sure you should be doing that?” Can you do this, can you do that and I just say go for a walk. I’m doing it and you get on in the end. [Laughing]’ (Participant 3).

Overall, participants found the process worked well—the preoperative ‘joint schools’ being well received. These preoperative sessions provide patients with a central location for multi-disciplinary information on all aspects of postoperative recovery. Nurses, occupational therapists and physiotherapists provide practical instruction and information as to what they can expect following surgery. ‘I think the system they have got here is actually remarkably good’ (Participant 10). Participants reported that going through the postoperative physiotherapy and occupational therapy requirements prior to the operation was beneficial.

Participants found the hip school quite enjoyable and a welcome dose of levity in an otherwise quite serious time. 'There's the hip school which is a bit of a giggle but I mean it goes through some little tricks which are useful' (Participant 10).

Participants were happy with their length of stay and discharge home from hospital as they knew who to contact in times of concern: 'No regrets about getting home because you could always ring physiotherapy and if there's any issue you know drop in' (Participant 10).

Participants reported liking the fact that someone could be contacted by phone, just to talk over what was on their mind (Participant 22).

Involvement and understanding of care decisions:

Participants reported mixed levels of involvement and understanding in their care decisions. Initially some patients were shocked to discover that they needed surgical intervention to fix their hip or knee. However, after accepting the idea, most were relieved and looking forward to life with their new joint. Participants reported that they did not feel involved in their anaesthetic choice, with some expressing concern that they felt like their wishes were not always taken into consideration. Some did accept that their choice may not have been the best from a medical standpoint.

Some expressed being happy to be looked after and not feeling the need to make any decisions as their healthcare providers 'know and I don't, so I'll let them do it' (Participant 22). One interviewee reported that 'they have been very good at giving you what they think you need' (Participant 11). Another felt that, in regards to their healthcare decisions such as medication options or discharge planning, they did not know enough about it to make informed choices. They also felt ill-equipped to say the right things. 'I was asking for

something I couldn't have' (Participant 18). One suggested that being given more printed information sheets could be beneficial to help understand their available drug combinations, therapeutic actions, dosing and timing.

Some found that the information they were given regarding the early recovery phase during hospitalization was contradictory. This led to confusion and uncertainty over what to expect and who to believe. 'The surgeons tell you, you can come out the next day, the nursing staff say you are not ready to go home and you can't go home till the physios say you can anyway so everybody you speak to tells you a different story. They could liaise a bit better on that I think [laughs]' (Participant 11).

Participants reported relief following discharge. They felt that once home they were more in charge of their own schedules (medication, sleep, activity) and were better able to relax and manage their recovery.

Behaviour and coping:

Throughout the interviews, ways of managing the symptoms of arthritis, subsequent arthroplasty surgeries and recovery were explored. Participants reported multiple methods of coping, including altering activity and participation levels, medications, body mechanics, use of physical aids and attitudes.

Preoperatively, in terms of day-to-day coping with the changing movement ability and stiffness of the joint, participants found ways to position the leg to minimise symptoms. 'It's alright. If I keep my knee in this position too long then it hurts. I have to keep moving it so it doesn't stick in one position' (Participant 5).

Interviewees felt better equipped to deal with activity as they learned what activities they could and could not manage. 'I am getting to the point now I know what I can do and what I can't do' (Participant 1). Another explained that 'you don't realise what you can't do, you know, until you can't do it' (Participant 16) and now 'I know my capabilities' (Participant 15).

Following surgery, prior experience gave important insight into how best to conduct themselves. 'I know to take it easy the first day when you are back from surgery but the next day then hopefully I'm going to get up and start walking like I did before' (Participant 3).

The benefits of using ice and its effect on medication requirements were discussed by the participants, while in hospital and at home. 'I think the ice pack worked and I think actually it was as good a pain killer as having you know heavy drugs' (Participant 18) and 'It was painful at night. My partner had to keep going down to get frozen peas to put on it' (Participant 4).

Having a reduction in the amount of medication that was required in the postoperative phase was described as a positive change by one interviewee. 'The last few years one way or another I have been living on pain killers to take the edge off what was happening and I haven't had any pain killers for 3 weeks and I feel really good' (Participant 9). Participants reported that finding a happy balance between rest and activity (Participant 11) was a key coping method in the recovery period. Interestingly, the use of physical walking aids were seen as more of 'a mental crutch' (Participant 21) than anything else. 'I went out for walks with my sticks but I didn't feel I really needed them. They were there for just in case' (Participant 20). These aids provided a valuable source of confidence and belief in the user's ability while recovering from arthroplasty. 'I don't have a lot of confidence in my balance as yet and the crutches literally are a crutch. It gives you confidence' (Participant 23).

Participants' attitudes played a substantial role in how they dealt with the recovery process. A sense of humour was demonstrated to be helpful with all participants (n=30) laughing and sharing a joke during the interview sessions. Some had advice that had helped them cope that they wanted to share with others. 'Why paint a silly picture. It's painful; you have to put up with it don't you?' (Participant 9) 'Listen to what you are being told but know what you can do – yeah. Have faith in yourself that you can do it. Just set yourself that little goal each time and go for it. The physios and everything were marvellous here and they know, you know and if you think you can do it. Take a little time to do it. Go careful but take your time. Don't rush; don't jump before you can walk type of thing' (Participant 3).

Fatigue and sleeping:

All participants reported perioperative changes in their sleep patterns and levels of fatigue. These were related to several different factors. In the preoperative period pain and difficulty with positioning were reported by most but not all of the interviewees. 'I was awake all hours of the night...not to be able to get any sleep at night is a horrible thing' (Participant 2) and 'Yes, it was painful it didn't stop me sleeping but it was painful' (Participant 10).

In the immediate postoperative phase, the main complaints for problems with sleeping while in hospital related to pain (Participant 17), especially the first night (Participant 26), and muscle spasms (Participant 20), snoring roommates (Participant 21) and an uncomfortable bed (Participant 30). Some participants slept quite well from the first night after surgery and seemed to take it in their stride. 'I had fairly decent night's sleep, very comfortable' (Participant 30).

On the other hand, participants that were not sleeping well or were out of their sleep routines reported the most problems from this disruption. 'Getting enough sleep and being able to sleep in the day is really important to me' (Participant 28) and 'I think the phrase was,

distraught. I just basically said “I want to go home. I am not comfortable here. I am not sleeping. I want to go home” (Participant 30).

Following discharge and the subsequent recovery period at home, participants reported an increase in their ability to sleep well and that their overall fatigue was less. ‘I can easily sleep at night it doesn’t bother me now’ (Participant 25) and ‘it doesn’t tire me out quite so much’ (Participant 2).

Discussion

Throughout the interviews, the issues and topics raised by both hip and knee patients were very similar. Improvement in both joint function and overall mobility have been reported and discussed in the literature (Jones, Beaupre et al. 2005). This was confirmed in the study with patients reporting progress in the early days following arthroplasty. Patients overall expressed a general feeling of heightened well-being in the postoperative period. This was particularly noted in the patients that had been symptomatic for an extended period of time. The surgery had brought a welcome relief from the debilitating pain and stiffness they had experienced previously.

As mentioned above, by the time the majority of arthroplasty patients reach the operating theatre doors, they will have dealt with increasing pain and decreasing mobility and function. This is particularly true for the TKA patient (Nguyen, Ayers et al. 2016). In both the findings of this study and in prior PPI work, patients discussed pain in the context of both preoperative and postoperative experiences. Discussing postoperative pain in the PPI group, patients reported that it was something they knew how to deal with. This was mirrored in the study and patients felt they knew how to manage their pain. Previous work looking at reasons for delay in discharge and readmission following discharge in arthroplasty patients has identified pain as the most common factor (Husted, Lunn et al. 2011).

Pain is a common postoperative complaint following arthroplasty, particularly of the knee (Szots, Pedersen et al. 2015, Hamilton, Strickland et al. 2016). Pain has also been recognised as a possible cause of confusion and disorientation in the immediate postoperative phase for the elderly (Duggleby and Lander 1994). This study found patients dealing with surgical pain in combination with physiotherapy and the side effects of medications. A challenging combination for some, but not all. This is in agreement with prior work from an American nursing research group (Jacobson, Myerscough et al. 2008).

Patients reported concern regarding having a regional anaesthetic (spinal, epidural or local block) for their surgery. These fears centred around two main areas: being awake or conscious during the procedure and not being able to move in the postoperative phase upon awakening in the recovery room. Some patients reported feelings of alarm at emerging from the anaesthetic. Previous studies have demonstrated that these feelings can be quite distressing for the patient in the perioperative phase (Bergman, Stenudd et al. 2012, Karlsson, Ekebergh et al. 2012, Bager, Konradsen et al. 2015).

A patients' prior experience impacted how they saw the current surgical setting. Respondents reported that familiarity with hospital routines helped to alleviate some of their worry. Again, in the PPI session, these findings were confirmed when patients explained that positive experiences, such as with previous joint replacement, positively influenced recovery in terms of knowing what to expect, and how tackle challenges such as stairs. Some patients felt the whole experience of healthcare was a very positive one. Patients expressed feelings of being well cared for and given what they needed while hospitalised. A European study has shown that if a patient has positive, satisfying experience during their care, they are more likely to have a higher quality of recovery postoperatively (Johansson Stark, Charalambous et al. 2016). Interestingly, it has also been shown that a patients' level of satisfaction with their postoperative care following arthroplasty can determine how well they feel themselves

(Baumann, Rat et al. 2009). Patient satisfaction and improved outcomes do seem to be related in arthroplasty patients.

Patient support networks and the feeling of being supported by both family and professional sources have been found to have an impact on patient recovery and outcomes (Broos and Fourneau 2000). Study patients reported the need for increased connection with hospital professionals immediately following discharge. Patients liked knowing that they could speak to someone by phone to talk through things instead of making a physical appointment. A Danish trial reported that patients felt more able to succeed and accomplish tasks through telephone follow up (Szots, Konradsen et al. 2016).

Patients reported needing help understanding their changing needs in order to make informed decisions during the early recovery period. This included changing medication needs, wound care and other transitions. This confirms previous work investigating the needs of patients and their partners following arthroplasty surgery (Showalter, Burger et al. 2000).

Preoperative education has been considered to be beneficial in the recovery process and timely discharge of patients following arthroplasty surgery (Jones, Alnaib et al. 2011).

Patients have previously reported increased feelings of confidence and trust in the process through these programmes (Konradsen, Gjerseth et al. 2016). This reinforces findings in the study that patients reported feeling more able and prepared to deal with things as they came along following attendance. It was also reported to be an enjoyable and uplifting process.

Patients reported using a range of psychological coping mechanisms throughout the perioperative phase. These included humour, not taking things too seriously and knowing that they were in the midst of a recovery process and that it would pass. Work by Moon and Backer (Moon and Backer 2000) discuss the importance of self-efficacy in recovery. A patients' belief in their ability to cope and recover will have a direct impact on their actual

recovery. This point was echoed in the study where a patient encouraged others to have faith in themselves and the process. Participants also reported that the use of physical aids, such as crutches, were often just mental crutches. They recognised that they were using it for the feeling of confidence it gave them as opposed to actually needing them for mobility. This has been previously reported in the literature (Grant, John et al. 2009). Rebuilding trust and confidence in a patients' own ability following arthroplasty takes time and is not just a physical issue.

Fatigue and sleep disruption in the post-operative period has been recognised over the years as detrimental to the recovery process of many types of surgery (Salmon 1992). Problems with sleep as a direct result of acute postoperative pain have been explored following lower limb arthroplasty, with between 44-57% of knee patients and 21-52% of hip patients reporting pain on the first 3 postoperative days (Wylde, Rooker et al. 2011). This then returned to baseline levels by one week (Salmon, Hall et al. 2001).

Patients reported being keen to return home to be able to have a good nights' sleep. Patients reported disruption in sleeping patterns ranging from other patients snoring in their shared room, disruption from staff or equipment noise and postoperative pain. It has been reported that sleep disruption in the perioperative period following arthroplasty has long lasting effects on outcomes (Cremins-Smith, Millington et al. 2006).

Study limitations

The demographic distribution of participants was very homogenous due to the local patient population presenting at the hospital. It is acknowledged that cultural differences may exist between other patient groups. The importance of culture and understanding of both participants and the interviewer in the qualitative process is recognised in this work (Mishler 1986).

Care was taken to balance the number of hips/knees. However, due to patients' medical conditions, willingness to participate and cancellations, this was not fully achieved.

As this study was carried out in the UK and in an NHS hospital, it may only be applicable in the NHS.

Conclusions and future work

Optimising perioperative recovery is critical to enhancing patient care and ensuring timely discharge, as well as improving short and long-term outcomes after a surgical intervention.

These interview themes and issues will now be developed into potential candidate items for a new early recovery questionnaire by the research steering committee which includes nurses, surgeons, psychometricians (health measurement questionnaire specialists) and two patient representatives. Being able to measure improvement from arthroplasty surgery on patient-selected issues could be of great benefit for use in clinical trials involving medication, care pathways and implants and potentially for routine care. Patient-reported issues can give vital insights into patients' perspective through the perioperative experience. It can allow provision of appropriate, safe, timely care and interventions for them.

The questionnaire will be subsequently tested, refined and validated in accordance with international recommendations for best practice (Food and Drug Administration 2009).

Relevance to clinical practice

With current trends in healthcare moving towards enhanced early recovery, this work shows key issues for the hip and knee patient directly from their perspective. To have specific patient-reported information regarding key areas of importance during the perioperative phase is invaluable when caring for the orthopaedic surgical patient. It gives insight and understanding to this increasing population group. This study has also served as a starting

point in the development of a questionnaire which may be used to assess interventions in the lower limb arthroplasty population.

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Study design: All authors; Data collection and analysis: LHS and LK; Manuscript preparation: LHS.

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Conflict of interest

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