Patients' experiences and satisfaction at one year following primary total knee arthroplasty: a focus-group discussion

Objective: To date, no study has explored patients' experiences, outcome expectations and satisfaction one-year post-TKA using focus-group discussion (FGD). The exploration of patients' expectations, functional recovery and limitations may support future modifications and thus improve outcomes post-TKA.

Methods: An FGD was conducted with seven patients at one-year post-TKA. Moderators led the discussion using a semi-structured discussion guide. The discussion was digitally recorded, transcribed verbatim and analysed to formulate themes.

Results: The study identified four main themes: recovery experience post-TKA, experience before TKA, activity of daily living (ADL) changes post-TKA, and post-TKA outcome expectations. The recovery experience theme explores the overall experience post-TKA in terms of symptoms and progression issues; their experience with the orthopaedic surgeon and physiotherapy; and the differences between first and second knee replacements. The experience before TKA theme discusses many issues raised by patients that they believed strongly affected TKA outcomes and their satisfaction, such as: the referral process, ADL limitations before TKA, and their beliefs about post-TKA outcomes. The ADL changes post-TKA theme discusses the diversity of functional improvements, limitations and new functional ability. The outcome expectation theme explores what the patients expected to gain from surgery and the factors that modified those expectations, and whether their expectations were met.

Conclusions: Patient attitude, sufficient pre-operative education, outcome expectation modification, communication with the surgeon, and patients taking an active role in

rehabilitation can all affect post-TKA outcomes and satisfaction. Hence, the recommendation is to address all of these issues before TKA to enhance outcomes and patient satisfaction.

Keywords: Focus-group discussion, post-total knee arthroplasty, patients' experience, patients' satisfaction, qualitative study, knee osteoarthritis

Introduction

An effective gold standard end-stage treatment for knee Osteoarthritis is total knee arthroplasty (TKA) (Carr et al., 2012). The main outcomes expected post- TKA are relief from pain and improved function(Goodman et al., 2020). Satisfaction post-TKA is significantly less than for post-total hip arthroplasty (THA). A previous study found 81% satisfaction post-TKA and 91% post-THA (Neuprez et al., 2016; Noble, Conditt, Cook, & Mathis, 2006). Additionally, patients explained that their activity limitations pre-operation were due to pain, and post-TKA due to other new limitations and their personal beliefs about physical activity (Harding, Holland, Delany, & Hinman, 2014). This emphasises the need for further exploration of the reasons for such beliefs and confirms that current medical outcome evaluation for intervention implications differs from the patients' perspective. Quantitative measurement tools (profession-driven) do not reveal patients' experience and hence a qualitative method needs to be used to identify this (Klit, Jacobsen, Rosenlund, Sonne-Holm, & Troelsen, 2014). No study has explored patient experiences, satisfaction, expectations and outcomes post-TKA using focus-group discussion (FGD) one year after surgery to identify whether there are factors that might help us to understand why some patients' medical outcome measurements are good, but they are not satisfied, and vice versa.

Study design

The present study aims to understand patient experiences, outcomes and satisfaction post-TKA. Qualitative research offers useful methods to explicate the complexity and deeper meaning of

a specific phenomenon which, in this case is outcomes post-TKA. Specifically, a Phenomenological approach allows for the collection of diverse and unique patient experiences, satisfaction and outcomes post-TKA (Beaton & Clark, 2009). Therefore, an FGD is useful for exploring poorly understood areas such as outcomes and experiences post-TKA. It has advantages over one-to-one interviews as the interaction among group members provides an extra dimension to gather data and a wider degree of spontaneity in the patients' views is expressed, in contrast to one-to-one interviews where the interaction is limited between patients and the researcher and depends on patient responses. The interaction in a group allows patients to refine their views in light of others' views and facilitates further spontaneous expression (Denscombe, 2014; Sim & Snell, 1996; Westby & Backman, 2010).

Although data from an FGD sample could be considered limited, compared to data from questionnaires, they provide a flexible structure that allows patients to express their own views and feelings in their own words, while questionnaires limit that ability. The limitation of an FGD is the small sample size, while purposive sampling may threaten the external validity and generalisation of results; however, generalization is not a primary concern in this exploratory stage as the findings can be tested using structural questionnaires in a further stage of research (Taylor & Francis, 2013; Willis, 2007). The study methodology is registered at ClinicalTrials.gov (NCT03064334) and NHS ethical approval was obtained (IRAS project ID: 224594, REC reference: 17/LO/0838) before recruitment began.

Recruitment and Sampling frame

Commonly in FGD studies, sample size estimation aims to achieve meaning saturation to develop a theory. However, the current study's aim was to understand the phenomena of patients' experience, outcome expectations and satisfaction post-TKA without any aim to generalization or develop a theory at this stage. Hennink et al, found that the majority of codes

(60%) were identified in the first FGD and 97% (29/30) of concrete codes were generated in the first FGD. This indicates that one FGD with purposeful sampling will be sufficient to fulfil the aims of the study (Hennink, Kaiser, & Weber, 2019). Therefore, an FGD with 7–10 patients was preferred to allow the sharing of perceptions and experiences, with sufficient quantity and diversity of views, while balancing the facilitator's ability to manage all patients' participation for 90–120 minutes (Bloor, 2006; Kitzinger, 1995; Sandelowski, 1995). The participants were recruited at Stepping Hill Hospital, Stockport, UK, they had no previous relationship/connection with the facilitator or researcher prior to study commencement. A participant information sheet, consent form, and an agreement for digital audio-recording were posted to all patients attending for a one-year follow-up visit who were willing to participate in an FGD four weeks before the study. The study includes patients who have undergone primary unilateral TKA within the last year and can read and understand English without any limitations regarding patient's age, gender or health condition.

FGD data collection and Analysis

Demographic data were collected first, then participants were requested to complete an Oxford Knee Score (OKS) questionnaire as the common patients reported outcome measure used post-TKA to explore the agreement between the score and FGD findings (Ramkumar, Harris, & Noble, 2015). The FGD was facilitated by a focus-group expert, and the researcher used open-ended questions to prompt free discussion (Table 1). All proposed questions and probes were based on previous FGD post-arthroplasty and the researcher's previous experience as a physiotherapist with TKA patients (Lehoux, Poland, & Daudelin, 2006; Palomba & Banta, 1999; Sim & Snell, 1996).

The analysis was performed and the themes formulated by two independent researchers to enhance the naturalism and credibility of the findings according to thematic analysis, as

recommended by Braun and Clarke (2006). Thematic analysis is defined as a qualitative descriptive method to identify and analyse narrative material to report patterns, or themes (Braun & Clarke, 2006). It has the advantage of flexibility; other analysis methods are tied to or based on a theoretical or epistemological position. Its flexibility provides rich and detailed data about current phenomena after TKA. The recommended six phases used in the current data analysis are summarised in Figure 1.

Participants

A total of 10 patients were invited to the FGD. Two of them regretfully declined, as the time and day were not convenient for them, one patient gave no response, and the remaining seven patients attended the FGD. Patients' characteristics and OKS are summarised in Table 2. All OKS showed satisfactory knee joint function (44–48), except in the case of one patient, who showed mild to moderate knee function (33). All of them lost kneeling ability post-TKA.

FGD Findings

The identification of codes and themes was largely based on the current narrative data and patients' responses in the FGD transcript rather than the questions used in the FGD. The evolving themes were described and shaped as the two independent researchers agreed on them (see Fig. 2). The FGD analysis resulted in four themes, with four or five subthemes under each one. The themes covered patient experiences before and after knee replacement, improvements and limitations to the activity of daily living (ADL) after surgery, expectations from surgery and advice for future replacement patient (summary in fig. 3). The quotes below are attributed to patients by initials, plus age and gender (e.g. 70.F is a 70-year-old female).

Theme one: Recovery experience

A substantial amount of the focus group discussion time was spent discussing functional recovery after TKA, revealing four subthemes to cover the diversity of post-TKA experiences: the overall experience post-TKA in term of symptoms and progression issues, the experience with the orthopaedic surgeon, their experience of physiotherapy and differences between first and second knee replacements.

Sub- theme 1 - The overall post-TKA experience

All patients agreed on the severity of post-TKA symptoms for a few weeks or months, followed by a gradual reduction in pain accompanied by functional improvements that helped them regain their confidence.

> *"I think you forget that kind of pain, it is a bit like childbirth you forget it otherwise you wouldn't go on and have another child, would you? I remember with my first one I was really quite depressed and cried quite a lot the first fortnight because of how painful, how bruised and how swollen it was and kept doing these exercises and thinking it is not getting better, it is not getting better and then suddenly you start to be able to walk on your two crutches, then your one crutch"* (M. 80.F).

Also, one participant revealed her opinions on the longer-term physical benefits,

> "*… it might never feel as pain free as my left now, I can walk, and I can move. It gives you part of your life back doesn't it, and I think that is worth the pain and discomfort for a few weeks''* (P.70.F) and another talked about the psychological impact, *"It gives you confidence back doesn't it? to do things you were quite anxious about doing before a knee replacement"* (J. 72.F).
>
> *"I think you do things naturally now without thinking about it, you just get up and get on with it"* (Br.82.F).
>
> *"6-7weeks I started to walk a few weeks with crutches and then one crutch, probably about 2 months. It's changed my life now"* (Ba.76.M)
>
> *"Having them both done has improved the quality of my life 100% it is just unbelievable I can't thank the hospital enough"* (J.77.M).

The overall experience post-TKA began with severe pain and swelling – which was ultimately forgotten – for a few weeks or months, followed by gradual improvements in physical activity and confidence. The overall quality of life improved post-TKA.

Sub- theme 2 - Their experience with the orthopaedic surgeon

All patients reported having a satisfactory experience with their surgeon, who tried all possible conservative options before surgery. Only two patients said their details experience with surgeon, and the others agreed with that.

"He checked that I had tried everything, and he said I think you need a knee replacement" (M.80.F).

"the surgeons they do a really good job in my case" (J.77.M).

In addition, all the surgeons advised patients to attend the pre-TKA educational class to learn more before the surgery and played a crucial role in modifying their pre-surgery expectations.

"The surgeon didn't say it would be perfect, but it will be better than it is now" (Ba.76. F).

"The doctor is very realistic when I saw him, he said it is not going to be really flexible when you have a new knee, but it will be far less painful, and you will be able to do a lot more without pain" (M.80.F).

All patients had good experiences with their orthopaedic surgeons, who tried every possible conservative treatment before moving on to surgical intervention. Outcome expectations post-TKA were modified to be more realistic by both the surgeon and the educational class.

Sub- theme 3 - Their experience of Physiotherapy

Patients' experience with physiotherapy post-TKA varied; it was excellent for two patients in terms of quality of exercise and advice.

"*Mine was excellent yeah, I couldn't have wished for better" (Br. 82.F).*

"the physio was absolutely excellent. I think the physio are a lot to be thanked for certainly in my case, because she gave me a lot of advice in terms of what to do and I am still doing it even now every day, and I have had no trouble whatsoever with my leg" (J.77.M).

However, three patients were not satisfied with their physiotherapy experience, due to the content and number of the treatment sessions. They expected more than exercise and advice; they wanted manipulation or other manual treatments for more than three to six post-TKA sessions.

"Just giving you the exercises, I came 6 times, they just put you through the exercises for about an hour and checked your bend, but the exercises that they gave and the exercises that we did and the physio I was already doing it anyway" (Ba.76.M).

"I mean I came for reviews and that, and they said to me after about 3 visits if you are happy and you are carrying on with the exercise we don't need to see you again and I have kept on with the exercises" (P.70.F).

"they didn't do any manipulation at physio; it was just telling you what to do" (J.72.F).

One patient was dissatisfied because physiotherapy service was not offered to her in the hospital, and she paid for it herself.

"I wasn't offered any for either knee from Stepping Hill, so I paid privately for it" (M.80.F).

The last patient did not attend any physiotherapy sessions or do any of the exercises, because she believed that walking was the most suitable exercise for her.

"I don't do exercises; I walk so that is my best exercise – I don't do none of this" (K.80.F).

The experience, expectations and opinions of physiotherapy post-TKA varied from one patient to another. Two patients were satisfied with the exercise and advice. However, three patients were not satisfied, as they expected more than advice and exercise. One patient believed that simply walking is the best exercise post-TKA, while another patient was dissatisfied with physiotherapy because she had to pay for it privately.

Sub- theme 4 - Differences between experiences of first and second knee replacements and the time between them.

Although patients with more than one primary joint replacement experience were not considered in the semi-structured questions in the FGD, the patients raised many issues and concerns regarding the difference between the first and second replacements, how they decided to have a second replacement and the time between the two surgeries. Five FGD participants had both knees replaced, the recent knee in the previous twelve to thirteen months and the first between one and eight years previously.

All patients agreed that their knees had different recovery progressions, but the second experience was better, as they felt more confident and knew what was going on.

"with my second knee because I knew it was going to be ok in the end I did things quicker, I was more confident" (M.80.F).

"I struggled for years, I then had that one done, and I learnt from that so the second" (Ba.76.M).

"Different for each one" (P.70.F).

Two patients' timing between the surgeries was between five and eight years; they wished it had been shorter.

"I would rather have it done sooner but I had other pathology" (P.70.F).

"Hope short time, I would rather have it done for the other knee as soon as possible" (J.77.M).

Only one patient's first experience was horrible, and she was very upset about it because nobody told her what was going on.

"eventually, I said I would never have a second one done, I would never ever after this first one but eventually you have to, but I would try anything rather than have it done. We weren't told anything, and you were like lamb to the slaughter really and it's not right" (J.72.F).

Overall, both the first and second replacement experiences were good, but the second replacements were better; the patients had more confidence because they knew the rhythm of the progression of recovery. One patient's first experience was horrible. Two of five patients wished that the time between their replacements had been shorter.

Theme Two: Experience before TKA

Although patients' experience before TKA was not considered in the semi-structured questions in the FGDs, the patients raised many issues that they believed strongly affected the TKA outcome and their satisfaction with it. The following five sub-themes were identified: the overall experience before TKA and the referral process to the orthopaedic surgeon, ADL limitations before TKA, exercise and physiotherapy before TKA, any alternative treatments that may have helped them improve their conditions before surgery and, finally, their beliefs about the post-TKA outcome.

Sub- theme 1 - Pre-TKA experience with the general practitioner (GP) and orthopaedics referral process

Four patients were completely satisfied with their experience with the general practitioner before the orthopaedics referral in terms of referral timing and the conservative treatments provided to them before the referral.

"Mine *did as much as they could, or He could prevent me from having to have the operation. I was told I shouldn't really be having a knee replacement until I was 70 because of the length of life of a new replacement, and so he was very good he gave me steroid injections for at least 3 years to just keep me going until like you I got to a point where I wasn't able to walk every far and I dreaded going shopping, I dreaded going out" (M.80.F).*

"I struggled for 10 years, my GP gave me 3 or 4 sheets of exercises to do to help strengthen the knee and that is when I started to do it probably 5- 6 years before I had the operation I was given that to make it stronger" (Ba.76.M).

"my GP has been superb" (J.77.M)

"they are under such pressure, but they did their best" (Br.82.F).

Three patients were not satisfied due to the severity of their symptoms and long waits before referral, which may have risked further joint damage.

"When I had my left one done, I was absolutely past the suicidal stage because the pain was that bad. we can't take anymore, and we need some treatment of some sort, replace or whatever. Instead of pushing us right to the limits and risking further damage, then surely it is better to sort it when it is necessarily – we don't all go to the doctors and say oh I want a new this, and a new that for the hell of it – we go because it is something that is absolutely necessary to the change of quality of our lives so why not attend to it."(P.70.F).

"they won't refer you and you have become so much in pain that you say anything is brilliant after that. My knee got damaged because it was a very bad knee and should have got it done ages ago" (J.72.F).

"waiting for the GP's you wait forever. I will never forget, and I couldn't walk, and that went on for a couple of months and I come round to the A&E",

"I waited 12 months in agony and then I am sure he told me the bones were rubbing together, no wonder I was in agony" (K.80.F).

There was disagreement in terms of satisfaction with GP management; four patients were satisfied in terms of the conservative treatments provided, advice from the GP and the recommended exercises. In contrast, three patients were not satisfied, as their GPs pushed them to the limit and would not refer them until they could not walk due to severe pain.

Sub- theme 2 - ADL limitation before TKA

Severe pain before surgery limited patients' walking ability to five minutes or fifty yards.

"but I couldn't walk from the supermarket with a bag of shopping to the car 50 yards" (J.77.M).

"where I wasn't able to walk every far and I dreaded going shopping, I dreaded going out with my grandchildren if they said let's go for a walk and I would say oh yes and within about 5minutes I was in a lot of pain" (M.80.F).

Severe pain before surgery limited two patients from doing anything, including walking.

"I couldn't walk, I couldn't do any things, it was in severe pain" (K.80.F).

"I agree the pain was severe I couldn't do any things" (P.70.F), (J.72.F) & (Br.82.F).

On the other hand, one patient said his ability to walk was good before surgery, but he was in severe pain during any activities that required standing.

"*I can walk before the operation I could walk but I was in pain. Even if I went to the library for half hour just standing there looking at books I was in agony just standing and not moving. At the airport standing in the queue for an hour just checking in I was in agony just waiting for your baggage just agony" (Ba.76.M).*

All patients agreed that severe pain before surgery limited their daily activities, their ability to stand and their walking ability; some even suffered during a brief walk for shopping.

Sub- theme 3 - Exercise and physiotherapy experience before TKA

The pre-TKA exercise and physiotherapy experience varied from one patient to another. Two patients recommended physiotherapy before TKA as it helped alleviate their symptoms and improve the muscle strength.

"The physio did a lot of manipulation, gave me exercises to do to try and strengthen the muscles around the knees because they know they are not still particularly strong" (K.80.F).

"the physio was absolutely excellent, gave me exercises to strengthen the leg muscles" (J.77.M).

However, three patients did not recommend pre-TKA physiotherapy, because it would not improve their case or because the recommended exercise was available on a website.

"it didn't help very much. I may have given up with them" (J.72.F).

"I may have given up with them leisurely yes because I was still working as a teacher at the time, so it was trying to fit in doing exercises as well as working" (M.80.F).

"I went to physio, but I don't recommend much to it" "I don't think physio would have helped, the only way I think physio would help is if they gave you exercises to do, which you can get online anyway, the same exercises anyway (Ba.76.M).

Three patients tried to keep themselves fit with regular swimming, yoga and golf.

"I kept my right knee under control by doing the twice a week the yoga and the keep fit" (Br.82.F).

"I did swimming with difficult" (M.80.F).

"I couldn't walk –funny thing I could play golf 3 times a week" (Ba.76.M).

Two patients had no physiotherapy visits before surgery.

"Never had it before" (P.70.F).

"Never even occurred that I could have it to be honest (Br.82.F).

There was disagreement among patients regarding the benefits of physiotherapy or other exercise before surgery. Two patients recommended physiotherapy to improve muscle strength before surgery, while three patients did not because they found it difficult to stick with the sessions and all the exercises were already available online. Two patients did not attend any physiotherapy sessions before their TKAs. Interestingly, three patients maintained their overall fitness – despite the severity of their pain – through regular yoga, swimming and golf.

Sub- theme 4 - Alternative treatment before TKA

All patients used pain medication before surgery; its controlled pain for all except one patient, who had a steroid injection in the knee every six months for three years before the TKA.

"I try Ibuprofen and paracetamol regularly 3 times a day the Ibuprofen and I was a little bit worried about taking it for such a long time so every now and again I had a bit of a break and I don't think it actually helped. Then the GP started doing steroid injections into the knee every 6months and I think I had them for 3 years" (M.80.F).

Two patients found their walking ability improved with insoles, but another patient who tried insoles found that they made no difference for her.

"I went on a website and sent for these heel sole inserts which are brilliant, and I still wear them today in my other shoe, in both shoes actually because they are brilliant. Wear two at a time and without them before the operation I couldn't walk half a mile but with them I could walk a lot further (Ba.76.M).

"Yes, I have to wear heeled inserts and for me they worked, If I hadn't had those it would have been unbearable" (K.80.F).

"Shoes insole! they didn't do anything for me" (P.70.F).

One patient preferred to walk while wearing a knee brace.

"I wear the brace on my right knee just in case it is sore. I don't like to walk without it" (Ba.76.M).

Two patients found acupuncture useful in controlling their symptoms.

"the exercise didn't help very much I had acupuncture which did, I found the acupuncture very good the guy I went to" (M.80.F).

"acupuncture very good" (J.72.F).

All but two patients tried to find alternative treatments that might help ease their symptoms before surgery. One patient tried steroid injections, two others used insoles, one preferred a knee brace and two found acupuncture useful.

Sub- theme 5 - Patients' beliefs about post-TKA outcome

All the patients agreed on the importance of a determined, positive attitude before surgery.

"I think when you go into an operation, well any kind of operation – you have got to have that positive determination" (P.70.F).

"I think too, it starts out with the attitude that you have before you have the operation, you go into it determined that you are going to do X, Y and Z and that is it" (J.77.M).

"it is an attitude of mind a lot because with the things my yoga and my keep fit my one aim was to get back doing that as quickly as I could, and I got back to it gently but very quickly" (Br.76.F).

In addition, all patients agreed on the importance of starting exercise as soon as possible post-TKA to improve muscle strength and facilitate the recovery process.

"you have got to exercise ASAP because if you don't Well you lose your muscles but it's going to be a hell of a lot more painful if you don't" (J.72.F).

"start trying to move and start doing some little bit of exercise which is the way I approached it with my first one" (Br.76.F).

"if you don't exercise You lose your muscles, don't you" (P.70.F).

"I think exercising that you need before the operation I think is you should definitely do it" (Ba.76.M).

Another patient believed that the overuse of the knees in sport led to severe osteoarthritis and that a having a TKA on one knee would make the other knee deteriorate more rapidly.

"I've always been a football player and watcher and what I think caused my major problem was playing too long. I played until I was early 60s. I find there are lots of footballers that have a lot of knee replacements. I think once you have the one knee put right the other one is going to deteriorate" (J.77.M).

All patients agreed on two important issues before surgery: being determined to have a positive attitude and starting exercise as soon as possible. Other individuals offered opinions such as males enjoying better outcomes than females and knee overuse leading to early joint deterioration.

Theme Three: ADL changes one-year post-TKA

One of the main objectives of the FGD was to explore post-TKA functional improvements from the patient point of view. The patients' feedback on this theme was classified into four sub-themes to cover the diversity of functional improvements: walking ability improvements, other ADL improvements and limitations, new functional ability following TKA and exploring whether they ever forgot that they had undergone a TKA.

Sub- theme 1 - Walking ability one year following TKA

As previously mentioned, all patients had notable limitations in their walking ability before TKA; many could not walk for more than five minutes due to severe pain. At one-year post-TKA, they all reported marked improvements in their walking ability. When we asked if they could walk to a specific shop that required 45 minutes of walking from the hospital, they all answered that they could.

"*Yeah brilliant" (M.80.F), (Ba.76.M), (J.72.F) & (J.77.M).*

"Yeah, no pain" (P.70.F), (K.80.F) & (Br.82.F).

Sub- theme 2 - ADL improvements post-TKA

Three patients agreed that their ADL quality and quantity post-TKA were the same as before the surgery but were now free of pain.

"Now, I can do the same amount of activity time before TKA but pain free" (J.72.F).

"It's definitely improved everyone's quality of life now. Now, I can do the Same amount of activity time before TKA but pain free" (Ba.76.M).

"yeah, the same amount of activity time before TKA but without pain" (J.77.M).

However, one patient showed quality improvements in her activity, as she no longer needed to take rests or short breaks during activities, as she did before the surgery.

"I think with the activities it is the same thing, but I felt I had to sit down much more just to rest my knees because they were hurting a lot but now I can just carry on" (M.80.F).

Two patients indicated improvements in both quality and quantity of ADL; they did everything naturally without thinking or worrying, as they did before the surgery.

"I think you do things naturally now without thinking about it, you just get up and get on with it, I can climb up ladders and I can do anything" (Br.82.F).

"I can take the dog for a walk now, I couldn't before, and he is a big dog – he takes me. Same here I couldn't go to the soft play area with my grandchildren if I haven't had my knees done" (P.70.F).

One undertook many new activities that she could not perform before her TKA.

"we ended up in Whitby last July and I was climbing cliffs, climbing rocks" (P.70.F).

The overall ADL comparison before and after TKA varied from one patient to another. Some felt it was the same but pain free, while others felt their ADL improved in term of both quality and quantity.

Sub- theme 3 - ADL limitations and difficulties post-TKA

All patients could not kneel after TKA, although some of them could do that before surgery.

"I do gardening, or I used to do a lot of gardening, I can't kneel. Before TKA, I was kneeling and gardening on those things you have, and it hurt but there is no way I could do it now" (Br.82.F).

"No, I can't kneel it hurts" (J.72F) & (P.70.F).

"Never tried kneeling" (J.77.M), (Ba.76.M) & (M.80.F).

Two patients mentioned difficulties due to pain when walking up or down stairs.

"Pain during walk up the stairs Up mainly – I put pressure on my replacement knee to lift myself up. I feel as though it is pushing out from my knee and it is tight as if someone is pushing" (Ba.76.M).

"Pain when going down the stairs with the one knee I feel I am having to turn it sideways I have go down" (M.80.F).

The major limitation post-TKA was an inability to kneel. Two patients found minor difficulties in going up or down stairs; no other limitations were mentioned.

Sub- theme 4 - Forgetting they had a TKA

Only two patients said that they act neutrally without any apprehension and forget that they had knee replacement surgery. The other patients said that they did not forget, as they have minor pain and discomfort with some activities such as walking up or down stairs.

"My left one from 8 years ago you know I never even think about it. I think you do things naturally now without thinking about it, you just get up and get on with it" (Br.82.F).

"I'm the same, I never even think about it" (P.70.F).

Theme Four: Outcome expectations following TKA

This theme explores what the patients expected to gain from surgery and the factors that modified those expectations, any apprehension they faced before surgery, whether their expectations were met and what they recommend for future patients to improve their experience and outcome.

Sub- theme 1 - Overall expectation following TKA

All agreed that they would feel better, but the meaning of "better" varied from patient to patient. Three patients said their main goal from the surgery was to be better and return to normal ADL before surgery without pain or limping.

"We all expected success, and we all expected to come out swinging. No more limping". doing the same things that you were doing but with no pain" (Ba.76M).

"It wasn't sort of extreme expectations, it was simply and solely mobility, able to do things that you normally do but haven't been able to do because you haven't been able to stand the pain and stiffness and everything else. It is just that focus of getting sort of normality and that better quality of life" (P.70.F).

"doing the same things that you were doing but with no pain" (M.80.F).

"we were going to be back to normal that is how I felt about it". No more limping" (Br.82.F).

Two patients expected to return to playing their favourite sports, football and yoga.

"I wanted to get back to my keep fit and yoga" (Br.82.F).

"I am looking at the possibility of walking football and having a go at that" (J.77.M).

Two patients said they expected everything to be better but did not specify any symptom or ADL.

"will be better" (J.72.F) & "K.80.F).

Most patients' primary expectation was a return to the same ADL as before surgery, but without pain or limping. Two patients had specific expectations of being able to return to playing a specific sport, while two other patients had no specific expectations post-TKA.

Sub- theme 2 - Expectation modification

Two patients' expectations were modified by surgeons, who clarified that TKA was not a magic treatment, but that they would be able to do more with less or even no pain.

"*The doctor is very realistic when I saw him, he said it is not going to be really flexible when you have a new knee, but it will be far less painful, and you will be able to do a lot more without pain" (M.80.F).*

"The surgeon didn't say it would be perfect, but it will be better than it is now" (Ba.76.M).

The other five patients' expectations were modified after they attended the educational class, which advised them to be more realistic about the outcome.

"I came to both knees. I found that helpful they explained it is not magic, you have got to work yourself as well" (J.72.F).

"Yes, I did. they explained How sore you were going to be. To expect it to be sore first 4 or 5 weeks" (Ba.76.M).

"I came to a talk with a physio, I found that helpful" (K.80.F).

"Oh yes I came. It was helpful, I recommend making the educational class compulsory before surgery" (Br.82.F).

The expectations were modified to be more realistic by the surgeon and through attending an educational class pre-TKA. The class provided complete information about what to expect immediately after surgery, such as soreness and swelling for several weeks and what patients should do after their TKAs.

Sub- theme 3 - Apprehension before TKA

Four patients knew others who previously had the surgery and recommended it; no patients talked with anyone who regretted having the surgery.

"I only knew one and she said oh my god you must have it done, she said it is absolutely brilliant" (P.70.F).

"No, people they recommended it" (Br.82.F) & (J.77.M).

One patient believed that recovery varies from one patient to another.

"I haven't spoken to anyone who have regretted it, some have taken longer to recover, and I know someone who it took him 2 years before it started to feel normal and natural – he wasn't in pain it just felt different" (Ba.76.M).

One patient believed that the condition after surgery would be better than not having the surgery.

"so much in pain that you say anything is brilliant after that" (M.80.F).

All patients agreed they were better than they would be without knee replacements, and those who had previously had the surgery recommended it.

Sub- theme 4 - Meeting expectations

All patients said their expectations were met one-year post-surgery, without any other comments. One patient found more of her expectations met after her second replacement than after her first.

"Definitely both have been brilliant" (P.70.F) & (Ba.76.M).

"Yeah brilliant" (M.80.F), (K.80.F) & (Br.82.F).

"More, definitely both have been brilliant" (J.77.M).

"yes, more than the first one" (J.72.F).

Sub- theme 5 - Recommendation and advice for future patients

All participants agreed on the importance of exercise before and after surgery, even if it hurt to do so, so they advised all patients to strengthen their muscles before surgery and warned them to expect pain and discomfort for several months after surgery.

"you get a better quality of life and if you want some normality in your movement then get it done, but you have got to do your bit as well. You have discomfort for about 3 or 4 months and then I think I think it is alright that was me anyway. I did the exercises I was told to but that was all of it" (P.70.F).

"Exercises even if it hurts" (M.80.F).

"You have got to build up your muscles because we are not using them all the time, they go weak, so if you prepare for the operation by exercising" (Br.82.F).

"I would say exercise before you go in not for day or weeks but for months once you have got arthritis exercise helped me recover" (Ba.76.M).

Two patients recommended bicycle exercise to improve muscle strength and increase knee flexibility.

"Using Bike: Yeah, I think the bicycles help my knee definitely, do it as low as you can so it is really bending which is what you wouldn't normally do on a bike would you" (M.80.F)& (Ba.76.M).

All future patients were also advised to ask their surgeon and medical team about suitable painkiller options and any concerns before the surgery.

"*More information about Painkillers which work. Some people after the operation said they couldn't sleep for months and months, tossing and turning that is what concerned me, but I slept like a tot but that was because of the morphine. That is the only thing that worked for me" (Ba.76.M) & (K.80.F).*

"When you go in and you meet all the people and the nurse's staff that leave you under no illusion, anything you want to know they will tell you. So really it is your own fault if you don't know what is going to happen" (Br.82.F).

The summary of advice for future patients is as follows: a) exercise is important before and after surgery to improve muscle strength; b) bicycling post-TKA improves knee bending, according to two patients; c) clarifying all concerns before surgery such as suitable painkillers.

Discussion

This is the first study to utilise an FGD to explore patients' experiences one year post-TKA. The study identified four main themes: recovery experience post-TKA, experience pre-TKA, ADL changes post-TKA, and post-TKA outcome expectations. The recovery experience has four sub-themes: overall experience, experience with orthopaedic surgeons, experience with physiotherapy, and the differences between first and second knee replacements. Patients' main post-TKA concern was the severity of pain and swelling post-surgery, which lasted for weeks, even with pain medication. This finding accords with concerns expressed by patients in previous studies by van Egmond et al. (van Egmond, Verburg, Vehmeijer, & Mathijssen, 2015) and Westby et al. (2010), despite differences in FGD timing, patients' ethnicity and patient age ranges. All patients agreed that they did not anticipate the severity of post-TKA pain, even with pain medication, and that nobody had told them how much pain and swelling would occur after TKA.

All participants in the present study were satisfied with their orthopaedic surgeon experience both before and after surgery. This result diverges from the patient feedback reported by Westby et al. (2010) and Zacharia et al. (Zacharia, Paul, & Thanveeruddin Sherule, 2016), whose subjects complained about poor communication with surgeons. Those patients also recommended that surgeons devote more time to listening to patients in order to improve their comfort and confidence levels. The high satisfaction reported in the present study may be due to three reasons. First, patients' concerns and questions about surgery were covered in an optional educational class before surgery, and no previous study has explored the effect of an educational intervention before surgery on patients' satisfaction with surgeon communication to allow comparison of our findings. A second possible explanation for the high satisfaction in the current FGD may be due to the participants' ages, all of them being quite old (70–82 years), in comparison with the previous FGD study age range of 46–78 years; older patients are commonly not as demanding as younger ones. Younger patients showed more knee-related dysfunction and dissatisfaction post-TKA, despite their higher activity scores before and after surgery, than older ones (Lange, Lee, Spiro, & Haas, 2018). A third possible explanation for surgeon satisfaction in the current FGD is that five out of seven patients had had a previous contralateral knee arthroplasty, and so the surgical experience was familiar to them. Therefore, a future study is recommended with a wider age range and limited to one arthroplasty experience to explore the effect of pre-TKA educational classes on patients' satisfaction with their surgical experience so as to overcome the current sample limitations.

The patients reported varying experiences and satisfaction with post-TKA physiotherapy. Differences in satisfaction may result from different expectations, as some patients expected more than just exercise and advice: manual therapy, manipulation, and more than 3-6 sessions. In contrast, patients in Westby et al.'s (2010) study were dissatisfied due to long waiting lists for physiotherapy and the high cost of going private. Similar results were reported by van

603 Egmond et al. (2015), as most patients did not receive proper post-TKA rehabilitation or advice.
604 Accordingly, clarifying post-TKA physiotherapy objectives for patients before surgery may
605 boost their taking an active role in exercise and improve their satisfaction.

606 This is the first FGD to explore the differences between first and second knee replacement
607 experiences. Five patients had two knee arthroplasty experiences, they underwent a first knee
608 arthroplasty, followed by a contralateral arthroplasty sometime later; they all agreed that the
609 second experience was better because they felt more confident and knew what was going on.
610 This may clarify the impact of pre-TKA education, as patients progress well and have a greater
611 level of confidence if they know in detail what is likely to occur.

612 Although patients' experiences before-TKA were not directly addressed in the semi-structured
613 questions in the FGD reported here, the patients talked about it extensively, particularly how it
614 could affect outcomes and the overall post-surgical experience. This theme covers five areas:
615 their experience with general practitioners (GP), ADL limitations before surgery, exercise and
616 physiotherapy pre-TKA, and alternative treatments that helped them to control their symptoms
617 before TKA. The present study obtained results comparable to those of Westby et al. (2010) in
618 terms of satisfaction with GP service and the timing of referral to an orthopaedic surgeon. The
619 patients were satisfied with their GPs for the conservative treatments they provided and their
620 exercise recommendations. The main dissatisfaction was due to waiting a long time for an
621 orthopaedic surgeon referral; some patients had to wait so long that they could not walk due to
622 severe pain.

623 Severe pain before surgery led to ADL limitations on, for example, walking, standing, and
624 shopping. This accords with the results of Zacharia et al. (2016), where pre-TKA pain was
625 reported to limit patients' ADL, cause loss of earnings due to their inability to work, and leading

to their dependence on others for help with stairs and long walks. Thus, patients' mental health was affected before surgery and might have affected post-TKA outcomes.

Despite the severity of pre-TKA pain, most patients agreed on the importance of strengthening muscles through physiotherapy sessions, following an online exercise programme at home or keeping fit with swimming or yoga. In addition, the patients recommended foot insoles, knee braces and acupuncture to control the severity of pain before TKA. Interestingly, this agreement was not found in any previous FGDs comprising patients who underwent TKA.

All FGD participants agreed on the importance of a positive attitude and starting exercise as soon as possible after surgery. These results are similar to those found by Westby et al. (2010), who also reported the importance of a positive attitude before surgery. Emotional well-being, in the form of hope, self-worth and confidence, has been recognised as a crucial factor in coping with post-surgical outcomes (Street, Makoul, Arora, & Epstein, 2009).

The third theme involved exploring ADL changes one-year post-TKA. The FGD revealed that all patients' walking ability and ADL improved in both quality and quantity, largely because those activities were now pain-free. This reinforces the results found by Westby et al. (2010) and Zacharia et al. (2016). All their patients were satisfied with their ADL improvements: activities such as walking, climbing stairs and returning to work were pain-free. However, none of the FGD participants could kneel post-TKA, a limitation also reported in the study by Zacharia et al. (2016), where all participants were unable to use squat toilets as they had done before surgery. ADL limitations may affect the level of post-TKA satisfaction. For instance, patients who were told about this limitation before surgery showed higher satisfaction levels than those who did not know in advance that they would be obliged to use Western-style toilets post-TKA (Zacharia et al. 2016). Thus, clarifying possible post-TKA limitations in educational classes or during surgical consultations is highly recommended.

The last sub-theme explored the return to normality or acting naturally without apprehension post-TKA. The FGD in the present study reported similar results to those found in Westby et al. (2010), and both were based almost entirely on individuals' definitions of normality. Some patients defined it as being able to do everything they could before surgery without any kind of pain or limping. Based on this definition, a few patients had minor pain or discomfort with some ADL such as stairs, but the majority felt normal after one year. Others defined normality as being able to once again play sports they had enjoyed before the end stage of degeneration without pain or limitations, thus ignoring the ageing factor. This illustrates the powerful impact of patient expectations of surgery, which is explored below.

The last theme deals with patient expectations, expectation modifications, and the degree to which patients expected what they ultimately experienced. The results reported here are in agreement with those found in Westby et al. (2010); all patients expect to feel better, but, as the previous paragraph makes clear, the meaning of "better" or "normal" differs from one patient to another. Patients' expectations ranged from performing the same ADL as before surgery without pain or limping, to returning to play their favourite sport without limitations. Unclear or unrealistic expectations about post-TKA outcomes and recovery periods may lead to disappointment, great pain and even depression.

All patients initially expected that the surgery would work "like magic" and that they would be perfect immediately afterwards. Their expectations were modified to be more realistic by their surgeons and by attending a pre-TKA educational class. After those interventions, patients learned to expect soreness and swelling for 4-5 weeks, that they would have to work on their own recovery through exercise, and that, while the new knee would not be very flexible, it would be far less painful. The participants in the present study agreed with those in Westby et al. (2010) on the importance of modifying expectations before surgery, either though consulting with the surgeon or by taking a compulsory educational class.

In the FGD reported here, it was found that participants who were satisfied with their post-TKA experience had satisfactory knee joint function (44–48) based on the Oxford Knee Score (OKS) (Mont, Banerjee, Jauregui, Cherian, & Kapadia, 2015). This contradicts the results found in the FGDs reported by Zacharia et al. (2016), who found no association between satisfaction among FGDs and participants' Knee Society Scores (KSS). The participants with high KSS showed low satisfaction with their FGDs, while patients with low KSS reported higher satisfaction. This could be due to the focus of KSS on pain, knee range of motion and alignment; it has only three questions relating to function (walking ability, using stairs and using a walking aid) (Lingard, Katz, Wright, Wright, & Sledge, 2001). In contrast, OKS is largely based on the functions of daily living, e.g. bathing, using public transportation, walking ability, moving from sitting to standing positions, limping, kneeling, stability, housework, shopping and stairs (Mont et al., 2015).

Only the patient with moderate knee function (33) showed moderate satisfaction in the FGD due to a poor experience with her first knee surgery. Her satisfaction as expressed in the FGD was good with her second knee replacement, which may illustrate the effect of a patient's overall experience on the scores for patient-reported outcome measurements (PROMs), at least for some patients. A further study is recommended to explore the discrepancies between satisfaction expressed in FGDs and different types of PROMs.

In summary, patient attitude, sufficient pre-operative education, expectation modification, communication with the surgeon, and patients' taking an active role in rehabilitation may all affect post-TKA outcomes and satisfaction. Hence, the recommendation is to address all of these issues before TKA to maximise outcomes and patient satisfaction.

Strengths and limitations of the study

This is the first FGD to explore patient experience one-year post-TKA and the differences in experience between first and second knee replacements. In the present study, trustworthiness was promoted via a transparent description of the narrative data analysis process by two independent researchers. Moreover, the flexible thematic analysis provides rich and detailed data about post-TKA experiences. Including both males and females, a mixture of unilateral and bilateral experiences, a wide range of BMI, and patients from different surgeons all improve the richness of the findings.

There are some limitations in the FGD reported: the findings are based on one FGD, but the recommended level of data saturation is reached after 4-6 FGD sessions. Therefore, the findings cannot be generalised to a broader population due to the small sample size, limited age range and single discussion group. We thus recommend testing these findings against other FGDs using structural questionnaires and quantitative methods. Member-checking or participant verification was not performed due to the practical difficulties of returning FGD transcripts to patients with no evidence showing its efficiency in enhancing confirmability (Long & Johnson, 2000).

As to limitations within the sample, all the present study's participants were retired, so we could not explore return-to-work barriers or a younger age group's experiences and needs; in addition, all participants were highly educated. Access to health care and associated programmes is not universal and differs from country to country, so other patients' experiences and barriers may differ from the findings reported here. Exploring post-TKA experience in different cultures and countries might help to capture important differences.

Clinical recommendations

Sufficient communication between surgeon and patients before surgery may improve patient confidence and self-efficacy and lead to the most positive attitude possible.

Modifying any unrealistic or unclear expectations regarding recovery rates and outcomes is crucial to minimise post-TKA disappointment, as is clarifying possible ADL limitations after surgery.

The intensity and duration of post-TKA pain were both generally unexpected among the patients in this FGD. Clear and realistic guidance should be provided about pain issues, along with an appropriate plan to control acute post-TKA pain.

Patients should be advised to strengthen relevant muscles before TKA and as soon after surgery as is feasible.

Clear post-TKA physiotherapy objectives may enhance the patient's role in rehabilitation. Elucidating what to expect from physiotherapy services post-TKA in terms of treatment options based on an evidence-based protocol and the number of sessions authorised by hospital policy may reinforce patient satisfaction.

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Table 1. Focus group post total knee arthroplasty discussion guide.

Main question/area	Probes
Experience post-TKA	How was your experience following Total Knee Arthroplasty (TKA)?
Functional improvements after TKA	Have you experienced any improvement in your function? What types of activity have improved? To what extent?
Loss of function after TKA	Have you experienced any loss of function? For how long? What modifications have you made to compensate for that? What are your barriers?
Satisfaction and expectations	How do you feel about your surgery now? Does it satisfy all your expectations? What were your expectations? Are you planning surgery for your other knee if it has the same complaint? Would you recommend surgery to your friends or relatives?
Health team communication	Did you receive sufficient information and explanation about surgery and expectations in advance from the health team? Was that sufficient for what you needed to know before surgery? Do you think that has affected your satisfaction after surgery? What is the most important information you think all patients should know before surgery?
Rehabilitation services	Have you received or are your receiving physiotherapy post-surgery? For how long? How many sessions? Were or are you satisfied with it? What do you recommend in terms of physiotherapy services?
What are your recommendations to future TKA patients	
Do you have additional concerns not covered during this meeting regarding the period after hospital discharge up to a one-year follow-up?	

Table 2. Focus Group Discussion Patient Characteristics and Oxford Knee Scores

Participant Code	Age	Gender	BMI	TKA Date	Education Level	Marital Status	Oxford Knee Score
P.	70	Female	35	First 2012 Second 2016	High School	Married	41
M.	80	Female	31	2016	High School	Widowed	42
Ji.	72	Female	28	First 2015 Second 2016	Bachelor's Degree	Married	33
K.	80	Female	26	2016	High School	Widowed	48
Br.	82	Female	41	First 2007 Second 2016	High School	Divorced	45
Ba.	76	Male	34	First 2014 Second 2016	Bachelor's Degree	Married	43
Jo.	77	Male	42	First 2009 Second 2016	High School	Divorced	44

Figure 1. Data analysis flow chart

Figure 2. Agreed themes and sub-themes mind maps.

Figure 3. Focus group discussion themes summary