

Do lifestyle factors affect clinical outcomes following total knee replacement? An integrated qualitative study exploring the perceptions and experiences of participants in the PRO Knee feasibility cohort study

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Do lifestyle factors affect clinical outcomes following total knee replacement? An integrated qualitative study exploring the perceptions and experiences of participants in the PRO Knee feasibility cohort study.

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Abstract

Background

The development of pre-operative interventions to improve clinical outcomes following total knee replacement surgery has been identified as a research priority. In the first step of a programme of research, we conducted a feasibility cohort study, which investigated the effect of modifiable lifestyle factors, including alcohol consumption, smoking, physical inactivity and living with overweight, on clinical outcomes following total knee replacement (PRO Knee). Alongside PRO Knee, we conducted an integrated qualitative study to understand the acceptability of the methods used in the PRO Knee study and to explore the experiences of patients waiting for total knee replacement surgery, along with their beliefs and experiences regarding lifestyle interventions.

Methods

Adult patients awaiting total knee replacement surgery, who had consented to participate in the PRO Knee study were eligible to participate. Semi structured interviews were conducted with all patients who provided informed consent for the qualitative study. Interviews were audio-recorded; transcribed in an intelligent verbatim format and data were analysed using the Framework Method.

Results

Ten participants (9 female, 1 male) were recruited (average age 70, range 56-88) and all interviews were conducted over the telephone. The recruitment and data collection processes of the PRO Knee study were acceptable to participants. Five further themes relating to the lived experience of waiting for and undergoing total knee replacement surgery were identified: 1) Osteoarthritis of the knee and co-morbidity; 2) The decision to have surgery; 3) Waiting for total knee replacement; 4) Lifestyle conversations and interventions; 5) Recovery from total knee replacement.

The burden of living with osteoarthritis of the knee was significant and participants had often experienced multiple unsuccessful interventions. Participants could recall lifestyle conversations, which they were open to, but were not offered support. Most participants were positive about participating in lifestyle interventions prior to surgery. The participants who had poor outcomes were left with intrusive pain, and feelings of regret.

Conclusion

The recruitment and data collection processes for the PRO-Knee feasibility cohort study were acceptable to participants and further study in this area is now warranted.

Keywords

Total knee replacement, lifestyle factors, feasibility.

Key Messages Regarding Feasibility

- 1) Patient participants valued the opportunity to have lifestyle conversations prior to their total knee replacement surgery, although some noted that structured lifestyle advice was not always offered.
- 2) Recruitment and data-collection processes within the PRO-Knee study were acceptable to participants.
- 3) This PRO-Knee study suggests that a larger, substantive, cohort study is feasible.

1.0 Background

Around 110,000 total knee replacement surgeries are undertaken each year within the UK, aiming to relieve the pain caused by osteoarthritis [1]. Whilst many patients are satisfied after total knee replacement surgery, up to 20% of patients are dissatisfied with their outcome after one year [2,3]. People who undergo total knee replacement are often in poor health and report a number of lifestyle factors including smoking tobacco, drinking alcohol, physical inactivity and living with overweight that might contribute to suboptimal clinical outcomes [4,5]. NICE (2020) recommend that the development of pre-operative interventions to identify and address relevant lifestyle factors with the aim of improving clinical outcomes and reducing dissatisfaction following knee replacement surgery is a research priority [6]. However, before effective pre-operative interventions can be developed, it is first necessary to understand which, if any, of these lifestyle factors affect clinical outcomes following total knee replacement surgery.

In the first step of a programme of research, we conducted a cohort study (PRO Knee) to evaluate the future feasibility of a larger, substantive multi-centre cohort study evaluating the effect of lifestyle factors on clinical outcomes following total knee replacement surgery [7]. Alongside PRO Knee, we conducted an integrated qualitative study, reported here, as a process evaluation of the research methods used. Furthermore, the study explored the experiences of patients who had waited for and undergone total knee replacement surgery alongside their beliefs and experiences regarding lifestyle interventions.

The objectives for this integrated qualitative study were:

1. To explore barriers and facilitators to recruitment and data collection within the feasibility cohort study.
2. To understand the experiences of people who have undergone total knee replacement, regarding the wait for surgery and the support / interventions offered to them.

3. To understand the experiences and perceptions of people waiting for total knee replacement regarding the influence of lifestyle factors on their outcomes.

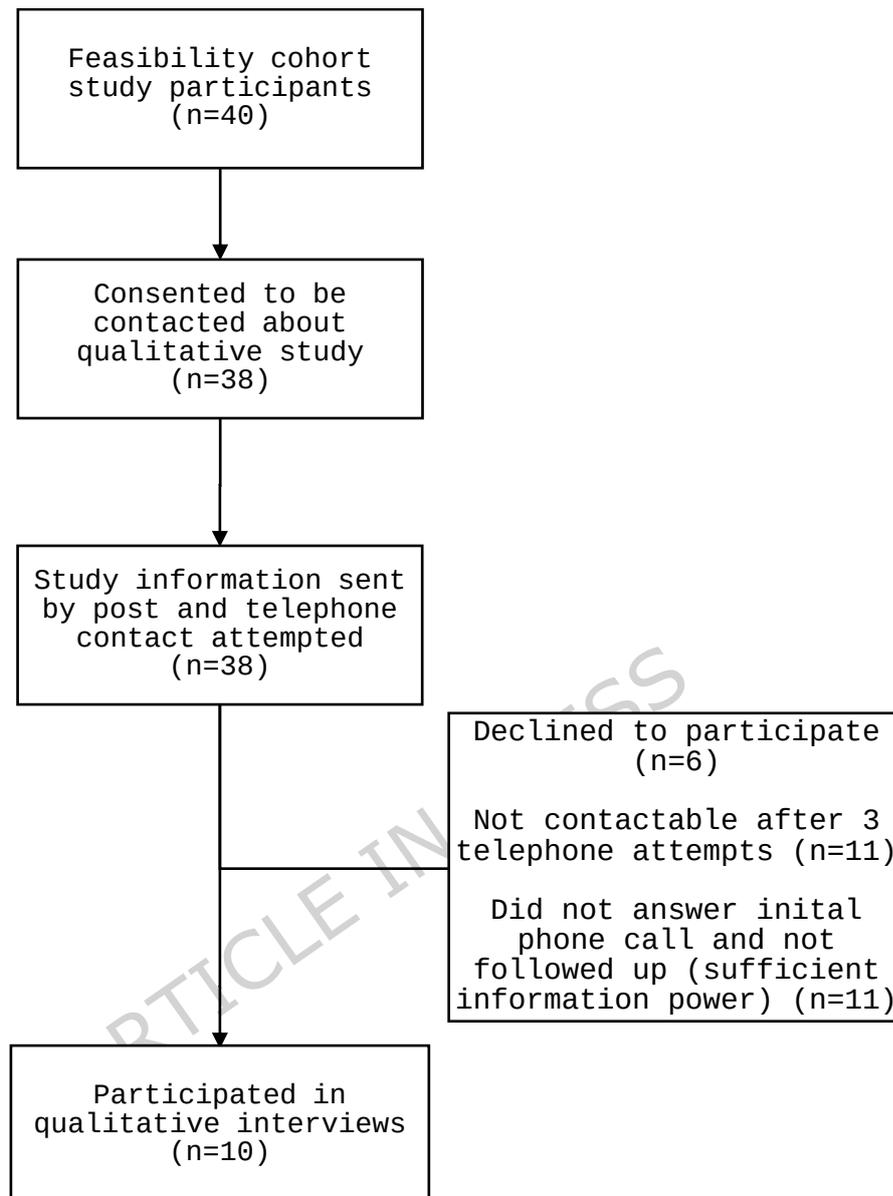
2.0 Methods

A qualitative study was undertaken using semi-structured individual interviews. This study is reported in accordance with the consolidated criteria for reporting qualitative research (COREQ) checklist [8]. The study sponsor was the Royal Orthopaedic Hospital NHS Trust (ROH23ORTH01). A favourable ethical opinion was granted by the North of Scotland Research Ethics Committee on 13th December 2022 (22/NS/0155). Recruitment and data collection to the feasibility cohort study took place between January 2023 and January 2024 and recruitment to this qualitative study took place between those dates.

During recruitment to the PRO Knee feasibility cohort study, participants could consent to further contact to discuss participation in this qualitative study. When consent to contact was gained, patient participants were sent the patient information sheet in the post three months after their total knee replacement surgery. This was followed up with a telephone call by GS to discuss participation. If they were happy to participate, informed consent was recorded over the telephone and a subsequent time was scheduled for either telephone or face-to-face interview, depending on preference.

We anticipated that recruitment of 10 patient participants (25% of the sample of the PRO Knee feasibility cohort study) would provide sufficient information power to enable us to meet the objectives of this integrated qualitative study. Although data saturation is often used to justify sample size in inductive qualitative studies, it is conceptually distinct from information power. Information power focuses on whether the sample provides sufficient, relevant information to address a defined research aim, considering sample specificity, quality of dialogue and the analytic approach, rather than the point at which no new themes emerge [9]. Recruitment of consecutive participants continued until the target was met, at which point the research team felt the data was sufficient to meet the objectives. All participants (n=10)

chose telephone interview, which were conducted by GS, who was unknown to patient participants (Fig 1). GS is a male academic physiotherapist, with experience of conducting semi-structured qualitative interviews. GS has extensive clinical experience assessing and treating individuals undergoing total knee replacement surgery. This professional background provided familiarity with surgical pathways, postoperative recovery trajectories, and the challenges faced by patients who experience poorer outcomes. The study was conducted at GS's place of employment and formed part of his doctoral research, which may have influenced how participants perceived him and their willingness to share their experiences. GS was motivated by a desire to better understand the perspectives of individuals who experience poor outcomes from total knee replacement surgery to inform his future research, which aims to improve outcomes from clinical care. He entered the study with an expectation that participants might describe variation in support needs and postoperative challenges, and remained mindful of how his role, experiences, assumptions, and prior knowledge could shape the interviews and interpretation of data. To mitigate potential influence, GS engaged in regular reflexive discussions with the supervisory team throughout data collection and analysis.

Fig 1. The flow of participants through the study

The in-depth semi-structured interviews were based on a topic guide (additional file 1) developed by the research team and informed by other qualitative process evaluations [10]. The topic guides covered: 1) the processes of recruitment; 2) data collection (questionnaires conducted in person, via telephone or post); 3) the perceptions of participants regarding the impact of lifestyle factors on outcomes from TKR; 4) the pre-operative support participants

had been offered with lifestyle factors and their perceptions of them. The topics were covered flexibly to enable exploration of any new and unanticipated issues. The interviews were audio recorded and transcribed in an intelligent verbatim format.

Data were analysed using the Framework Method [11]. The Framework Method is a systematic approach to undertaking qualitative research when the objectives of a study are specified prior to analysis, and hence aligns well with process evaluations [12,13]. The Framework Method outlines seven stages of data analysis (Table 1) and can be applied to deductive analysis, where data is solely applied to pre-determined themes, whilst allowing for inductive analysis or a combination of both [11].

Transcript returns or member checking were not undertaken as part of the analysis. This reflected both the need to minimise participant burden within a feasibility study and the recognised limitations of member checking, including the potential for participants to reinterpret or feel obliged to confirm earlier accounts [14].

Table 1. How the Framework method was used to analyse the data

Stage of Analysis	Description
1. Transcription	Interviews were transcribed by GS and checked against the audio files for accuracy.
2. Familiarisation with the interview	All audio files were re-listened to and transcripts read, and quality checked by GS. MM quality checked four transcripts against the audio files. All transcripts were read by GS and MM who made contextual and reflexive notes which were discussed with the research team.
3. Coding	Each transcript was read line by line and codes applied to passages that were felt to be relevant by GS and MM. Passages were initially coded using six pre-agreed codes directly related to the areas of focus explored within the topic guide. This process was supplemented by 'open coding' where passages that were felt to be interesting or relevant but do not fit within the pre-existing framework were coded as 'other'. This 'open coding' was used to ensure that important aspects of the data were not missed and to evaluate whether the pre-existing framework needed to be altered.
4. Developing the working analytical framework	Once 2-3 transcripts had been fully coded both GS and MM; both met to reflexively discuss the coding and determine whether any new codes needed to be added to the pre-existing framework relevant to the study objectives. Four further codes, including 'overall experience of participation', 'experience of previous treatments', 'co-existing conditions' and 'post-operative recovery' were added to the initial codes.
5. Applying the analytical framework	The transcripts were then indexed using the 6 pre-existing and 4 newly generated codes using Microsoft Word by both GS and MM.
6. Charting data into the framework matrix	The coded data were entered into a coding matrix which included references to the initial quotations so that the sentiments of participants were not lost. GS and MM assessed whether sufficient knowledge had been generated to meet the objectives of the study considering the principles of information power. The narrow study aim (process evaluation), the specificity of the participant group (participants in a feasibility study (n=40), richness of interview dialogue, and strong consistency across cases (participants were satisfied with the acceptability of participation within the PRO-Knee cohort study), led the authors to assess that sufficient information power had been obtained following 10 interviews.
7. Interpreting the data	The coded data were then interpreted by GS and MM and discussed with the author group, to explore relationships between the codes and understand the phenomena that emerged from the data in relation to the study objectives. From this, six final themes emerged (Fig 2).

3.0 Results

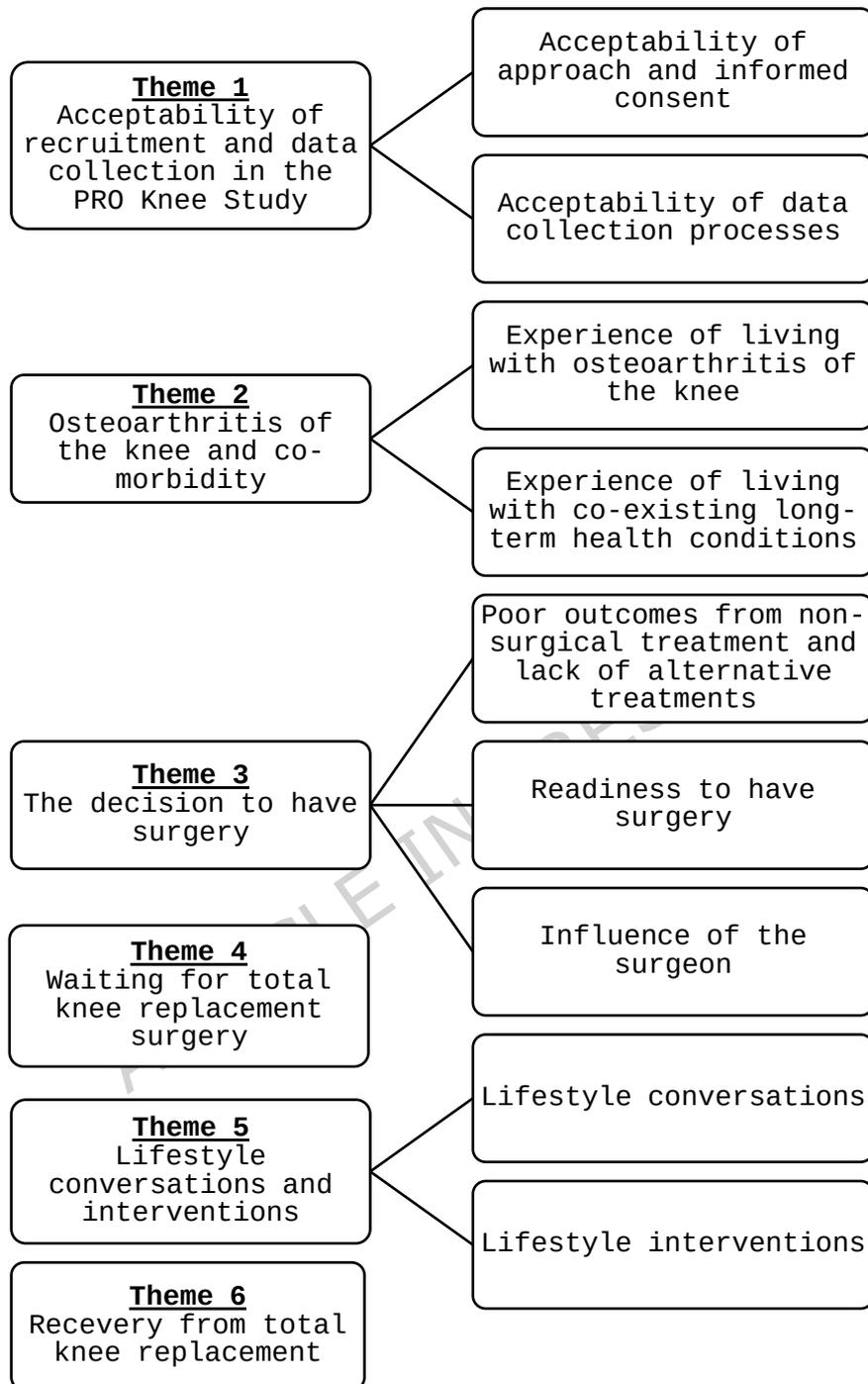
Thirty-eight (38/40) participants in the feasibility cohort study consented to be contacted about the qualitative study and were sent the study information in the post. Contact was attempted with all 38 participants via telephone. Six declined to take part as they did not have the time, 11 participants were not contactable over three phone calls, and a further 11 participants did not answer an initial phone call and were not followed up as the research team assessed that sufficient data had been collected to meet the study objectives following 10 participant interviews. Participants (9 female, 1 male) had an average age of 70 years (range 56-88) and 90% (9/10) were retired. Characteristics of participants are presented in Table 2. All participants opted for telephone interview which lasted a mean duration of 31 minutes (range 19-48 minutes).

Table 2. Characteristics of the participants

Participant ID	Gender	Age	Employment status	Lifestyle factors
PRO-001	Female	74	Retired	Smoker, BMI>25
PRO-003	Female	79	Retired	BMI>25
PRO-006	Female	56	Employed	BMI>25
PRO-008	Female	79	Retired	BMI>25
PRO-025	Female	88	Retired	BMI>25, alcohol, physical inactivity
PRO-028	Female	65	Retired	BMI>25, physical inactivity
PRO-030	Male	56	Long-term sick / disabled	BMI>25, physical inactivity
PRO-034	Female	74	Retired	Physical inactivity
PRO-035	Female	70	Retired	BMI>25, physical inactivity
PRO-040	Female	62	Retired	BMI>25, physical inactivity

In addition to one theme relating to acceptability of the research methods employed, a further five themes were developed that focused on the lived experience of osteoarthritis of the knee, lifestyle support offered leading to surgery, and post-operative recovery (Fig 2)

Fig 2. Themes that developed from the data analysis



Theme 1. Acceptability of recruitment and data collection in the PRO-Knee study.

Sub-theme 1. Acceptability of approach and informed consent

The recruitment processes used in the feasibility cohort study were acceptable to all participants. When asked about whether there are any changes participants would make to the recruitment process, including approach and consent, no participants had any suggestions.

'No I don't think there was anything I would need to change personally' [PRO-006]

'Yes, it's the first one I've ever done mind you but even so, you know, I'm quite happy about it (the recruitment processes) [PRO-025].

However, more than 6-months on, no participants could accurately recall the details of how they were approached to participate or the objectives of the study. Instead, the majority were motivated to participate by altruistic reasons.

I think I've always been sort of, I've always felt you really need to do research because if you don't do the research, you don't know if it's going to make a difference, whether there's things that could be improved, so I do think it's a good thing to be involved in. [PRO-028]

Yeah, I felt like, I felt like I'm coming to the end, you know, sort of, I'm, I'm you know sort of in the time when people do get osteoarthritis and things but I think whatever you can learn and however you can improve the experience of a knee replacement, pioneering surgery is so important, you know, and changing things is important [PRO-030]

Sub-theme 2. Acceptability of data collection processes.

The burden created by the data collection questionnaires, and the means of returning them (post and telephone) were acceptable to all participants.

'Em, No I didn't think it was a particularly lengthy questionnaire, erm you know, it didn't take up masses of time so no, there is nothing I would change on there' [PRO-006]

Whilst the content of the questionnaires was acceptable to most participants (7/10), some felt that the questions asked were repetitive or difficult to answer, as they asked participants to categorise complex experiences without allowing for context.

'I find it's difficult when it is 1-10 out of this, that and the other because I never know how to answer it.' [PRO-001]

'I don't like the questionnaire... I don't know, I think it was, I don't know, I think it was cos I don't particularly, I personally don't particularly like questionnaires, you know when you say I agree or I don't agree, or I'm satisfied...' [PRO-030]

Theme 2: Osteoarthritis of the knee and co-morbidity**Sub-theme 1. The experience of living with osteoarthritis of the knee**

The experience of living with osteoarthritis of the knee was discussed with all participants. All participants (10/10) described how their symptoms negatively affected their quality of life, including their ability to walk. Some participants discussed the negative effects living with osteoarthritis of the knee had on their participation in work, hobbies or social activities (6/10) and their mental health (3/10).

'But I'd get back, we'd be out, perhaps an hour, very very slow and I'd get back and I'd be nearly in tears...Some days, when I'd first get up, it was really really. I just wanted to cut it off...'[PRO-001]

'It just gradually got worse over time to the point where just to put the foot to the floor, err painful and obviously with my job which was a standing up job didn't really help'. [PRO-006]

Participants commonly reported their symptoms started gradually (8/10) and had been there for more than 12-months prior to surgery (7/10).

'It's been since 2009 when I noticed the problems and it has just been a gradual, progressively getting worse from there' [PRO-006].

'...and then I got pain in my knee and the back of my knee, and I couldn't walk. Er, they had to get a taxi to get me back to the hotel. I suffered that for a couple of years' [PRO-008]

Sub-theme 2. The experience of living with co-existing long-term health conditions

Most participants (7/10) discussed another long-term health condition that they were managing alongside osteoarthritis of the knee which negatively affected their quality of life. These co-existing conditions were commonly other musculoskeletal pain conditions (6/10), including previous joint replacement.

'I have had my hip 15 years, so I have got it [osteoarthritis] in my hands, I have lumbar spondylosis, I have got it in my neck, so I've always got some sort of pain somewhere'
[PRO-001].

'I'd already had a knee replacement 3 years earlier, so I knew, knew what was coming'
[PRO-034].

Some participants (3/10) also discussed the impact of co-existing non-musculoskeletal conditions, which they felt affected their symptoms or recovery.

'..but I also have neuropathy and that was in my feet, peripheral neuropathy and that was getting worse, erm and that makes a numbness in your feet and it interferes with your balance so I was finding it quite difficult to walk'. [PRO-003]

I developed cancer so (GS: Oh, I'm sorry to hear that) so that knocked it back a little bit, but I've got that to go through now... [PRO-040]

Theme 3. The decision to have surgery

Sub-theme 1. Poor outcomes from non-surgical treatment and lack of alternative treatments

Participants often recalled receiving treatments such as cortico-steroid injection (9/10) and physiotherapy (6/10) prior to surgery. The ineffectiveness of these treatments left participants with a feeling they had no alternative options than total knee replacement surgery.

'..,and then I was having I think I had injections in my knees about 4 times a year for about, oh I don't know, probably about 5 years, if not longer than that (GS: Ok)... because at the end of the day, the injections are not gonna, I mean they weren't that good anyway. You're

talking about I'd have one and a couple of weeks after, you know, I was in pain again' [PRO-028]

'I had some physio, err and used topical things and generalised pain killers. Erm, but it got worse and worse, and I had erm cortisone injections in both knees which didn't help at all, and I was eventually referred to [Hospital Name] to see a consultant' [PRO-035]

Sub-theme 2. Readiness to have surgery

Some participants (4/10) described reaching a point where they were no longer willing or able to tolerate the ongoing pain and, therefore, felt ready to undergo total knee replacement. Conversely, three participants described feeling considerable uncertainty about whether TKR was the right treatment option for them."

'I just wanted to get it done and done with so that I would be out of pain... I was just relieved, relieved that it was going ahead and that I'd got in to have it done'. [PRO-008]

'I didn't particularly want an operation, I was trying to put off, you know I didn't want invasive straight away, I do think there's other ways, other avenues that you can go down and sort of, even now, even though I have had a second one part of me wishes I could have kept going a bit longer without having it' [PRO-030]

Sub-theme 3. The influence of the surgeon.

Most participants (8/10) discussed the importance of the surgeon's opinion in influencing their decision to undergo total knee replacement surgery. For those who were undecided about whether to proceed with surgery, the surgeon's opinion was particularly influential.

'I kept going back for different err appointments and in the end, he just said look, you know, you can carry on having injections he said but it's not gonna do any good because the damage is done now, you can't, it's not repairable so you really need to think about having a knee replacement' [PRO-028]

'I could have kept going a bit longer without having it, you know but erm I couldn't really so...erm so erm yeah it got to a point where, my pain, the, the knee was going...so it was [Surgeon name] who actually said "No I think it needs to be done" so I was lucky I had that support' [PRO-030]

Theme 4. Waiting for total knee replacement surgery

All participants (10/10) discussed the waiting times for surgery. Many had waited during the COVID-19 pandemic, which meant the length of time between referral and surgery was more than three years for some participants.

'Oh, I would say a year, a year, 2 or 3, 2 years I should think at least' [PRO-025]

'...it was about 2 ½ years till I saw a consultant and then it was another 12 months before I got the operation'. [PRO-008]

One participant found the uncertainty of waiting for surgery had a detrimental effect on their mental health.

'It is just depressing really; you know it gets you down thinking that you have got to carry on like that everyday'. [PRO-006].

Theme 5. Lifestyle conversations and interventions

Sub-theme 1. Lifestyle conversations

The majority of participants (8/10) could recall having conversations about their lifestyle prior to surgery with different healthcare clinicians. However, these were often vague accounts and none of the participants were offered any support beyond advice and written information.

'I wasn't given a lot erm it was almost in passing rather than specific erm I did get the advice from [surgeon name] in to keep exercising, I did get that reiterated with the nurse in the clinic. The nurse in the clinic was excellent, she was saying keep go, keep, erm have a good diet and erm keep exercising, keep mobile' [PRO-030]

'Err yes, I was given err when I saw the consultant he gave me a booklet (G: Hmm) err which was very informative and he emphasised the fact that it would be very good to do the exercises regularly before surgery err which I did do and err to help with err recovery afterwards', [PRO-035]

Participants (8/10) reported being open to having lifestyle conversations and reflected that they understood being healthier prior to surgery could positively affect their outcomes from total knee replacement.

Oh, yeah definitely [had been open to conversations about lifestyle]. I mean I know obviously weight doesn't help; weight is a big problem when you're you know obviously with your knees cos that's where you carry a lot of your weight [PRO-035]

One participant felt that lifestyle conversations should be handled sensitively as, sometimes the social element of smoking tobacco and drinking alcohol can be important to an individual's wellbeing.

'Erm, I think I'd be in two minds. Sometimes I think well you know if somebody said don't have any alcohol at all or something you think well actually I quite enjoy a social drink with other people, I don't wanna be more different than I need to be, you know, I think if it can be done without it preaching, you know, not being told don't do this but in a more positive way...' [PRO-030]

In contrast, another participant felt that healthcare practitioners were not direct enough when having lifestyle conversations, as they fear causing offense.

I think people pussy-foot around things too much. If you're looking at somebody that's vastly overweight and they're saying they've got bad feet, the evidence is there, the feet are supporting the vast weight and you know, so why people can't say that I don't know, we're all too timid I reckon [PRO-003].

Sub-theme 2. Lifestyle interventions

All participants reported that they would be happy to be offered lifestyle interventions prior to surgery. The majority (8/10) reported they would have been keen to participate as they felt

interventions that could help them lose weight, or become more active, had the potential to improve their clinical outcomes following surgery.

'Yes, certainly. Certainly, about weight, I thought they would. I mean I'm... I'm fairly heavy I think for my size and I, all my life I've been on a diet you know what I mean? (G: Yeah) ...I'd have been very open to it [lifestyle interventions]'. [PRO-025]

P: 'Oh, definitely, definitely [participation in a lifestyle intervention], I just wanted to get mobile again' [PRO-034].

Whilst all participants would find the offer of lifestyle interventions acceptable and could see potential benefits for others, two participants did not necessarily think it would benefit them.

Ahh, I don't think it would have made any difference because if I had to stop [smoking], I can stop [PRO-001]

I think whatever was offered to me I would have taken them up on it because anything that would have helped me...I would have done but don't know that I would have felt that it would really have helped me to be fair. [PRO-006]

Theme 6. Recovery following total knee replacement

Some participants (4/10) reported significant improvements in their knee pain and mobility at 6-months post-surgery.

'I can bend on both of my knees, I can garden on my knees. I've got a cushion, a pad and I've got a kneeling stool' [PRO-001]

However, for the participants who were unhappy with their outcomes (3/10), their ongoing pain was often intrusive and accompanied by feelings of regret about their decision to have surgery.

'Right, at the moment my situation is very up and down. I can get a good day when I feel OK and I do as much as I can and then I get other days when I can't at all...But in terms of the operation, I should never have had it done' [PRO-003].

'Oh, it's terrible some days (GS: Yeah), absolutely awful...you know, what... I mean to be honest I've been in two minds ever since I've had it done as whether I should have had it bloody done or not! (GS: Oh really), yeah because I mean I'm in so much pain from it sometimes I just think "Oh my God!" don't know whether the pain's any worse now than it was before'. [PRO-025]

4.0 Discussion

Our findings suggest the recruitment and data collection processes in the PRO-Knee feasibility cohort study were acceptable to participants. Most participants were satisfied with the approach and consent processes, however, recall of the study objectives six-months after enrolment was poor. The data collection processes, including the burden of completion and return of study questionnaires were acceptable to participants. This study highlights that most participants would welcome conversations about their lifestyles and the offer of interventions to support them to adopt healthy lifestyles as part of their preparation for surgery. Furthermore, the findings of this study add context to previous research exploring

the importance of shared decision making, and the lived experience of those with osteoarthritis of the knee and those who have poor outcomes from total knee replacement.

All participants reported that the approach and consent processes in the PRO-Knee study were acceptable to them, whilst also finding the objectives of the study difficult to recall. This has been reported in other similar qualitative studies assessing feasibility [15]. In this study, research participants were often motivated to participate for altruistic reasons, rather than the objectives of the study.

A minority of participants found the questionnaires difficult to answer, as they asked them to categorise complex experiences. Research burden and relevance of patient reported outcomes need to be considered as part of research studies as some negative user experience is common [16]. In future iterations of PRO-Knee cohort study, additional support options such as brief explanatory guidance, examples illustrating scale anchors, and the option for assisted completion (e.g., telephone or in-person completion with a researcher) should be considered. These adjustments may help reduce respondent burden, improve inclusivity and improve data quality. The questionnaires used in this feasibility cohort study appear to be acceptable to the majority of participants.

The study identified some important findings regarding the perceptions and experiences of patients waiting for total knee replacement. The study highlighted the experience of living with osteoarthritis of the knee and the negative effect it has on multiple aspects of quality of life. Alongside this, participants were commonly managing other long-term health conditions which effected their mobility and recovery from surgery. This is in keeping with contemporary research findings, that people waiting for total knee replacement often have multiple comorbidities and poor quality of life that worsens with long periods of waiting for treatment [4,17,18]. In this study, patients generally found their experiences of waiting for surgery acceptable. This tends to contrast with previous qualitative research of patients on long waiting lists for elective care due to the COVID-19 pandemic [19].

For participants in this study, the decision to have surgery was influenced by the experience of unsuccessful previous treatments and the opinions of their surgeon. The opinion of the surgeon is very influential for most patients making the decision to have surgery [20]. Clinical guidelines for total knee replacement report that the decision to undergo total knee replacement, should be made with an individual as part of a shared decision-making conversation designed to empower patients to make informed decisions [6]. These conversations aim to make sure that patients are fully educated on the risks and benefits of surgery as well as alternative treatments, including doing nothing [21]. They are essential as it is recognised that surgeons can under-report risks of surgery, make decisions based on patho-anatomical factors, and fail to provide patients with adequate levels of information [20,22]. The findings in this study support previous research that highlights how influential the surgeon opinion is in the surgical decision-making process.

NICE (2020) do not recommend lifestyle interventions as part of standard care for patients waiting for total knee replacement but report that multi-dimensional prehabilitation programmes could improve outcomes and recommend research in this field as a research priority [6]. Participants were very open to having conversations about their lifestyles with healthcare clinicians as they intuitively felt that being healthier prior to surgery could help their recovery. Participants in this study could commonly recall being recommended healthy lifestyle choices whilst they waited for surgery, including weight loss and exercise. No participants were offered any intervention to support them to make healthier lifestyle choices which is in keeping with standard care in the UK NHS [23].

Whilst participants in this study were open to lifestyle conversations, there were a minority of diverse opinions regarding how lifestyle conversations should be handled. One participant expressed the desire for healthcare practitioners to handle lifestyle conversation sensitively. This opinion has been reported in previous research which suggested that patients feel that healthcare practitioners, such as physiotherapists, may not have the skills to conduct sensitive conversations about issues such as weight loss [24]. Conversely, another

participant in this study felt that healthcare clinicians needed to be more direct in their communication around lifestyle issues. A previous study by Holden et al, (2019) identified that healthcare practitioners may be reluctant to have these conversations as they lack confidence or feel it is not within the scope of their practice [25].

Training of healthcare professionals would need to be considered should any future lifestyle interventions be developed. Changing the practice of healthcare practitioners may present a barrier to delivering lifestyle interventions, as they do not feel equipped to have the conversations successfully [26].

This study highlighted the diversity of experiences of those who had both positive and negative outcomes following total knee replacement. For some, total knee replacement was a highly successful operation, however, for those who were dissatisfied with their outcome, there were feelings of despair and regret. The PRO-Knee feasibility cohort study reported dissatisfaction rates of 23% at 6-months post-surgery, which is reflected in the number of participants who were dissatisfied with their outcome in this qualitative study [7]. Data suggests that up to 20% of patients who have a knee replacement are dissatisfied and therefore more needs to be done to improve outcomes [2,3]. Support to enable patients waiting for total knee replacement to make healthier lifestyle choices may improve outcomes from surgery. To evaluate this, a substantive cohort study is required that investigates whether lifestyle factors are associated with poor clinical outcomes from total knee replacement.

The limitations of this study include:

1. All participants were recruited from one elective specialist orthopaedic NHS hospital, situated in a major city, and therefore the experiences and beliefs of participants may vary from those in different areas of the UK.
2. Only one male participant was interviewed in the study, despite 18% of the cohort of the PRO Knee study being male. Despite this, participants across a range of ages,

employment backgrounds, lifestyle profiles (Table 2) and outcomes were recruited to enable exploration of diverse experiences relevant to participation in the PRO-Knee feasibility cohort study, lifestyle and recovery.

3. The views of all participants were sought as part of the recruitment process for the interviews. The dropout rate from the PRO-Knee study was low at 6-months (15%), but the views of non-responders were not captured as part of the interviews.
4. Feasibility has been robustly demonstrated at a single NHS site, suggesting strong foundations for wider delivery, although some variability across additional sites remains possible.

5. Conclusions

These findings suggest that the recruitment and data collection processes of the PRO-Knee feasibility cohort study were acceptable to participants. The study highlighted the burden of living with osteoarthritis for participants, often alongside long-term medical conditions. For many, the decision to have surgery was influenced by the previous ineffective treatments and the opinions of their surgeon. Participants were very open to having conversations about their lifestyles pre-operatively and were positive about the potential of lifestyle interventions to improve outcomes from total knee replacement. The data from this study also highlights the intrusive pain and decision regret experienced by some patients following total knee replacement surgery. Given that feasibility has been established, further research is now warranted in this burdensome area.

Declarations

Ethics approval and consent to participate

A favourable ethical opinion of all study processes, including consent to participate was granted by the North of Scotland Research Ethics Committee on 13th December 2022 (22/NS/0155).

Consent for publication

Not applicable

Availability of data and material

The datasets during and/or analysed during the current study available from the corresponding author on reasonable request

Competing interests

The authors declare that they have no competing interests

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Authors' contributions

GS collected the data via semi structured interviews. GS performed the data analysis, including coding and generation of themes with support from MM. CL was primary supervisor of GS and the whole project. TL provided supervision to GS and the project. All authors reviewed and approved all documents and were major contributors in writing the manuscript. All authors read and approved the final manuscript

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Additional files

Additional file 1. Interview topic guide

This is a topic guide for semi-structured interviews, i.e. an open question framework that allows for a conversational, two-way interview in which the respondent can also contribute main topics to explore in-depth. The following list of topics is a guide to the main issues to discuss to meet the objectives of the study.

1. INTRODUCTIONS

- Brief sketch of the participants context: age, employment status and role, levels of physical activity, hobbies

2. PATIENT JOURNEY PRIOR TO SURGERY

- Can you describe how your knee pain started, how it changed over time and whether you received any treatment?
- What were your experiences of waiting to see the Consultant?
- Once you were listed for surgery, what were your experiences of waiting for your knee replacement?
- Were you given any advice on the best things to do whilst you waited for surgery?
- Did anyone discuss weight, smoking, alcohol consumption or physical activity with you?
- How would you have felt about being given advice regarding your lifestyle whilst you waited for surgery?

3. RECRUITMENT

- What was your impression of the study documents, and did they influence your decision to take part in the study?
- Did you feel you understood what the purpose of the PRO-Knee study was? Could you describe it in your words?
- Did you have sufficient time and opportunity to ask about the study? Were all your questions answered?
- What issues did you consider when opting to join the study?
- Could the research team have done anything differently to support your involvement in the study?

4. FOLLOW UP

- What were your experiences of completing the questionnaires at 3-months and 6-months?
- Could the research team have done anything differently to support you with the follow-up questionnaires.

5. OVERALL

- How would you describe your overall experience of being part of the PRO-Knee study?
- Anything else the participant would like to add that we have not touched on?

Thank you for your time.