Patient perspectives on home-based rehabilitation exercise and general physical activity after total hip arthroplasty: A qualitative study (PHETHAS-2) [version 1; peer review: 1 approved with reservations]

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Abstract

Background: Home-based rehabilitation exercise following Total Hip Arthroplasty (THA) shows similar outcomes compared to supervised outpatient rehabilitation exercise. Little is known about patients' experiences with home-based rehabilitation, and this study aimed to investigate patient-perceived facilitators and barriers to home-based rehabilitation exercise and general physical activity after THA.

Methods: Semi-structured interviews of qualitative design were conducted with 22 patients who had undergone THA and who had performed home-based rehabilitation exercise. The study took place in a regional hospital in Denmark between January 2018 and May 2019. Data was analyzed using an interpretive thematic analysis approach, with theoretical underpinning from the concept 'conduct of everyday life'. The study is embedded within the Pragmatic Home-Based Exercise Therapy after Total Hip Arthroplasty-Silkeborg trial (PHETHAS-1), which aims to quantitatively investigate recovery outcomes after a home-based rehabilitation exercise program.

Results: The main theme, 'wishing to return to the well-known everyday life', and the subtheme 'general physical activity versus rehabilitation exercise' were identified. Generally, participants found...
the home-based rehabilitation exercise boring but were motivated by the goal of returning to their habitual conduct of everyday life and performing their usual general physical activities. Participants enrolled in the PHETHAS-1 study used the enrollment as part of their motivation for doing the exercises. Both pain and the absence of pain were identified as barriers for doing home-based rehabilitation exercise. Pain could cause insecurity about possible medical complications, while the absence of pain could lead to the rehabilitation exercise being perceived as pointless.

Conclusions: The overall goal for the THA patients was to return to their habitual everyday life. This goal served as a facilitator for undertaking home-based rehabilitation exercise. Being able to perform usual activities paradoxically became a barrier for some participants, as they were more motivated to engage in general physical activity than the rehabilitation exercise.

Keywords

total hip arthroplasty, rehabilitation, qualitative research, patient perspective
Introduction

Total hip arthroplasty (THA) is a common surgical intervention in Western countries. It is often performed as fast-track surgery and the number of THAs has been rising.1,2 Fast-track surgery has proven to be effective in terms of reducing costs, length of hospital stay, morbidity, and convalescence.3,4 In Denmark alone, 11,000 THAs are performed every year,5 with patients routinely being discharged from the hospital within two days of surgery.6

Rehabilitation exercise is a customary part of the postoperative program for patients undergoing THA, in the expectation that it will reduce pain and increase mobility.7 This is also the case in Denmark, with each hospital having different procedures. Some hospitals refer patients to supervised rehabilitation exercise in the municipality while others recommend home-based rehabilitation exercise after initial instruction is provided.8

Level 1a-evidence from systematic reviews show that supervised exercise after THA provides no additional benefit compared to home-based rehabilitation exercise after initial instruction, when considering patient-reported function, pain, health-related quality of life, or performance-based functions.9,10 Additionally, home-based rehabilitation is presumably less expensive than supervised rehabilitation, and with rising healthcare costs, one might expect home-based rehabilitation exercise to become even more prevalent in the future.

There are indications that adherence to home-based rehabilitation exercise is low which might affect outcome. Jan et al. found that only half of their included participants performed 50% or more of the prescribed home-based rehabilitation exercise.11 They also found that the high compliance group showed greater improvements in muscle strength and functional ability compared to the low compliance group.11 Yet we know little about patients’ perspectives on home-based rehabilitation exercise and general physical activity after THA.

The PHETHAS studies were founded to support and optimize clinical pathways with patients rehabilitating at home after THA. PHETHAS-1 (ClinicalTrials.gov NCT03109821, April 12, 2017) quantitatively investigates the physical outcomes of performing a home-based rehabilitation exercise program,12 while this study, PHETHAS-2, qualitatively investigates patient-perceived facilitators and barriers to home-based rehabilitation exercise and general physical activity after THA.

Methods

Ethics statement

The study complies with the declaration of Helsinki13 and was approved by The Ethics Committee of Central Denmark Region and the Danish Data Protection Agency (ref. no: 1-16-02-589-15). The interviewer obtained written informed consent from participants prior to the interviews being conducted. Consent included participation in the interview, and consent for the participant’s data being used in analysis, including publication of anonymized quotations.

Theoretical underpinning

The concept ‘conduct of everyday life’ from critical psychology14,15 was chosen as the theoretical underpinning for this study. ‘Conduct of everyday life’ is an overall concept that embraces the complexity of an individual’s everyday life across contexts.14,15 It includes the different aspects of a person’s everyday life, which could be working, performing general physical activities, or home-based rehabilitation exercises. According to theory, the individual person will prioritize activities based on what he/she considers will contribute to their subjective understanding of ‘quality of life’.14,15

Using ‘conduct of everyday life’ as the theoretical underpinning provides the potential to elucidate how patients integrate both general physical activity and home-based rehabilitation exercise into their everyday lives in the rehabilitation period, thereby informing on possible patient perceived barriers and facilitators for performing the rehabilitation exercise.

We defined home-based rehabilitation exercise as a plan of physical activities designed and prescribed to meet specific therapeutic goals. Its purpose is to restore normal musculoskeletal function or to reduce pain caused by diseases or injuries. This definition is synonymous with the Medical Subject Headings (MeSH) term ‘Exercise therapy’ as defined in the PubMed MeSH database.16 Our definition is also in alignment with the World Health Organization’s description of ‘exercises’ as a subcategory of ‘physical activity’.17 In this study we distinguish this type of prescribed rehabilitation exercise from general physical activity undertaken while working, playing, gardening, and engaging in leisure time activities.

Participants and recruitment

Participants were recruited from a Danish Regional Hospital in the period January 2018 to September 2019. In terms of study inclusion and exclusion criterion, adults > 18 years who had undergone a primary THA due to osteoarthritis were
included, but any patients who had been referred for supervised rehabilitation were excluded. The participants also needed to understand written and spoken Danish. The participants were purposely sampled with the aim of reflecting the gender and ages of typical THA patients.

As this study was embedded in the PHETHAS-1 study, participants were recruited from participants enrolled in PHETHAS-1 by the researcher responsible for PHETHAS-1 (MNM) in a face-to-face approach. Participants in PHETHAS-1 may have been more motivated to exercise than the average THA patient and hence may have been more adherent than those who decline participation in clinical exercise trials. With this in mind, and to avoid gathering data from participants of PHETHAS-1 only, we recruited an additional eight participants from standard care. Standard care participants were recruited in a face-to-face approach by physiotherapists responsible for the standard care pathway at the hospital (see Figure 1). A total of 22 participants were included. No participants dropped out. All participants were instructed to perform the exact same home-based rehabilitation exercise. Details of this home-based rehabilitation exercise have previously been published, see Figure 1 for an overview.

Data collection
The interviews took place during the period February 2018 to December 2019. Demographic data in terms of age, gender and working status (retired or not) were collected. The demographics of the participants are illustrated in Table 1.

Individual interviews with the participants were conducted to gain an in-depth knowledge of their experiences with home-based rehabilitation exercise and general physical activity after THA. The interviews were guided by a semi-structured interview guide, which is provided in Extended data. The interview guide was informed by existing knowledge in the field of THA along with the theoretical concept ‘conduct of everyday life’. The first interviews conducted were planned for pilot testing the interview guide, but since no changes were found necessary regarding interview guide and procedure, these interviews were included for analysis.

Data collection and recruitment was guided by a concurrent data analysis. The interviews were conducted 10 weeks postoperatively.

Participants enrolled in PHETHAS-1 were physically tested at the hospital 10 weeks postoperatively and were individually interviewed afterwards in a private meeting room. Participants following standard care were interviewed in their homes (Figure 1). Occasionally a spouse was present when the interview was conducted, but they did not interfere or participate in the interview. Interviews were audio recorded and lasted an average of 43 minutes (20–67 minutes).

The interviews were conducted by AG, JG and CR, who are all female researchers. AG and JG, both research assistants holding a master’s degree, are trained in the qualitative field of research and are trained interviewers. They were supervised in between interviews by CR, who is a researcher holding a PhD, and an experienced qualitative researcher and interviewer.

Data analysis
Data were thematically analyzed. This is a method for identifying and analyzing patterns of meaning across data. The audio recordings were transcribed verbatim by assistants. The transcripts were subsequently read and corrected by AG and JG, while listening back on the recordings. Initially, the interviews were manually coded by AG and JG, with supervision and input from CR. The coding process was carried out both deductively and inductively. The deductive part of the analysis was guided by theory e.g. how the participants integrate home-based rehabilitation exercise and general physical activity as part of their everyday life during the rehabilitation period. This included which activities they prioritized and why, along with factors serving as motivators or barriers respectively. The inductive part of analysis added an openness for other themes of importance in the dataset. After potential themes were identified and discussed with the co-authors, the original data were re-visited to validate the themes using an iterative process. The analytic process was supported by NVivo version 12 software (this can be replicated using Taguette, a free, open source alternative).

Results
The analysis of the data resulted in the identification of the main theme, ‘wishing to return to the well-known everyday life’, which is expanded on below, and includes the subtheme ‘general physical activity versus rehabilitation exercise’.

Wishing to return to the well-known everyday life
All participants wished to be physically active and their overall goal was to return to their habitual everyday life. The following quote came from a male participant who was still working and enjoyed being active through sports.
**Educational class**
An interdisciplinary team of health professionals explain the perioperative pathway i.e.:
- Procedures of anesthesia and surgery
- Rehabilitation
- Postoperative movement restrictions
- Expected postoperative pain and management

**Recruitment for PHETHAS-1**

**Total Hip Arthroplasty (THA) surgery**

**Physiotherapy**
Performed by a physiotherapist during admission
- Mobilization
- Instruction in unloaded exercises and movement restrictions
- Recommendations on physical activity
- Evaluation of need for referral to supervised rehabilitation

**Phone call**
Performed by a nurse one week postoperatively to check up on physical and mental wellbeing.

**Clinical follow-up**
Performed by physiotherapists at the hospital three to four weeks after surgery including:
- Evaluation of need for referral to supervised rehabilitation
- Instructions in strengthening exercises
- Advice to gradually increase their activity level
- Instructions on how to handle pain during exercise and general physical activity
- Advice to comply with the recommendations on physical activity from the Danish Health and Medicines Authority

**Recruitment for PHETHAS-2**

**Baseline measurements**
Performed by a research assistant three to four weeks after surgery*, supplemented by:
- Instructions in use of equipment that measure training and activity
- Instructions on registering pain level and performing home-based rehabilitation exercise and general physical activity in a diary

**Follow-up measurements**
Performed by a research assistant 10 weeks after surgery*

**Interview**
Performed 10 weeks after surgery

* The following outcomes were measured: 40-m fast-paced walk test, Hip disability and Osteoarthritis Outcome Score, 30-s chair stand test, Hip muscle strength, adverse events, evaluation of prescribed exercises, change in hip problems, perceptions of result after surgery

**Figure 1. Flowchart of the study design in Pragmatic Home-Based Exercise Therapy after Total Hip Arthroplasty – Silkeborg (PHETHAS-2).**
The goal was to be able to do sports again. Primarily to be pain free. And then leading a more or less ordinary life again with some sports. Aesthetically it is nice to get outside and experience the world with your eyes and ears, as you do when you go outside. First and foremost, the aim of the operation was to get my quality of life back again and then pain free.

The participants’ goal was to return to their usual everyday life, consisting of activities that contribute to their quality of life. What they perceived as valuable activities were unique to each individual, and they used their own habitual everyday activities as a reference point. Participants found motivation for doing the home-based rehabilitation exercise program in the belief that it would bring them closer to their goal.

When asked whether there were times when it was difficult to get the home-based rehabilitation exercise done, a male participant who worked part time in a shop answered:

P07: No. If something came up, I did it in the evening. I think it is nice you can decide for yourself when you do it, compared to going somewhere to see a physiotherapist.

Analysis showed that for some participants, flexibility on when and where to include the rehabilitation exercise in their everyday life helped in facilitating their performance of rehabilitation exercise. The flexibility made room for other activities that they considered as contributing to their quality of life. In this sense, the home-based rehabilitation exercises had an advantage compared to supervised rehabilitation.

Some participants missed being in contact with a physiotherapist during the rehabilitation period. One participant, who was retired from an office job, described how she phoned the hospital staff to address certain issues she was worried about. She would prefer participating in group training with a physiotherapist to performing home-based rehabilitation.

P12: Because first of all you could have your exercises corrected. Second you could have been told when to use a tighter elastic band. And talk to the others. And this thing in my head being so afraid of crossing my legs, I think that could have been killed [laughing]. And then I might have been able to talk about pain in the groin, because I did have a lot of pain in the groin. Just being told to go see my own [private] physiotherapist with that problem. That would have been nice.

Lack of contact with a physiotherapist during the period of performing the home-based rehabilitation exercise could be identified as a potential barrier for some participants. The quote above reflects the patient’s concerns about missing the possibility to address issues of uncertainty with both a physiotherapist and other THA patients.

Our data showed that most participants experienced a degree of pain that did not affect their performance of the home-based rehabilitation exercise. However, the analysis also revealed that having more intense pain and having no pain affected performance of home-based rehabilitation exercise. A male participant working in academia and who was usually active experienced rather intense pain and described his struggle:

P06: I think the challenge all along has been how much it must hurt. We are instructed to repeat to exhaustion, […] but where is that point when you are in pain?
Other participants felt hardly any pain at all. An active female participant, who was retired from the healthcare sector, explained how having no pain affected her:

*P14: When you get out of bed three hours after the surgery and walk and bike and climb stairs and go all the way down the hall and back again and you notice nothing. Then you say to yourself: nothing is wrong with you. [...] Then you really have to pull yourself together to do the exercises, because you already feel that you can do everything.*

Our data paradoxically showed that both pain and the absence of pain can be seen as barriers in regard to performing the home-based rehabilitation exercise. Pain provided insecurity about how to best perform the exercise, and the absence of pain provided the possibility of simply returning to the patient’s habitual and preferred everyday life, which was more tempting than prioritizing time to do the rehabilitation exercise.

**General physical activity versus rehabilitation exercise**

We identified the subtheme ‘general physical activity versus rehabilitation exercise’ which showed that the participants consistently distinguished between the instructed home-based rehabilitation exercise and the general physical activities they considered part of their habitual everyday life.

This retired female participant was usually very active with hiking and fitness. She explained:

*P001: Well, I would rather do normal activities, long walks or something like that. That’s what I prefer. And I do the exercises to achieve that. I mean, it is quite boring doing those exercises, it depends on what’s on the radio [laughs]. [...] I do them to be able to do the other things.*

For most participants, the rehabilitation exercise was used as a means of regaining their habitual everyday life. Their usual general physical activities contributed to their understanding of quality of life and were considered joyful, while the rehabilitation exercise was perceived as boring and time consuming.

A male participant, who had already restarted work and exercise, explained why he no longer performed the rehabilitation exercise as instructed.

*P008: It is going so well [laughing]. I do them, [the exercises] but not...maybe not every day, and there are days where I have forgotten.*

Analysis revealed a difference between the group of standard care participants and participants also enrolled in PHETHAS-1. Standard care participants often modified the home-based rehabilitation exercises as illustrated in the citation above. To this group, as their level of functioning improved and they were able to perform their usual general physical activities, they perceived the rehabilitation exercises as having lost their purpose.

In contrast, a very active male participant enrolled in PHETHAS-1 explained his motivation for performing the exercises:

*Interviewer: [...] As you have resumed all these usual activities, are you still motivated for doing the exercises with the elastic band?*

*P08: I think so, yes. Absolutely, because it is part of this trial [PHETHAS-1] that I wish to be very loyal to. So I have followed it completely. Otherwise you can’t use it for anything if you don’t know whether one just filled it [the training diary] out as one pleases.*

Analysis showed that for the group of participants enrolled in PHETHAS-1, their enrollment served as a facilitator for performing the rehabilitation exercises exactly as instructed. They referred to an obligation towards the researcher and the study they had signed up for, and they knew that it would supposedly benefit them personally as well.

**Discussion**

Findings from our study show that participants wished to return to their habitual conduct of everyday life after their THA surgery. Similar results have previously been reported in other studies, also concluding that patients have little interest in achieving greater levels of physical activity than they had before the hip restricted their functioning. In our
study, many participants found the home-based rehabilitation exercise boring and preferred performing their usual
general physical activities. They generally performed the home-based rehabilitation exercise, believing it would bring
them closer to their goal of returning to their usual conduct of everyday life and used this as a motivator to get the
exercise done.

Furthermore, we found an important difference between the two groups of participants. Analysis showed that participants
also enrolled in PHETHAS-1 were motivated by an obligation towards the study and the researcher, which supports a
review with similar findings. Other studies also find that contact with a physiotherapist can enhance adherence to
rehabilitation exercises, using the concept of therapeutic alliance as a possible explanation. Therapeutic alliance
focuses on the impact of the relationship between the patient and the professional on adherence to rehabilitation
exercise. This knowledge is crucial when assessing results from clinical training studies.

Standard care participants gradually modified the exercises as they were able to return to their habitual everyday life,
and performed the usual general physical activities they felt contributed to their quality of life. Modifying therapeutic
instructions is well known in other areas, but to our knowledge, this is the first time it is described in THA patients.

Overall the participants favored general physical activities where possible, and it would be useful to investigate whether
general physical activities could be as effective as home-based rehabilitation exercise, and if so, whether future THA
patients could rehabilitate by only doing their preferred physical activities.

A previous study has shown that patients can have a feeling of uncertainty with being left alone to perform the
rehabilitation exercise after discharge from the hospital, for example when dealing with pain. Our study supports this
finding, with some participants also describing a wish to have contact with a physiotherapist who would be able to provide
advice. Furthermore, our study adds the knowledge that the absence of pain can be identified as a barrier for performing
home-based rehabilitation exercise.

Strengths and limitations
While it could be seen as a limitation of the study that we recruited participants from both the PHETHAS-1 study and from
standard care, this particular combination of participants revealed an important difference in motivation towards
adherence to, and performance of, the home-based rehabilitation program and could therefore be viewed as a strength.
Moreover, we note that our findings show no other differences regarding results of the analysis between the two groups of
participants.

We recruited participants from only one hospital, and since the rehabilitation after THA differs between hospitals this
might have affected our results, although we made clear what this particular rehabilitation consisted of.

The participants in our study are considered relatively physically active, which could have influenced the results and it
would have been favorable to have included more sedentary patients as well. Additionally, our participants consisted of
fewer females compared to males which differs from the group of patients undergoing a THA in general, where more
females undergo THA compared to males. This might have affected our results.

There may be additional contributing factors in relation to patients’ perceptions of home-based rehabilitation exercise after
THA. These include age, gender, previous training experience, and culture. Further studies are needed to explore this.

Scientific rigor is enhanced in this study by using theory throughout the scientific process and triangulation in the form
of more investigators collaborating on the analysis, is also considered a strength.

Conclusion
This study showed that THA patients’ goal was returning to their habitual conduct of everyday life as it was before their hip
restricted their functioning, and that this goal generally served as a facilitator for performing the home-based rehabilitation
exercise, because it was perceived as a means to achieve their goal. Most participants found the rehabilitation exercises
boring and would prefer usual general physical activities. Partly motivated by an obligation towards the researcher,
participants enrolled in the PHETHAS-1 trial reportedly performed the home-based rehabilitation program as instructed.
In contrast, the participants following standard care often modified the program, as they became able to perform their usual
general physical activities, which they found more motivating.

Paradoxically both pain and the absence of pain could be identified as barriers to performing the home-based rehabilitation
exercise and some participants experiencing barriers towards the home-based rehabilitation exercise missed having contact
with a physiotherapist in the rehabilitation period.
Data availability

Underlying data

Access to this data is restricted due to ethical reasons. The data cannot be made publicly available as it is not possible to sufficiently de-identify the interview transcripts, which contain information that could compromise research participant privacy and consent. Transcripts can be made available upon reasonable request e.g., for the purpose of reviewing this article. Please contact the corresponding author, Anne Grøndahl Poulsen (anngorna@rm.dk). Please note that transcripts are in Danish.

Extended data


This project contains the following extended data:

- Interviewguide.docx (semi-structured interview guide).

Reporting guidelines

Figshare: COREQ checklist for ‘Patient perspectives on home-based rehabilitation exercise and general physical activity after total hip arthroplasty: A qualitative study (PHETHAS-2)’. https://doi.org/10.6084/m9.figshare.14101877.v2.22

Data are available under the terms of the Creative Commons Attribution 4.0 International license (CC-BY 4.0).

References


This article addresses patients' perspectives on home-based rehabilitation exercises following total hip arthroplasty (THA). The topic is investigated through a qualitative method using semi-structured interviews. Data were analysed using thematic analysis. The study found the theme: 'wishing to return to the well-known everyday life', and the subtheme 'general physical activity versus rehabilitation exercise'. The topic of the paper is interesting and overall the paper is well-written; however, there are a number of issues throughout the paper.

Introduction:
- The Introduction is a well-written section uncovering the knowledge within THA and home-based rehabilitation exercise.

Aim:
- There are some concerns about the aim as it could reflect the title in a better way. The semi-structured interview guide sets the stage for broader and more open interviews with the patients' perspectives on the topic in general, including facilitators and barriers.Rewording is wanted for the aim so that it better reflects the title which has a more open approach. A suggestion could be something like this: 'the study aimed to investigate how patients perceived home-based rehabilitation exercise and general physical activity after THA, including facilitators and barriers'.

Methods:
- The theoretical underpinning with the use of the concept 'conduct of everyday life' fits the topic very well, and the definition of home-based rehabilitation exercise is helpful for the overall understanding of the paper.
- The study investigates home-based rehabilitation exercises, for international readers, it is
crucial to understand what it contains in Denmark and Silkeborg. Therefore, there is a need for a detailed description of home-based rehabilitation exercises.

- Furthermore, was it the same programme for the two included groups? The authors have reference number 10 to describe the home-based rehabilitation exercise, this is a review, which confuses me. Please elaborate on the details of the programmes and whether they were similar for the two groups.

Regarding the patients and recruitment, please elaborate on some of the details:

- Sample size – how was that determined?
- How many were asked to participate in the study?
- Did any refuse to participate?
- Included participants from the PHETHAS-1 study were 14 – how many were included in the PHETHAS-1 study, as this might be the group of patients where the participants in the PHETHAS-2 study were selected?

**Results:**

- Taking into account that the interviews lasted an average of 43 minutes and the open questions in the semi-structured interview guide, it is surprising that only one theme, including one under-theme, was generated. There must be huge data material from all these minutes of interviews. During the analysis process, could it be possible to find more valuable results to give more perspectives on the aim?

- Quote P12: “Because first of all…” – Could another interpretation be more like a desire for a contact to the healthcare system because of uncertainty?

- To build upon what is already known, it could be interesting if there were any quotes about the last question in the interview guide: We are considering investigating whether this exercise program works better than general physical activities, what do you think of this idea?

**Discussion:**

- The Discussion section is very short. Further discussion about the meaning of motivation, intrinsic and extrinsic factors could be valuable for the paper.

- The concept ‘conduct of everyday life’ was chosen as a theoretical framework, it would have been interesting to bring this framework into the discussion. Additionally, topics such as pain and absence of pain and individual expectations alignment could be further discussed.

- To improve the Discussion section, more research and other theories on, for example, the above-mentioned topics could expand on the results and make implications for practice more clear.

- Patients from the two groups were interviewed in different places (at the hospital and in their homes), what impact could that have on the results? In addition, patients being a part of another study, what consequences does that have for the transferability of the study?
Two paragraphs in the Discussion section belong more to the Conclusion or a perspective section: “Overall the participants ...” and “There may be additional ...”.

**Conclusion:**
- The conclusion is supported by the results. However, adding a perspective section would be helpful to clarify how the findings can improve clinical practice.

**Is the work clearly and accurately presented and does it cite the current literature?**
Partly

**Is the study design appropriate and is the work technically sound?**
Yes

**Are sufficient details of methods and analysis provided to allow replication by others?**
No

**If applicable, is the statistical analysis and its interpretation appropriate?**
Not applicable

**Are all the source data underlying the results available to ensure full reproducibility?**
No source data required

**Are the conclusions drawn adequately supported by the results?**
Yes

**Competing Interests:** No competing interests were disclosed.

**Reviewer Expertise:** Orthopaedics, fast-track in hip and knee arthroplasty, qualitative studies

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 27 Jan 2022

**Anne Poulsen**, Central Region, Denmark

Dear Reviewer,

Thank you for the thorough review and highly valuable comments, improving the quality of the manuscript *Patient perspectives on home-based rehabilitation exercise and general physical activity after total hip arthroplasty: A qualitative study (PHETHAS-2).*

Please find listed below the reviewer comments, our responses, and subsequent actions taken to improve the manuscript. We find that working with your comments greatly improved the manuscript and we hope you will find that the revisions address the concerns...
and issues raised in the review.

Sincerely,
Anne Grøndahl Poulsen, on behalf of the authors

No 1.
Reviewer comments:
There are some concerns about the aim as it could reflect the title in a better way. The semi-structured interview guide sets the stage for broader and more open interviews with the patients’ perspectives on the topic in general, including facilitators and barriers. Rewording is wanted for the aim so that it better reflects the title which has a more open approach. A suggestion could be something like this: ‘the study aimed to investigate how patients perceived home-based rehabilitation exercise and general physical activity after THA, including facilitators and barriers’.

Author response:
Thank you for turning our attention towards a better coherence between title and aim. We have taken your suggestion into consideration and reworded the aim. At the same time (for transparency), we want to stay true to the meaning and wording of the original aim as laid out in the trial protocol (see reference under No.2, Action taken). We feel that the current revision of the aim does that.

Action taken:
Rewording of the aim into:
To investigate how patients perceived home-based rehabilitation exercise and general physical activity after THA, focusing on facilitators and barriers.

No 2.
Reviewer comments:
The study investigates home-based rehabilitation exercises, for international readers, it is crucial to understand what it contains in Denmark and Silkeborg. Therefore, there is a need for a detailed description of home-based rehabilitation exercises.

Furthermore, was it the same programme for the two included groups? The authors have reference number 10 to describe the home-based rehabilitation exercise, this is a review, which confuses me. Please elaborate on the details of the programmes and whether they were similar for the two groups.

Author response:
Thank you for making this point and for your sharp observation towards the wrongly noted reference. We have addressed this comment in two ways.

A) Correcting the reference in which a full description of the home-based rehabilitation exercises is included.

B) The article already states that the two groups were instructed in the exact same rehabilitation exercises. As a supplement, we have added a passage that describes the
rehabilitation exercises in brief terms.

Action taken:
A) Correction of reference into:

B) The following passage is added:
This included an instruction before hospital discharge, where the patients were instructed to perform daily unloaded hip exercises for the first three weeks. At the clinical follow up after three weeks, the patients were instructed to perform strengthening exercises every second day, supplemented with daily balance exercise and stretching of the hip flexor muscles. The strengthening exercises were hip abduction, hip flexion and hip extension with elastic band resistance plus sit-to-stand exercise.

No 3.
Reviewer comments:
Regarding the patients and recruitment, please elaborate on some of the details:
Sample size – how was that determined?
How many were asked to participate in the study? Did any refuse to participate?

Author response:
Thank you for these comments regarding the sampling process. The sampling process followed the principles of purposeful sampling and hence the number of participants was not determined ahead of recruitment. We have elaborated the passage describing the recruitment process in more detail and hope it will answer the questions asked.

Action taken:
The following passage in italics is added:
The participants were purposely sampled hence sampling was based on the ongoing analysis including themes that were under continual development and with the aim of reflecting the gender and ages of typical THA patients. All invited patients accepted participation.

No 4.
Reviewer comments:
Included participants from the PHETHAS-1 study were 14 – how many were included in the PHETHAS-1 study, as this might be the group of patients where the participants in the PHETHAS-2 study were selected?

Author response:
Thank you for this comment. The number of participants in the PHETHAS-1 study is 94. This will of course be stated when the PHETHAS-1 study is published. It is unclear to us how this information could be relevant for the qualitative PHETHAS-2 study. Please do not hesitate to comment on this again and elaborate if you find it needed.

Action taken:
No action taken.

No 5.
Reviewer comments:
Taking into account that the interviews lasted an average of 43 minutes and the open questions in the semi-structured interview guide, it is surprising that only one theme, including one under-theme, was generated. There must be huge data material from all these minutes of interviews. During the analysis process, could it be possible to find more valuable results to give more perspectives on the aim?

Author response:
Thank you for this perspective on the relationship between the length of interviews and identified themes. We find the content of the two themes reflects the content of the interviews related to the concept of everyday life, which is a comprehensive concept. In relation to the aim, the identified themes do provide several aspects of the focus on barriers and facilitators towards performing home-based rehabilitation exercises, which might not be stated very clearly. Therefore, we have added a table illustrating facilitators and barriers to home-based rehabilitation exercises.

Also, we have added several elaborations in the results section, underpinning analytical findings regarding facilitators and barriers.

Action taken:
We have added Table 2 illustrating facilitators and barriers towards home-based rehabilitation exercises.

We have elaborated on the results section to more clearly present findings regarding facilitators and barriers towards home-based rehabilitation exercises.

No 6.
Reviewer comments:
Quote P12: “Because first of all...” – Could another interpretation be more like a desire for a contact to the healthcare system because of uncertainty?

Reviewer comments:
Thank you for suggesting an alternate interpretation of this quote. We believe it would be an overinterpretation to suggest that the participant refers to the healthcare system as a whole since this was said in relation specifically to the performance of the home-based rehabilitation exercises. Of course, we cannot rule out that there could be a connection to the healthcare system as well, but our data do not support this.

Action taken:
No action taken.

No 7.
Reviewer comments:
To build upon what is already known, it could be interesting if there were any quotes about the last question in the interview guide: We are considering investigating whether this exercise program works better than general physical activities, what do you think of this idea?

Author response:
Thank you for your careful attention to the interview guide. The specific question was asked as a supplement with the purpose of gaining information regarding a possible future research study. Such a research study is currently being undertaken. Since the replies to the question do not provide answers to the aim of this study, no replies are included in this paper.

Action taken:
No action taken.

No 8.
Reviewer comments:
The Discussion section is very short. Further discussion about the meaning of motivation, intrinsic and extrinsic factors could be valuable for the paper.

Author response:
Thank you for your suggestions regarding the discussion section, also including comments No. 9, 10, and 11. We agree that adding a perspective regarding intrinsic and extrinsic motivation could improve the discussion section, and we have added a passage concerning this.

Action taken:
The discussion section is extended and rewritten to a wide degree, including the perspectives of intrinsic and extrinsic motivation.

No 9.
Reviewer comments:
The concept 'conduct of everyday life' was chosen as a theoretical framework, it would have been interesting to bring this framework into the discussion.

Author response:
Concerning this suggestion, we have elaborated on how returning to the well-known everyday life is used and described in relation to the concept of everyday life.

Action taken:
The discussion section is extended and rewritten to a wide degree, including the concepts of 'conduct of everyday life'.

No 10.
Reviewer comments:
Additionally, topics such as pain and absence of pain and individual expectations alignment could be further discussed.
Author response:
Thank you for this suggestion. We have expanded the discussion regarding pain in the Discussion section.

Action taken:
The existing passage concerning pain has been extended, and now include the following:

Some participants described a wish to have contact with a physiotherapist who would be able to provide guidance and support during the rehabilitation period. Positive impact of being in contact with a therapist during rehabilitation is supported in a review by Davenport et al. In terms of motivation this would serve as an extrinsic motivational factor for performing the home based rehabilitation exercises. Some of the participants in this study wished for contact to a physiotherapist, because they experienced barriers such as doubt of whether the exercises were performed correctly or whether to perform them at all e.g. due to pain. In such a situation the person might be fully motivated for performing the exercises on their own, but choose not to do so due to doubt regarding how to handle pain. According to Davenport et al, this would be accommodated when in contact with a therapist.

Specht et al showed that patients can have a feeling of uncertainty when being left alone to perform the rehabilitation exercise after discharge from the hospital, for example when dealing with pain. Our study adds the knowledge that not only pain, but also absence of pain can be identified as a barrier for performing home-based rehabilitation exercise. Standard care participants in this study gradually modified the exercises as they were able to return to their habitual everyday life, and performed the usual general physical activities they felt contributed to their quality of life instead. Modifying the exercises might also be a way of handling the fact that most participants described the exercises as boring. Modifying therapeutic instructions is well known in other areas, but to our knowledge, this is the first time it is described in THA patients.

No 11.
Reviewer comments:
To improve the Discussion section, more research and other theories on, for example, the above-mentioned topics could expand on the results and make implications for practice more clear.

Author response:
Thank you for the suggestion. We have addressed this by adding a section into the discussion, concerning perspectives on both implications for practice and for future research.

Action taken:
The following section is added to the discussion:

**Perspectives**
Several perspectives grow out of our study both in terms of implications for practice and for further research.

Importantly, most participants appreciate the home-based rehabilitation exercise program
underscoring the flexibility of deciding for themselves when and where to perform the exercises. Based on this, our study support the use of home-based rehabilitation exercise, but attention should be paid towards patients who might need additional support and easy access to a physiotherapist should be provided.

Concerning participants wish to return to their usual everyday lives and this serving as a motivational factor for performing the exercises, it is important that healthcare professionals are in dialogue with the individual patient to identify which activities are preferred in their habitual everyday life, and on that basis decide on relevant goals for the rehabilitation period. Further, physiotherapists working in this area might want to consider how to include general physical exercise into rehabilitation exercise programs, since participants generally favoured this type of exercise over formal exercises. This might also address the finding of home-based rehabilitation exercises perceived as boring and thereby increase motivation and support adherence to the exercise program. Additionally, it would be useful to investigate whether general physical activities could be as effective as home-based rehabilitation exercise, and if so, whether future THA patients could rehabilitate by only doing their preferred physical activities.

There may be additional contributing factors in relation to patients’ perceptions of home-based rehabilitation exercise after THA. These could include age, gender, previous training experience, and culture. Further studies are needed to explore this.

No 12.
Reviewer comments:
Patients from the two groups were interviewed in different places (at the hospital and in their homes), what impact could that have on the results?

Author response:
Thank you for turning our attention to the potential impact of the setting of the interviews. We have added a passage addressing this point in the 'strengths and limitations' section.

Action taken:
The following passage is added to the section of strengths and limitations:
The two groups of participants also differed regarding the location of the interviews. Participants recruited from usual care were interviewed in their homes, while participants recruited from PHETHAS-1 study were interviewed in a hospital setting. This might have affected data e.g. if participants were more comfortable in their homes as well as being in the setting where the home based rehabilitation exercises were performed and therefore would give more open hearted and detailed interviews. Data retrieved from interviews conducted in both types of settings are similar which indicate that this potential limitation is not applicable to this study.

No 13.
Reviewer comments:
In addition, patients being a part of another study, what consequences does that have for the transferability of the study?

Author response:
We have been transparent throughout the paper about recruiting from two groups of participants. Importantly, the only difference was some participants being part of another study. This recruitment strategy had a positive impact, and we have accounted for potential negative impacts. Meanwhile, we have elaborated on these points in the discussion section. We do view results as transferable to similar settings, although one could argue for a higher degree of transferability regarding findings from participants recruited from usual care. Yet, the only difference in our findings was a higher degree of motivation towards adherence over time and performing exercises as instructed, which is accounted for in the discussion section.

Action taken:
We have added the following passage in italics to the strengths and limitations section:

In this study we recruited participants from both the PHETHAS-1 study and from standard care. This combination of participants revealed an important difference in motivation towards adherence to, and performance of, the home-based rehabilitation program. The PHETHAS-1 participants had a higher degree of motivation towards adherence over time and performing exercises as instructed, but our findings showed no other differences between the two groups of participants. In addition to this specific point, one might argue that findings from the PHETHAS-1 participants have a lower degree of transferability to practice compared to the usual care participants.

No 14.
Reviewer comments:
Two paragraphs in the Discussion section belong more to the Conclusion or a perspective section: “Overall the participants ...” and “There may be additional ...”.

Author response:
Thank you for this fine suggestion.

Action taken:
The two paragraphs are moved to the new 'perspectives' section.

No 15.
Reviewer comments:
The conclusion is supported by the results. However, adding a perspective section would be helpful to clarify how the findings can improve clinical practice.

Author response:
Again, thank you for this suggestion which we have met by adding a 'perspectives' section.

Action taken:
A 'perspectives' section is added.

Competing Interests: No competing interests were disclosed.
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