

1 **The journey of recovery after hip-fracture surgery:**
2 **older people’s experiences of recovery through rehabilitation services**
3 **involving physical activity**

4 **Abstract**

5 Purpose: This study sought to explore and describe the experiences of recovery among
6 community-living older people undergoing rehabilitation involving physical activity
7 following hip-fracture surgery. Methods: We conducted in-depth interviews with 5 men and
8 16 women (age range: 67 - 84 years). The data were analysed by means of systematic text
9 condensation. Results: The analysis revealed the following four interrelated themes: 1) *what*
10 *participants bring to the recovery situation matters*; 2) *support through individually tailored*
11 *rehabilitation services, involving physical activity, – is key to recovery following hip fracture*
12 *surgery*; 3) *needing professional help on the journey from helplessness and vulnerability to*
13 *being more confident and active*; and 4) *making progress and regaining function represent*
14 *the essence of recovery*. Conclusions: All four identified themes relate to how physical
15 activity, as an aspect of rehabilitation services, contributes to the recovery process for patients
16 who have experienced a hip fracture. Differences were reported with regard to the services
17 used, and all the participants were at the mercy of what their municipalities chose to offer in
18 terms of rehabilitation services.

19 **Keywords:** hip fractures, older patients, physical activity, recovery, rehabilitation, healthcare
20 services

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1 **Introduction**

2 Hip fractures are serious injuries that can have major negative consequences, both for
3 individuals and for society. Worldwide, the number of hip-fracture incidents is estimated to
4 increase threefold by 2050 [1] rising from the present number of two million incidents per
5 year [2]. The one-year mortality rate following a hip fracture has been reported to be as high
6 as 30% [3]; however, a recent systematic review revealed a reduction in the one-year
7 mortality rate following a hip fracture to 22% worldwide [4]. Due to the decreased mortality
8 rate and the increase in the incidence of hip fractures [4], the number of people living in the
9 recovery phase following a hip fracture is increasing.

10 Today, generally, older patients are discharged from hospital “quicker and sicker” than they
11 were previously [5, 6], which means that most people’s recovery from hip-fracture surgery
12 now takes place in the home [5-7]. When patients are unable to be discharged directly to their
13 homes, they may first be transferred to a rehabilitation unit within a special care facility or to
14 a community care facility, such as a short-term nursing home [8]. The recovery of physical
15 function can continue up to a year following a fracture, or even longer among the oldest age
16 groups [9].

17 The consequences of hip fractures have a hugely negative impact on patients’ quality of life
18 [10], mobility, and ability to perform the activities of daily living (ADLs) [11]. Indeed, less
19 than 50% of patients regain their pre-fracture level of ability to perform the ADLs, especially
20 walking, within three months undergoing hip-fracture surgery [12]. Moreover, half of all
21 formerly independent older adults never live independently after a hip fracture [13], while
22 patients’ limited mobility may persist for one to two years following a hip fracture [11].

23 Based on the findings of a prospective study, Marsault et al. [14] stated that physical activity
24 is crucial in relation to older patients’ recovery from proximal femoral fractures and, further,

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1 that is an influenceable key factor in terms of their successful reintegration into normal life
2 through the recovery of mobility following a hip fracture.

3 Previous research in the field has principally focused on causalities and acute treatment,
4 which has resulted in the diversity of the recovery process from the patients' perspective
5 being less comprehensively described [15, 16]. A recent systematic review and meta-analysis
6 that included nine randomised controlled trials (RCTs) [17] concluded that exercise
7 interventions for people recovering from hip-fracture surgery could have the potential to
8 improve such people's physical function following hip fracture during the sub-acute phase,
9 although the analysis did not reveal what kind of exercise was superior in this regard. Physical
10 activity interventions have also proven to be effective in terms of improving and maintaining
11 the functional capacities of both frail and non-frail older adults [18] as well as reducing the
12 risk of major mobility-related disabilities among frail populations [19].

13 The importance of the interactions among pain, mobility, mental health, and capacity for
14 participation during the recovery process was underlined in a recent integrative review
15 concerning older adults' experiences following a hip fracture [20]. As the provisions of
16 regular post-fracture rehabilitation programmes has been shown to be helpful but not
17 sufficient when it comes to restoring patients' pre-fracture functional level, the introduction of
18 an extended exercise programme has been suggested as a promising strategy for improving
19 their functional capacity [21]. For instance, Kronborg et al. [22] conducted a cross-sectional
20 study in Denmark and found that the physical rehabilitation provided to patients who had
21 suffered hip fractures varied in duration and was poorly planned in terms of its intensity and
22 progression. The authors called for the development and implementation of an optimised
23 rehabilitation programme. A meta-analysis from 2018 [23] found that rehabilitation following
24 hip fracture served to improve both function and mobility when it was team-based and
25 multidisciplinary in nature. Moreover, a recent thematic synthesis supported the relevance of

1 patients' perspectives in relation to improving hip-fracture care in the community [24]. It also
2 identified engaging in physical activity, maintaining a positive outlook, and receiving support
3 to be key to improvement [24].

4 Engaging in physical activity, including therapeutic exercise training, after a hip fracture is
5 recommended in clinical guidelines as part of a multidisciplinary program [25-29]. Although
6 physical activity is recommended, there is much still to be learned regarding the factors that
7 can interfere with the recovery process following a hip fractures as well as why some
8 individuals recover while others do not [30]. Despite evidence indicating exercise to be an
9 effective intervention in relation to the extended physical rehabilitation of patients following
10 hip fractures, some municipalities seem to struggle to incorporate this knowledge into their
11 health services [22]. There seems to be only scarce insight available into the experience of
12 having a fracture and progressing through the various phases of the recovery process, which
13 suggests that more qualitative research into patients' experiences is needed to inform best
14 practice [16, 24]. We believe that qualitative research focusing on individuals' experiences of
15 rehabilitation services could contribute valuable knowledge in this regard.

16 *Purpose*

17 Given that people who have undergone hip-fracture surgery are experts in relation to how the
18 recovery from such surgery is experienced, it is important to ensure that they are given the
19 opportunity to convey the factors that have been important to them in terms of their recovery.
20 In light of this, the present study sought to explore and describe the experiences of recovery
21 among community-living older people receiving rehabilitation services involving physical
22 activity following hip-fracture surgery. More specifically, we were interested in
23 understanding how the available rehabilitation services were experienced with respect to
24 everyday life at home following hip-fracture surgery. Hopefully, the current article can

1 contribute important knowledge for the future improvement of rehabilitation services for this
2 patient population.

3 ***Conceptual framework***

4 The concept of *recovery* can be described as the process of learning to live in a new way
5 following an acute, life-altering event or a chronic illness [31, 32]. In their systematic review,
6 Leamy et al. [32] summarised the key aspects of *recovery* as follows: “The recovery processes
7 that have the most proximal relevance to clinical research and practice are: connectedness,
8 hope and optimism about the future, identity, meaning of life, and empowerment”[32, p. 449].
9 This framework comprises three interlinked, overarching categories—namely, the
10 characteristics of the recovery journey, the recovery processes, and the recovery stages. The
11 *recovery process* can be described as a journey, and it can be further characterised not only as
12 an active, unique and non-linear process but also as a multidimensional process as well as a
13 struggle [32]. Recovery involves elements of personal motivation combined with
14 opportunities—that is, elements that can inhibit or promote this positive development. The
15 recovery process following a hip fracture is understood to be influenced by a number of
16 factors, including the interventions a patient receives after discharge [33], each patient’s pre-
17 fall functional level [14], and nursing-related factors, such as pain management [34].

18 **Methods**

19 ***Research design***

20 This study aimed to capture the participants’ subjective experience, as well as to understand
21 the compound realities of older people’s experiences of physical activity as part of the
22 rehabilitation services available after hip-fracture surgery. Against this background, a
23 qualitative research design informed by a phenomenological-hermeneutic approach was
24 chosen [35]. Our decision to use phenomenology was based on our desire to obtain detailed

1 descriptions of the “life worlds” of patients who had undergone hip-fracture surgery, to move
2 beyond the immediately experienced meanings and “to make the in-visible visible” [36]. The
3 interpretation of meaning was achieved through the hermeneutic circle, a process whereby the
4 separate individual parts may change the originally anticipated meaning of the totality [37].
5 Our understanding of the participants’ lived experiences was further formed by the fusion of
6 both the present and the past, as based on the polarity between familiarity and strangeness
7 [38]. In light of the chosen research approach, this manuscript was prepared in accordance
8 with the Consolidated Criteria for Reporting Qualitative Research [39].

9 ***Inclusion, exclusion and recruitment***

10 In the present study, we used purposive sampling to reach out to the patients who could
11 provide us with relevant information [40]. More specifically, we used maximum variation
12 purposive sampling when recruiting the participants in order to embrace heterogeneity based
13 on age, gender and length of experiences of the situation of living with a hip fracture, in
14 addition to including residents from different municipalities with different cultures. This study
15 was approved by the Norwegian Regional Ethics Committee as well as by Sørlandet
16 Hospital’s research department, which provided us with lists of patients based on the
17 following criteria: aged over 65 years, living at home and having suffered a hip fracture
18 during the last six months that required surgical treatment. A diagnosis of dementia served as
19 the exclusion criterion during the first stage of the participant recruitment process while the
20 hospital acted as the gatekeeper. During the second stage of the recruitment, we made
21 telephone calls to 43 of the 150 included in the lists provided by Sørlandet Hospital. Our aim
22 was to achieve broad information according to gender, age, time since surgery and home
23 municipality. We kindly informed the identified patients about the project and asked whether
24 they had had any experiences of rehabilitation services involving physical activity. If they
25 had, given the aim of the present study, we then asked if they wanted to participate in the

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1 research by being interviewed. During this process, some patients were excluded because they
2 had moved to nursing homes (3 out of 43), did not have the experience we sought (12 out of
3 43) or had dementia/confusion explained by the next of kin who answered the phone call (1
4 out of 43). Two of the numbers we called were no longer in use while four of the 43 patients
5 we contacted declined to take part in the study. Ultimately, a total of 21 patients who satisfied
6 the inclusion criteria and expressed an interest in participating in the research, were recruited.
7 They all provided verbally consent to participate, and the interviews was scheduled.

8 ***Participants***

9 All the participants had experienced a hip fracture, undergone related surgery and returned to
10 live at home by the time of the interviews. The timeline from the surgery to the interviews
11 varied from one to eight months in order to cover the participants' different experiences with
12 respect to time. All the participants had received rehabilitation services involving physical
13 activity provided by the healthcare system. Fourteen participants had been admitted for a
14 short-term rehabilitation stay after their discharge from hospital, although they had all
15 returned to their homes for further rehabilitation by the time of the interviews. The
16 participants lived in ten different municipalities in the southern part of Norway, in both rural
17 and urban areas. Four out of the 21 participants lived with a spouse, while the others lived
18 alone. The participants' ages ranged from 67-84 years (mean: 76,5 years), and five of them
19 were men. More detailed information concerning the characteristics of the participants can be
20 found in table 1. In qualitative research, the term *sample saturation* refers to the point at
21 which to cease collecting data because the themes or categories are saturated, which means
22 that gathering fresh data would not reveal any new insights [41]. In interviews 19 to 21, the
23 participants' stories seemed to yield no substantiating new information relevant to the study,
24 which indicated that saturation—or sufficient “information power”—had been achieved [42].

1 [Insert table 1 here.]

2 *Context and physical rehabilitation services*

3 The present study took place in the southern part of Norway, in both urban and rural areas. In
4 Norway, the regulation of habilitation, rehabilitation, individual plans, and the coordination of
5 care [43] is based on national guidelines, although the actual services provided vary based on
6 availability in the area of rehabilitation. The national aims in this regard are to offer adequate
7 staffing capacity and multidisciplinary competence in primary health care, in addition to
8 planned patient trajectories and committed cooperation between the different levels of care
9 and the different staff involved. The overall goal is to ensure that the available community
10 healthcare services run efficiently and are of sufficient quality. The municipalities are free to
11 organise their services as they choose within the framework of the relevant legislation. In
12 Norway, most patients are transferred to rehabilitation facilities for short- or long-term
13 rehabilitation following hip-fracture surgery [44].

14 The rehabilitation services described in the present study focus on physical activities that are
15 performed during everyday life, and they are services that patients with hip fractures receive
16 in the Norwegian municipalities. The municipalities in which our participants resided differed
17 in terms of their size and organisation and the rehabilitation services were provided in both
18 institutions and the participants homes. Further, the rehabilitation services were either team-
19 or individual-based, and they were provided by either municipally employed personnel or
20 privately employed physical therapists.

21 *Interviews*

22 The interviews were conducted by the first author consecutively as the participants were
23 recruited for the study. Overall, the interview period lasted from February to October 2019.
24 Written and verbal information about the study was provided to all the participants, and their

1 written consent concerning participation and publication was obtained. Data were collected
2 through individual semi-structured interviews with a mean duration of 48 minutes (range: 37–
3 61minutes), which were conducted in the participants' own homes with just the first author
4 and the participant present. A semi-structured interview guide [45] containing the main
5 interview questions was used, and these questions were followed up with additional questions
6 during the interviews. Each interview began with the first author providing the interviewee
7 with information about the study, which was part of a doctoral dissertation, and ended with
8 the first author thanking the participant for their contribution. All the interviews were
9 audiotaped. The semi-structured interview guide was designed to elicit data specific to the
10 aim of the study, as well as to allow participants to address the topics they considered to be
11 essential to them. In response to what the participants said, the interviewer formulated
12 specific questions as the interview progressed, in order to encourage them to answer at length
13 and in vivid detail [46]. Examples of the main interview questions asked are as follows:

- 14 • Would you please describe what happened when you broke your hip?
- 15 • Would you please tell me how you experienced the exercises you performed after
16 having surgery?
- 17 • Would you please describe your experience with the services you received that
18 involved physical activity when you returned home?
- 19 • Can you describe how the exercises contributed to your recovery with respect to your
20 personal motivation and opportunities for managing your everyday life?

21 *Analysis*

22 All the interviews were conducted in Norwegian and transcribed verbatim by the first author.
23 The qualitative research process entails moving to and from description and interpretation,
24 meaning it was natural to follow the systematic text condensation model of data analysis,

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1 which aims to clarify how the participants perceived and experienced their own lifeworlds
2 [47]. After a cursory readthrough, we read the data thoroughly to capture the key concepts and
3 thoughts, focusing on the participants' experiences of the physical activity involved in the
4 rehabilitation services offered to them throughout the recovery process. During this step, we
5 also reduced the data by removing any parts of the interviews not directly related to our
6 purpose [40]. After this step, all the extracted meaning units were coded into a total of 612
7 codes, which all the authors agreed upon.

8 During the next step, the codes fell into four thematic groups which corresponded to different
9 timelines in the recovery; from the fresh experiences from the fracture, via experiences from
10 the varied services received to a deeper description of how these services affected their
11 recovery, and finally were experienced as contributive to the regaining of the participants'
12 pre-fracture functions. After we had read the material several times, we changed the groups
13 into which some of the codes were sorted because we found that they fit better in another
14 group. During the final step in the analysis, all the authors agreed upon the following four
15 themes: 1) what participants bring to the recovery situation matters; 2) support through
16 individually tailored rehabilitation services, involving physical activity, is key to recovery
17 following hip-fracture surgery; 3) needing professional help on the journey from helplessness
18 and vulnerability to being more confident and active; and 4) making progress and regaining
19 function represent the essence of recovery. The relations among the themes and the strands of
20 meaning that traversed those themes formed the basis of the interpretation of the data as a
21 whole. The analysis was mainly performed by the first author and then validated by the co-
22 authors, who followed every step of the analysis and read and commented on the process. In
23 the present study, quotations are used to illustrate the findings as well as to demonstrate the
24 validity of our interpretations. Examples of the analysis process are provided in table 2.

25 [Insert table 2 here.]

1 ***Trustworthiness***

2 To ensure the trustworthiness of the present study, its credibility, confirmability,
3 dependability, and transferability must be reflected upon [48]. In this context, *credibility* is
4 connected to the researchers' integrity, and to achieve it, the authors reflected internally upon
5 their preconceptions of the study material due to their backgrounds as educated
6 physiotherapists and as a nurse, with competence in the field. We tried not to direct the
7 participants' testimonies and to instead be open to their original stories when conducting
8 interviews. All three authors were actively involved in the analysis and interpretation
9 processes, and the categories were thoroughly discussed.

10 *Confirmability* here refers to the extent to which the findings are shaped by the respondents
11 rather than by the researchers' bias, motivation or interest. We realise that our preconceptions
12 regarding physical activity may have influenced our interpretations, although to ensure
13 agreement between the content of the interviews and the identified themes, we have illustrated
14 the themes using quotations labelled with a code that refers to the person who made the
15 relevant statement. Moreover, *dependability* refers to whether the findings are consistent and
16 stable over time [35]. The fact that the same researcher conducted all the interviews helped to
17 ensure consistency between and throughout the empirical data used in the study. The issue of
18 whether the findings can be transferred to other contexts, settings, or groups [48] was
19 addressed by providing a detailed description of the research context and the data by quoting
20 the participants' responses in order to substantiate the findings. According to Lincoln and
21 Guba [48], this approach can provide external validity or *transferability*.

22 ***Ethics***

23 All the participants provided written consent after having received both oral and written
24 information about the study. It was emphasised that participation in the study was entirely

1 voluntary, and both the confidentiality of the data and the anonymity of the participants were
2 assured. The participants were further informed that they could withdraw their consent to
3 participate—either orally or in writing—at any time throughout the study, but none of the
4 participants did so. None of the researchers were involved in the clinical care of the
5 participants.

6 The study was approved by the Norwegian Regional Ethics Committee (2015/1814 REK
7 south-east B) and performed in compliance with the Declaration of Helsinki.

8 **Findings**

9 The findings of this study present the story of our participants' journey of recovery—in terms
10 of both time and function. The circumstances they faced prior to recovery were the “luggage”
11 they brought with them on the journey, while the rehabilitation services provided to them by
12 municipal staff can be seen as their travelling companions. Given the participants'
13 testimonies, both these factors appear to have been significant in relation to how the journey
14 of recovery was experienced. The rehabilitation services involving physical activity that our
15 participants received in their home municipalities seemed to depend externally on how each
16 municipality was organised and staffed, as well as internally on the participants' needs and
17 wants, as determined through dialogue with the service providers.

18 Eventually, our participants reached their destination—that is, the goal of each journey—and
19 regained functionality that mattered so greatly in their lives. The four interrelated main
20 themes, along with selected quotations from the interviews used to illustrate the findings, are
21 presented in the subsequent sections.

22 ***What participants bring to the recovery situation matters***

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1 Personality traits, such as impatience, optimism, stubbornness and the ability to follow
2 through on plans, served as motivational assets for some participants. For instance, an
3 optimistic approach to facing life's challenges, such as a hip fracture, helped to motivate one
4 participant:

5 "This will work out well," I told myself as I was lying in the ambulance on the way to
6 the hospital. Yes, I actually said that. If I only have some time, I will manage to get
7 back on my feet again. I will never give up! (participant 5, man, 65–69).

8 All the participants' narratives indicated a positive attitude toward engaging in physical
9 activity and exercise in different forms and doing so represented continuity for some
10 participants. They were used to being active through participating in exercise groups,
11 walking, or doing housework. This seemed to render rehabilitation services involving
12 physical activity a meaningful choice. One female participant described her previous walking
13 habits as follows:

14 I have been walking quite a lot in the woods. I have been joining in on these walks
15 because I know a couple of guys in the neighbourhood always start at eleven o'clock,
16 so I have joined once or twice a week, depending on my program. (Participant 10,
17 woman, 70–74)

18 Two thirds of the participants had other diseases or injuries that impacted their physical
19 functioning in addition to the hip fracture, which made adjustments necessary. Three women
20 had experienced an arm fracture at some point prior to the hip fracture, which made walking
21 using crutches especially difficult for them. There were also stories about severe
22 complications after the surgery such as the dislocation of the hemi-prosthesis, or a knee that
23 was injured during hip operation leading to the use of a knee orthosis. One man related how
24 he developed pneumonia after the surgery, which meant that he had to stay in hospital for

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1 three weeks. These situations placed an extra load on the participants and seemed to have
2 delayed their recovery process. One woman, who had been living with polyneuropathy for
3 many years and who already had an infection when she fractured her hip, described her
4 situation in relation to the fall as follows:

5 I stagger a bit when I walk, but that's because of the polyneuropathy. Still, I haven't
6 been falling so much, but when I tried to stop the car from rolling . . . and at the same
7 time tried to get hold of the handbrake, I tripped and fell over. I had been to the
8 doctors because of a urinary infection. He gave me pills, which I brought with me to
9 the hospital, and I had to have several treatments (participant 18, woman, 75–79).

10 A number of participants became aware, a while after fracturing their hip, of other injuries
11 that had also been caused by the fall. These injuries included rib fractures, pelvic fractures,
12 back pain and arm injuries, and they all had an impact on the recovery process. The pain and
13 limitations stemming from these injuries seemed to be somewhat hidden during the first part
14 of the recovery process, although they became more of a problem when the rehabilitation
15 became more physically demanding. The hip-fracture surgery and the following subsequent
16 medication seemed to have drowned out these other sensations, as one man commented:

17 I can hardly lift my shoulder, and that is surely from the fall too. I was drugged down
18 by the pills at the hospital, so I didn't feel the pain then, but now it's a totally different
19 story (participant 3, man, 80–84).

20 The participants' overall circumstances prior to and during the early days after their hip
21 fracture seemed to have been significant when it came to how they experienced the
22 rehabilitation services involving physical activity as well as how much effort they managed to
23 put in.

1 ***Support through individually tailored rehabilitation services, involving physical activity, is***
2 ***key to recovery following hip fracture surgery***

3 The journey of recovery started at the hospital. While there, the participants received post-
4 surgical physical therapy sessions in which they were instructed how to get out of bed and
5 how to walk using a pulpit aid and/or crutches. Most participants were also instructed about
6 how to manage stairs. During the early days after their surgery, many of the participants were
7 in bad shape, both physically and psychologically, and some could not complete all the
8 activities they were offered. As one female participant described:

9 Yes, I had physical therapy every day at the hospital. I learned to use the stairs, and
10 she took me to the gym. But I got sick, so I told her, “This isn’t going to work. I think
11 I have to do these exercises later.” Because I was supposed to bend and stretch my leg,
12 I got so dizzy, and I couldn’t do it. But I went walking in the corridors. Bending and
13 stretching hurt too much at the time (participant 20, woman, 75–79).

14 Fourteen participants required a short-term rehabilitation stay after being discharged from the
15 hospital because they could not yet manage at home. The physical activities they completed
16 during these stays were mostly as instructed by a physiotherapist, either in groups or
17 individually. The premises of the rehabilitation centres were well suited for walking and
18 doing individual exercises, both indoors and outdoors. The participants explained that when
19 they were back in their own homes, they were given aids by the municipality to make it easier
20 to manage and stay physically active despite the disability due to their hip fracture. Mostly,
21 they received walking aids, aids to make it easier to rise from the toilet seat, and aids to
22 equalise thresholds. As this participant explained:

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1 Yes, they came home to my home to see if I needed any aids, and I did! I got aids to
2 equalise the thresholds, which made it easier to use the rollator from room to room,
3 and three handles for the bathroom (participant 2, woman, 75-79).

4 The participants were given exercise programmes as “homework,” and they were supposed to
5 work through the programmes by themselves, more or less. Some felt this was a difficult task
6 and preferred to have someone with them to provide support and instruction.

7 The most commonly used team-based service offered to our participants was the reablement
8 service, which was a team-based, functional and intensive rehabilitation service provided over
9 three to four weeks. Nine of our participants made use of the reablement service, which
10 involved almost daily sessions, explicit goals and systematic evaluations. The participants
11 reported being particularly satisfied with this service. The goals of the rehabilitation
12 programmes that comprised the reablement service were generally very functional, as in the
13 case of this woman:

14 Then, they offered me the reablement service. For one month, they came every
15 morning, initially, and then they would evaluate it [the service]. My stairs to the
16 basement are very difficult, but I have my washing machine and freezer downstairs, so
17 I had a lot to do in the basement. The reablement team helped me to manage it at the
18 start by using a belt and supporting me—with one in front of me and one behind—as I
19 walked down the stairs. Eventually, I could bring my laundry down in a backpack and
20 take food from the freezer back up, you see? (participant 8, woman, 65–69).

21 Most services offered by the municipalities were implemented as soon as the previous step in
22 each participant’s rehabilitation had ended, although those who had to contact private
23 physical therapists had to do so by themselves, and they experienced a “break” in their

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1 recovery while they waited for an appointment. One woman, who had never been to a gym
2 before, described it in the following way:

3 I have a good dialogue with the physical therapist, really. She is very clever and
4 follows me all the way. If she says that I should do ten repetitions, she walks around
5 and helps others in the area, but will suddenly tell me, “Now it’s thirteen! Stop after
6 ten. You’re not supposed to do more.” I use the equipment in the gym all the time. I
7 start with the bike for a warm-up ride for 20 minutes, then I do knee-bending and
8 stretching exercises with weights. I also do arm exercises and work on the balance
9 pillow, and now she has introduced me to an exercise for my back (participant 20,
10 woman 75–79).

11 After they had regained the ability to walk independently, whether with or without aids, some
12 participants took part in exercise groups arranged by the municipalities. They experienced the
13 exercise to be harder and more demanding in terms of the energy required:

14 What happens in the group I attend now is very exhausting. We have a male instructor
15 and he runs a tough programme of exercises in 45 minutes. We use different
16 equipment and last time we started to use rubber bands in the exercises. There are nine
17 people in the group, and the exercise we do is helpful for balance, my back, my hip
18 and everything (participant 9, woman, 75-79).

19 There seemed to be great variability with regard to the available rehabilitation services and
20 how they were organised by the participants’ home municipalities. Next, we will describe
21 some of the challenges the participants experienced while taking part in the rehabilitation
22 services.

1 *Needing professional help on the journey from helplessness and vulnerability to being more*
2 *confident and active*

3 During the recovery period the participants' state of mind gradually shifted from them being
4 downhearted and worried about their functional situation and future to them being
5 increasingly confident. Their experiences concerned both their bodily perceptions of using
6 their fractured hip during physical activities and the effect this had on their state of mind.
7 Most participants stated that they depended on the rehabilitation services and having someone
8 to support them throughout the recovery process. They also reflected that being left alone to
9 follow an exercise programme would have made the process more difficult for them to
10 handle. The initial feeling of being downhearted and requiring support is evident in this
11 quotation:

12 I was really downhearted when I came to the rehabilitation unit in the municipality.
13 Well, things improved eventually, but I felt very down at the start. And they were so
14 sweet to me, my goodness, they really were (participant 2, woman, 75-79).

15 The helplessness experienced from the start of the recovery journey made it difficult to put in
16 the required effort as this woman commented:

17 But I will emphasise [that] when you come home to an empty house and you sit down
18 in a chair with two crutches, knowing that you are supposed to manage on your own,
19 is very tough. I really felt that I needed all the power I could find, both physical and
20 psychological, to manage. You feel very helpless (participant 8, woman, 65-69).

21 The perceptions of having a broken leg and the feeling of walking on it were described as
22 strange, and the participants feared that the leg would not be able to carry their weight as it
23 had done before. One participant described it in the following way:

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1 It felt like my leg was made of rubber, and I was afraid to put weight on it. But I was
2 reassured that I could safely stand on it with all my weight, even if it did feel strange
3 (participant 4, woman, 75-79).

4 One participant described how her perception of functional movements changed following the
5 hip fracture as well as how it felt when she needed help and tight follow up from the physical
6 therapist to do things that she could easily manage before:

7 Something odd happened in the rehabilitation home: I was supposed to lie on a bench
8 and move my leg sideways out, but I simply couldn't do it. It was like the "start"
9 button didn't work. The therapist had to help me and lead the movement to get me
10 started. That was a strange feeling and a horrible one, not being able to manage the
11 movement at all (participant 21, woman, 70-74).

12 All the participants paid particular attention to their walking ability and walking quality,
13 although it seemed that those participants who did not have other health challenges impacting
14 their recovery were more eager and impatient to return to their "normal" walking ability. In
15 particular, the problem of limping, which they wanted to avoid at almost any cost, was
16 commented upon. This was not due to concerns about appearance, but for their own benefit.
17 Some participants had been corrected in terms of the limping by their physical therapist;
18 others had not but wished to be helped with the problem. The cause of the limping during
19 walking was partly ascribed to a stinging pain in the groin area when placing weight on the
20 fractured leg. This pain troubled the participants and led to worries about their future walking
21 quality. One woman like this woman described it as follows:

22 Sometimes when I feel the stinging pain in my groin, I wonder:" Oh, have I been
23 exercising too much?"- when I feel the stinging pain in my groin. But they [the
24 therapists] say it is normal to feel like that sometimes (participant 19, woman, 80-84).

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1 The participants' experiences during their recovery reveal that the guidance provided by the
2 professionals involved in the rehabilitation services made sense for the participants when they
3 faced challenges related to their situation.

4 *Making progress and regaining function represent the essence of recovery*

5 All the participants had experienced physical and functional progress as well as an improved
6 state of mind since the acute and sub-acute phases following the hip fracture. Most
7 participants also reported that the pain was almost gone by the time of the interview, which
8 made physical activity easier. Making progress and being able to live like they had before the
9 fracture was the goal of the recovery process, and this enhanced their positive emotions and
10 encouraged their motivation to put in further effort. Their progress in terms of performing the
11 ADLs seemed to be the most recognised:

12 Yes, in fact, I could feel it become easier day by day to get out of bed and to the toilet
13 and things like that, and after a while I could manage on my own—they didn't need to
14 help me. It wasn't painful at all. And now, I can lie on both sides in my bed, and I
15 don't have to lie on my back all the time (participant 7, woman, 75–79).

16 Many of the women felt pride in maintaining a clean and tidy home. As such, regaining
17 sufficient strength and mobility to manage this area of their life was underlined as positive,
18 and they considered it a practical exercise to enhance muscular strength:

19 I try to do the housework, and I can do it. I cleaned the bedroom, washed the floor in
20 there—not like I used to, but . . . I take the mop. Yes, so I have managed. I have
21 changed the bed linen. I thought that I would do it now to get in shape both in the back
22 and in the muscles. I can also hang out the laundry and take it back in (participant 16,
23 woman, 75–79).

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1 Making progress was important in relation to the participants' motivation to put further effort
2 into the recovery process. Even a small amount of progress was important in this regard, as is
3 evident from this man's statement:

4 In fact, I noticed a little progress every day for a long time—a small amount of
5 progress in terms of achievements, which motivated me. I mean, things became
6 easier—for instance, to put on my left sock. That was totally impossible at the start.
7 They gave me an aid for it, but I didn't use that. But now I can just about manage, and
8 there is progress of a millimetre every week to put on the sock. Things like that I have
9 noticed have slowly changed for the better (participant 11, man, 80–84).

10 Many participants stressed the importance of regaining the ability to drive a car. Most of them
11 were dependent on their car because they lived in a rural area with poor public transportation
12 links. Thus, the ability to drive was necessary for getting around to meet others or to go
13 shopping. Those who engaged with the reablement service practiced driving as part of the
14 reablement programme:

15 Well, making progress is a wonderful feeling, and I could have jumped for joy if I
16 didn't have the crutches! And what's most wonderful now is that I can drive the car
17 again. I don't have an automatic car, and I fractured my clutch leg, but the surgeon
18 said it was OK to drive if it didn't hurt. So, someone from the reablement team drove
19 with me the first time (participant 21, woman, 70–74).

20 Most participants had regained the ability to walk, either with or without walking aids, by the
21 time of the interviews. In fact, many had experienced an increase in their walking distance
22 during the period they took part in rehabilitation services.

23 Discussion

The journey of recovery after hip-fracture surgery

1 The present study aimed to explore and describe the experiences of recovery among
2 community-living older people receiving rehabilitation services involving physical activity
3 following hip-fracture surgery. Our findings reflect the conception of recovery as a process of
4 change as well as a process of interaction between the participants' needs and the
5 opportunities offered by rehabilitation services during the different stages of the process.
6 Further, the participants experienced the recovery process as a gradual shift in physical,
7 functional, and psychological status that, ultimately, led to regained functionality.

8 In this section, we will discuss the findings in terms of the characteristics of the participants'
9 needs, the rehabilitation services offered and the degree to which those services seem to have
10 met the needs of the participants. We will also discuss our findings in the light of earlier
11 research and the presented conceptual framework of recovery [31, 32] in the Norwegian
12 healthcare context.

13 *Patients' needs during the recovery process following a hip fracture are multifaceted and* 14 *complex*

15 The participants' experiences—presented in a timeline perspective from the time of the
16 fracture to the time of the interview—included glances back into their history, not only of
17 being active but also of having a condition that made life and functioning harder even prior to
18 the fracture. Marsault et al. [14] found that a high degree of functional independence prior to
19 a fracture positively influences physical activity postoperatively. The influence of the
20 difficulty our participants experienced due to their overall situation was also substantiated by
21 Ziden et al. [15] in their description of hip-fracture patients as frequently being old and having
22 experienced losses and/or increasing disabilities.

23 The description of the journey of recovery as an active and unique process found within the
24 conceptual framework for personal mental health recovery [32] fits well with our participants'

1 testimonies. Engagement and positive thinking regarding physical activity seem to be
2 important individual characteristics when it comes to overcoming hardship and maintaining
3 motivation throughout the recovery. Interestingly, for some participants, the fracture itself
4 was not the worst part of their situation. Although they had all undergone the same kinds of
5 injury and surgery, in line with the recovery framework, each participant's prior life situation
6 made their recovery situation unique, different [32].

7 Pain has been found to significantly limit mobility during the acute phase following a hip
8 fracture [13, 49]. Therefore, pain management is crucial in relation to managing physical
9 activity and exercise and, further, succeeding during the recovery process. It has been found
10 that many patients still experience occasional pain in combination with specific movements,
11 four months after a hip fracture [7]. Pain formed part of the picture for our participants at all
12 points during the recovery journey, and it was an underlying factor in their feeling of being
13 overwhelmed by disability due to their recovery situation. Being in this state requires even
14 greater motivation to engage in physical activity. This notion corresponds with the
15 precontemplation stage of recovery described by Leamy et al. [32], during which patients feel
16 stuck in the situation and have no strength to deal with the changes required or with
17 rehabilitation services involving intrinsic motivation.

18 The stays at different institutions and the transitions during the most difficult parts of
19 participants' rehabilitation were found to complicate their recovery process. Transitions are
20 often experienced as complicated [50], while decisions about the need for further services are
21 often dealt with in conjunction with such transitions, which demands engagement on the part
22 of the patients [51]. Schiller et al. [51] suggested that older people suffering from a hip
23 fracture need a patient advocate to help them ask health professionals the "right" questions.
24 The complexity of our participants' cases might reflect a similar need for help in

1 understanding and directing their recovery processes. Also important was having sufficient
2 time to reach the point where they could actually utilise the available support and take action.
3 The above can be understood in light of the identified conceptual framework [32]. The first of
4 three stages of recovery are precontemplation, contemplation and preparation, and during in
5 each of these stages, individuals are generally unable to take action or implement changes by
6 themselves. During the fourth stage of recovery [32], however, where a personal decision to
7 act is made, it was recognised that our participants required information about how to perform
8 the exercise programmes and deal with the pain. Although physical therapists were reported
9 to be the most common source of such help, the participants actually needed support from
10 those in various professions as well as tight cooperation between them.

11 Returning to their pre-fracture life was an important goal for all the participants, which
12 included returning to their homes and important life roles. For instance, the ability to drive a
13 car was described by several participants as an activity that restored their freedom and
14 independence, which was particularly important for those who lived in rural parts of the
15 country. This finding was supported by Godfrey and Townsend [31], who determined that
16 regaining the ability to drive was an important part of the recovery process and, further, was
17 an ability that made patients feel like they had returned to normality. The need for support in
18 relation to resuming this activity is understandable, and those participants who engaged with a
19 reablement service were guided and supported in terms of practicing driving. The reablement
20 service was spoken of warmly by our participants and was characterised by its intensity,
21 interdisciplinarity and functionality of goals, which seemed to reflect the multifaceted and
22 complex needs described by the participants.

23 *Do rehabilitation services match older patients' needs during the recovery process?*

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1 As demonstrated by our findings, healthcare services play a key role in the recovery process
2 following a hip fracture, and the use of services increases during the first year following a
3 fracture [30]. There appears no doubt that physical activity and exercise can enhance the
4 recovery and independence of older people following a hip fracture [29]. As such, they should
5 form part of the rehabilitation process. Physical therapists are most commonly the
6 professionals who offer guidance through exercise programmes to hip-fracture patients [51],
7 which was also the case for our participants.

8 During stays in rehabilitation homes, follow-up visits by physical therapists represented a
9 significant part of the implementation exercise programmes; however, after the patients had
10 returned home, they were left alone to a greater extent to continue the exercise programme as
11 “homework,” which proved more demanding. Accordingly, strong support from physical
12 therapists after the patients had returned home was important with regard to their ability to
13 continue with the exercises and activities that were essential for their recovery. Having
14 nursing support to help with pain management was also important in relation to helping the
15 patients continue with their exercise programmes in addition to being a key aspect of the
16 rehabilitation service offerings [34].

17 Performing physical activities and exercises requires high levels of motivation, and such
18 activities and exercise typify the action stage of the recovery model [32]. For some
19 participants, who tended to exhibit lower degrees of motivation, the need for support was
20 understandable. The intensity of the exercise programmes in which they were involved was
21 also mentioned by the participants, and they reported variations in the services in terms of
22 both the intensity and the duration. The same was also found by Kronborg et al. [22], who
23 investigated the physical rehabilitation services offered to hip-fracture patients in the Danish
24 municipalities and found them to be initiated shortly after referral for a variable duration of
25 time and with a poorly described exercise intensity and progression. Davenport et al. [52]

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1 found that the total hours spent on physiotherapy and occupational therapy as well as the
2 activities applied therein, differed among rehabilitation facilities.

3 The definition of *rehabilitation* upon which the Norwegian legislation in this field is built
4 uses patients' or users' circumstances and life goals as its basis and, further is characterised as
5 involving coordinated and coherent processes among various professionals and the patients
6 [43]. The interdisciplinarity characterisation of rehabilitation [43] corresponds with our
7 participants' diverse needs, rendering a multidisciplinary or multicomponent approach ideal.
8 Such a multidisciplinary approach is often administered via teams to make cooperation and
9 coordination easier. In the present study, nine participants were involved in team-based
10 rehabilitation services offered by their municipalities.

11 The advantage of this approach is evidenced by the fact that interdisciplinary team-based
12 rehabilitation resulted in improved physical function and mobility in patients with hip
13 fractures when , compared with conventional care [23]. A physiotherapist and a nurse were
14 included in the multidisciplinary teams in all the studies included in this meta-analysis [23],
15 which is similar to the team-based reablement services our participants received and
16 experienced as being effective. This interprofessional team- and home-based service is a
17 relatively new type of service type that has been developed over the last two decades for use
18 among the oldest patients [53]. Physical activity has been integrated into such reablement
19 services, and our participants were especially satisfied with the intensity of the related
20 exercise programmes. Indeed, most participants had daily sessions over a period of three to
21 four weeks. This stands in contrast to what Kronborg et al. [22] found in Denmark, where
22 most rehabilitation interventions involved only one to two sessions per week.

23 Mjøsund et al. [54] stated that only limited research has been conducted to date on the
24 integration of physical activity into reablement services and how such services are targeted
25 toward older people's individual needs. Based on our participants' testimonies, physical

1 activity as part of the reablement services, was organised and followed up differently by the
2 different municipalities. Kronborg et al. [22] called for the national development and
3 implementation of an optimised rehabilitation programme for hip-fracture patients. Our
4 findings also indicate variability in terms of the rehabilitation services offered to patients who
5 have experienced a hip fracture. The participants' needs were complex, and there were
6 differences among municipalities with regard to the kinds and qualities of the services offered
7 to hip-fracture patients, which seems to leave patients at the mercy of the municipality in
8 which they live when it comes to the services available to them.

9 **Strengths and limitations**

10 The findings of the present study are limited by the specific demographics of the participants,
11 their geographical location, the sample size and the context of the study. Accordingly, the
12 results can only be transferred to similar situations and groups. The time-related difference
13 within the group in terms of the period from the surgery to the interview was intentional,
14 although this could be considered a limitation. Given the individual differences in the group
15 of old people as well as the length of the rehabilitation process following hip fracture, we
16 sought information from different stages during the first year of rehabilitation in order to
17 complete the picture. Moreover, contextual information is included to further clarify the
18 potential transferability of the results [55].

19 Pre-fracture, our sample may have been somewhat fitter than average, as the mean age of the
20 sample was 76,5 years which is a little younger than the worldwide average age of people
21 who experience hip fractures, which has been found to be 80 years [56]. A more diverse age
22 group of participants might have added more insights to the findings of the study. Hip
23 fractures occur more frequently in females than in males [57] and this was well reflected in
24 our sample. Further, our findings represent the client's perspectives on a service delivered

1 through professional health workers, in which interaction is essential. Therefore, a description
2 of the health workers perspective as well as observation of the related interaction could have
3 added useful information to the study. Our participants exhibited a positive attitude towards
4 physical activity, which could represent both a strength (in that it provides rich descriptions)
5 and a limitation (in that it is missing critical voices) of the study.

6 The authors' backgrounds, especially the interviewer, who is a physiotherapist by profession,
7 might have contributed to bringing forward positive narratives regarding physical activity in
8 the study, although we tried to remain open-minded and to encourage the participants' honest
9 responses. The positive attitudes in the culture and the society regarding physical activity
10 could also have influenced both the researchers and the participants in such a way as to have
11 hampered the critical meanings. Throughout the research process, we were conscious that our
12 preconceptions and backgrounds might have had an impact on our interpretations of data. As
13 such, we tried to make these interpretations in as open-minded a way as possible as well as to
14 provide a transparent description of the process from data collection through to the analysis of
15 the results. The involvement of multiple researchers with different health-related backgrounds
16 may also have strengthen the design of the present study because they could provide different
17 perspectives and critique each other's statements. The interviewer was immersed in the field
18 and so faced the challenge of balancing closeness and distance as an interviewer [58].

19 However, the involvement of several researchers in a reflexive analytical process should
20 enhance a study's trustworthiness [48]. We still believe that the results of this study can
21 contribute to a better understanding of older people's individual experiences of rehabilitation
22 involving physical activity after hip-fracture surgery.

23 **Conclusion and implications for practice**

24 The themes discussed in this study relate in different ways to how physical activity
25 contributes to the recovery process following a hip fracture. The rehabilitation services

1 offered, when focusing on physical activity, were essential in relation to this process and
2 proved important to the older patients' journey of recovery, allowing them to regain important
3 pre-fracture functionalities. Even so, differences were reported in terms of the rehabilitation
4 services' offerings and organisation, and the patients were at the mercy of what was available
5 in their particular municipality.

6 Explicit and implicit knowledge of older patients and their wider context could provide an
7 important link between life before a hip fracture and life afterwards. The findings of this study
8 could prove useful in relation to the development of rehabilitation services for hip-fracture
9 patients and, further, contribute to the identification of best practices in terms of aiding their
10 rehabilitation, given the complexity of their overall health status as well as the inevitable
11 diversity of the services required to meet their needs.

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15 **Declaration of interest statement**

16 The authors declare that they have no potential competing interests to disclose.

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1 **Table 1. Participants' characteristics**

Participant	Gender	Age- group	Months since surgery	Admitted to rehabilitation stay	Living alone
1	F	80-84	6	Y	Y
2	F	75-79	6	Y	Y
3	M	80-84	3	Y	N
4	F	75-79	4	N	N
5	M	65-69	1	Y	Y
6	M	80-84	8	N	N
7	F	75-79	7	Y	Y
8	F	65-69	6	Y	Y
9	F	75-79	5	Y	Y
10	F	70-74	2	N	Y
11	M	80-84	2,5	Y	Y
12	F	80-84	2	Y	Y
13	M	75-79	5	Y	Y
14	F	80-84	3	N	Y
15	F	70-74	3	N	Y
16	F	75-79	2	Y	Y
17	F	70-74	3	N	Y
18	F	75-79	3	Y	Y
19	F	80-84	2,5	Y	Y
20	F	75-79	3	N	N
21	F	70-74	1	Y	Y

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3 **Table 2. Examples of the analysis process.**

Meaning units	Codes	Condensation	Theme
““This will work out well,’ I told myself as I was lying in the ambulance on the way to the hospital. Yes, I actually said that. If I only have some time, I will manage to get back on my feet again. I will never give up!” (participant 5, man, 65-69).	I told myself, “This will work out well.” I will manage to get back on my feet. I will never give up.	The participant already had an optimistic and determined attitude during the acute phase.	What the participants bring to the recovery situation matters.
“I have been walking quite a lot in the woods. I have been joining in on these walks because I know a couple of guys in the neighbourhood always start at eleven o’clock,	I have been walking quite a lot in the woods. I have joined some neighbours who walk at fixed hours.	The participant had a habit of walking in the woods with others once or twice a week.	

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<p>so I have joined once or twice a week, depending on my programme” (participant 10, woman, 70-74).</p>	<p>I have joined in walks once or twice a week.</p>		
<p>“I stagger a bit when I walk, but that’s because of the polyneuropathy. Still, I haven’t been falling so much, but when I tried to stop the car from rolling . . . and at the same time tried to get hold of the handbrake, I tripped and fell over. . . . I had been to the doctors because of a urinary infection. He gave me pills, which I brought with me to the hospital, and I had to have several treatments” (participant 18, woman, 75-79).</p>	<p>I was staggering because of polyneuropathy.</p> <p>I hadn’t been falling before the car accident.</p> <p>I had been to see the doctor because of a urinary infection before I fell.</p> <p>I had to have several medical treatments.</p>	<p>Having polyneuropathy and a urinary infection when the fall happened added to the injury.</p>	
<p>“I can hardly lift my shoulder, and that is surely from the fall too. I was drugged down by the pills at the hospital, so I didn’t feel the pain then, but now it’s a totally different story” (participant 3, man, 80-84).</p>	<p>There was additional pain in my shoulder from the fall.</p> <p>The pain was managed by medication at the start.</p>	<p>The experiences of pain from other body parts after the fall emerged gradually in the recovery period.</p>	

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