

QUALITATIVE PAPER

Everyday life after a hip fracture: what community-living older adults perceive as most beneficial for their recovery

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Abstract

Objective: to gain insight into what older adults after hip fracture perceive as most beneficial to their recovery to everyday life.

Design: qualitative research approach.

Setting: six skilled nursing facilities.

Participants: 19 older community dwelling older adults (aged 65–94), who had recently received geriatric rehabilitation after hip fracture.

Methods: semi-structured interviews were conducted with 19 older adults after hip fracture. Coding techniques based on constructivist grounded theory were applied.

Results: four categories were derived from the data: ‘restrictions for everyday life’, ‘recovery process’, ‘resources for recovery’ and ‘performing everyday activities’. Physical and psychological restrictions are consequences of hip fracture that older adults have struggled to address during recovery. Three different resources were found to be beneficial for recovery; ‘supporting and coaching’, ‘myself’ and ‘technological support’. These resources influenced the recovery process. Having successful experiences during recovery led to doing everyday activities in the same manner as before; unsuccessful experiences led to ceasing certain activities altogether.

Conclusion: participants highlight their own role (‘myself’) as essential for recovery. Additionally, coaching provides emotional support, which boosts self-confidence in performing everyday activities. Furthermore, technology can encourage older adults to become more active and being engaged in the recovery process. The findings suggest that more attention should be paid to follow-up interventions after discharge from inpatient rehabilitation to support older adults in finding new routines in their everyday activities.

A conceptual model is presented and provides an understanding of the participants’ experiences and perspectives concerning their process of recovery after hip fracture to everyday life.

Keywords

geriatric rehabilitation, everyday activities, resources for recovery, technology, coaching, older people

Key points

- Older adults after hip fracture experience the transition from inpatient rehabilitation to functioning back home as a difficulty.

- Physical and psychological restrictions are the implications which hinder the recovery after a hip fracture.
- Resources ‘coaching and supporting’, ‘myself’ and ‘technological support’ can support recovery of everyday functioning.
- Rehabilitation at home is viewed as a necessary support in optimising everyday functioning.

Background

Worldwide, an increase in the number of hip fractures is expected because of population aging [1–3]. In the Netherlands, after hospitalisation for a hip fracture, approximately 40% of older adults receive short-term geriatric rehabilitation [4]. Many of them live alone, have multiple co-morbidities and do not regain their pre-morbid functional abilities [5–8].

In the Netherlands, mean duration of inpatient rehabilitation is approximately 4 weeks; however, the duration of functional recovery varies from 6 months to 1 year following hip fracture [9].

We know little about how older adults experience the transition from inpatient rehabilitation to their home and what supports their continued recovery to everyday life. Much literature on hip fracture recovery has focused on risk factors that explain functional decline or on intervention strategies for improving mobility [5, 10–13]. Some qualitative studies have concentrated on functional limitations and how the impact of hip fracture varies depending on individual circumstances [14–16]. However, studies are missing related to older adults’ experiences that focus on the transition from inpatient rehabilitation to return to everyday life at home (doing their everyday activities as before). Insight into these perspectives might help to improve the rehabilitation.

This study addresses the following research question: What aspects of the recovery process after hip fracture do community-dwelling older adults perceive as the most beneficial for their return to everyday life?

Methods

A qualitative research approach was needed to provide a rich understanding of participants’ experiences and perspectives concerning their recovery after hip fracture for their return to everyday life. We conducted qualitative interviews with older adults and used coding techniques based on constructivist grounded theory (CGT) as interpreted by Charmaz [17]. This method consists of systematic, flexible guidelines for collecting and analysing qualitative data to construct (rather than discover) theories ‘grounded’ in the data themselves [17].

Study setting and sample

This qualitative study was part of a research on sensor technology and was conducted between April 2016 and

December 2017 in the Netherlands parallel to a randomised controlled trial ‘the SO-HIP trial’ (www.sohipstudie.nl). To understand the underlying intervention mechanisms of the trial and to gain insight in the recovery process, we conducted this qualitative study. The trial aimed to investigate the effects of a transitional care rehabilitation programme to compare coaching and sensor technology to coaching without sensor technology and to usual care. The sensor technology consisted of a wearable sensor worn on the hip, ambient sensors at home and a dashboard.

The rationale of this trial has been described previously [18] (see Appendix 1, in Supplementary data, available in *Age and Ageing online*).

Participants

We sampled participants from the three groups of the trial ($n = 240$) who were discharged to go home and finished the geriatric rehabilitation approximately six to eight months after hip fracture. We used purposive sampling to capture a wide variation of experiences. We therefore included participants: (1) out of the three groups of the SO-HIP trial; (2) who represented a range in age; and (3) who were diverse in gender. Table 1 presents the characteristics of the participants, who included 12 women and 7 men (aged 65–94).

Ethical considerations

The study has been approved by the Medical Ethics Committee of the Academic Medical Centre, University of Amsterdam in the Netherlands (protocol ID AMC 2015_169). Written informed consent was obtained before inclusion.

Data collection

We conducted semi-structured interviews at the participants’ homes for approximately one hour. We used an interview guide containing topics that aimed to reconstruct participants’ experiences with their recovery and their return to everyday life. During interviews, the participants were encouraged to reflect and to clarify details [17]. (see examples of interview questions in Appendix 2, in Supplementary data, available in *Age and Ageing online*). Interviews were recorded and transcribed verbatim.

Analysis

In aiming to identify older adults’ experiences regarding their recovery, we applied open coding techniques derived

Table 1. Characteristics of the interviewed participants

Participant	Group	Gender	Age	Living arrangement	Cognition MMSE	Katz ADL	Fear of Falling	POMA-Tinetti	Mobility aid
A	I	Female	93	S	23	10	5	21	Walker
B	I	Male	65	S	28	4	1	26	None
C	I	Female	72	C	26	1	4	16	Walker
D	I	Female	79	C	25	2	2	26	None
E	I	Female	90	C	22	7	1	19	Walker
F	II	Male	78	C	28	1	3	26	None
G	II	Female	94	C	27	6	1	19	Walker
H	II	Male	79	C	29	0	1	28	None
I	II	Male	89	C	27	5	6	14	None
J	II	Female	85	C	26	4	1	22	Stick
K	III	Female	69	C	28	1	2	27	None
L	III	Male	82	C	21	4	4	24	None
M	III	Female	84	C	27	5	1	18	Walker
N	III	Female	89	C	24	3	4	19	Walker
O	III	Female	76	C	30	5	1	23	Walker
P	III	Female	84	C	27	3	7	18	Walker
R	III	Male	89	C	24	8	7		Walker
S	III	Male	91	S	25	8	6	20	Walker
T	III	Female	66	C	30	1	5	28	None

Note. Group I = care as usual; Group II = care as usual and coaching; Group III = care as usual, coaching and the use of sensor technology, C = living alone in a home in the community; S = living alone in a senior residence, MMSE = Mini Mental State Examination, score median (range of 0 to 30); a higher score indicates better cognitive functioning, Katz ADL = modified Katz ADL 15 score, range 0–15; a higher score indicates more (I)ADL (Instrumental) activities of daily living dependence.

Fear of falling, VAS-score 1–10; a higher score indicates more fear of falling.

POMA = Performance Oriented Mobility Assessment. ≤ 18 indicates high risk of falls; 19–23 moderate risk of falls; ≥ 24 low risk of falls.

(I)ADL = Instrumental and activities of daily living, IADL = Instrumental activities of daily living.

Note that the scores are at 6 months after the start of the rehabilitation.

from CGT [17]. Open coding consisted of two phases: an initial coding phase and a focused selective coding phase that used the most significant or frequent initial codes to sort, synthesise and integrate large amounts of data [17]. For initial coding, a line-by-line analysis of the transcripts was performed, while constantly comparing the data of each interview and between the interviews and comparing the data with existing codes (constant comparison). In the subsequent focused coding activities, we distributed the most useful initial codes into categories related to a core category, linking codes and specifying relationships between categories. These focused codes were more directed, selective and conceptual than the first initial codes. We performed this entire coding process for the three groups. Data were managed and organised using MAXQDA version 12.

Discrepancies during coding activities were resolved through discussion and consensus with the research team. In the last phase of the analysis, a conceptual model was developed, indicating the links between the formed categories.

Results

The conceptual model (Figure 1) provides an understanding of the participants' experiences and perspectives concerning their process of recovery to everyday life at home. Participants described the remaining physical restrictions (being less mobile, dependence on mobility aids) and psychological restrictions (being tired and careful and concerned about falling again) after their hip fracture that had

implications for everyday life (Category 1). The recovery process (Category 2), which started directly after hip fracture, was described by participants as trying and requiring practice, eventually leading to successful and unsuccessful experiences. Additionally, participants mentioned different resources that helped them in the recovery process (Category 3): supporting and coaching, 'myself' and technological support. These resources resulted in performing everyday activities (Category 4) in two distinct ways: engaging in the activities in the same manner as before or differently and [2] ceasing to engage in the activities. These related categories and sub-categories are detailed below.

Category 1-restrictions for everyday life

All participants expressed remaining physical restrictions and psychological reactions after being discharged from inpatient rehabilitation to home. These reactions had implications for their everyday life. The sub-categories are described in the following paragraphs, using quotations that capture the essence of participants' experiences. It is important to note that participants experienced subcategories to various extents.

Being less mobile

Although their physical functioning had improved during rehabilitation, all of the participants expressed that their mobility had become limited. They expressed having difficulties in standing up from a chair, in keeping balance, in

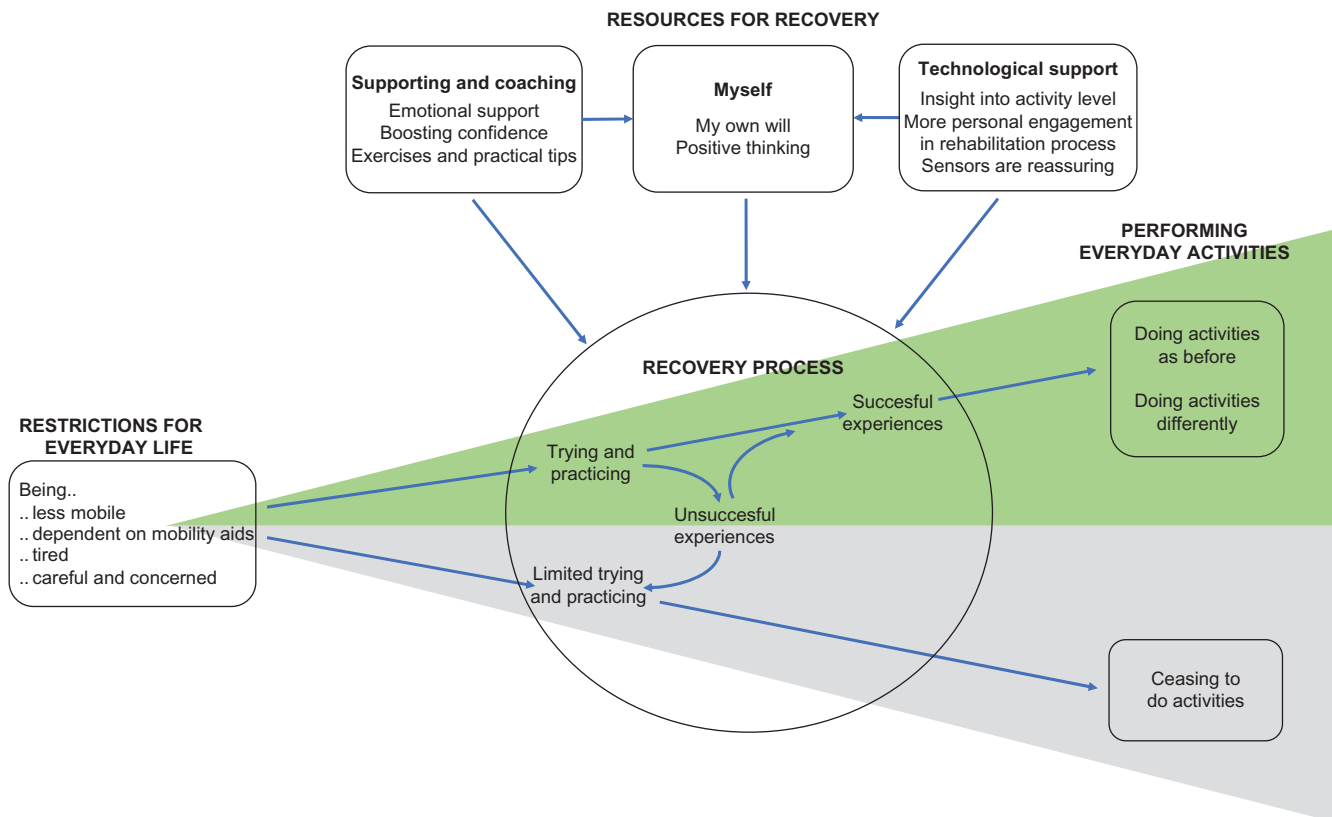


Figure 1 Conceptual model of participants' experiences concerning their recovery to everyday life

walking long distances or in cycling. For example, Mrs. E(I) told the interviewer the following: 'I walk a little bit in the neighborhood, but I don't go any further.'

Being dependent on mobility aids

A majority of the participants had to use mobility aids, which they had not used before the hip fracture. Some participants perceived the need for mobility aids as a lack of improvement and as representing the consequences of aging, thus making them feel old. Although the use of mobility aids provided greater safety when walking, they generally expressed that it also limited them in their mobility and restricted them in doing everyday activities. Mrs. O(III) said, 'Before this, I could walk normally, but now I have to walk with the help of a walker. I'm chained to the walker'.

Being tired

Some of the participants indicated that they were tired much sooner than before and that they had less energy. This tiredness limited and restricted their activities. Others expressed that activities were taking up much more time, and because of their lower energy levels, they had to balance their activities. As expressed by Mr. F(II), 'Activities take up much more time; I did the gardening in a single day, and now I need three or four days because I get tired a lot sooner, and therefore, I divide up the activities'.

Being careful and concerned about falling again

Almost all of the participants expressed concerns about falling again, which influenced their activities. Mrs. D(I) expressed this as follows: 'I'm worried to fall again; I have to have something to hold on to everywhere I walk'. As a result of these worries about falling, a majority of them were very careful and focused on planning their activities.

Category 2-recovery process

Although all of the participants experienced physical and psychological restrictions, they showed different ways of coping with these restrictions. Trying and practicing exercises was the central element in the recovery process according to the participants and in doing so gaining successful and sometimes unsuccessful experiences.

Trying and practicing and successful experiences

According to Mr. I (II), 'Look, what they used to do is ok: 'What you can do yourself, you should do; it was 'trying and practicing'.

Some of the participants mentioned the practical things they had to practice before discharge that worked in comforting most of them. Mrs. D (I) expressed, 'We did some cooking in the kitchen of the ward, and we practiced how you could use the walker at the kitchen sink to determine if we were able to succeed at home. For a moment, you feel you make progress and can do it'.

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Limited trying and practicing and unsuccessful experiences

Some participants expressed disappointment and frustration that they could no longer perform their activities as they used to. Mrs. A (I) stated, 'I hardly walk outside because I'm scared to fall; I feel more isolated because I can't go to the gym or go to the shopping center anymore'.

Category 3-resources for recovery

Participants talked about different ways to adapt or find alternative ways of doing their everyday activities.

Almost all of the participants experienced the transition to their home as very difficult. They were more dependent on the help of others. They felt insecure in doing things by themselves and in seeking their independence again, as expressed by Mr. I (II): 'The change of going home was disappointing at first. All of a sudden, you have to do it all by yourself, and there is no protection around you'. However, participants also talked about different resources that helped them in the recovery process.

'Myself'

A majority of the participants mentioned their own will and a positive attitude as important resources for recovery and in changing their everyday activities.

My own will Mrs. M (III) explained, 'My own will helped me most to do activities again; I think it is my own motivation. Because I can't accept help that is not necessary; what I can do myself I want to do myself'.

Positive thinking Some participants expressed that their way of positive thinking influenced their recovery.

Mr. I (II) said, 'Don't give up. The most helpful thing was my own positive approach and me, who truly wanted to go for it. Keep on going with what you still can do'.

Supporting and coaching

Participants mentioned different forms of support and coaching that they found helpful in their return to everyday life. A majority of the participants appreciated the talks with and the support of other rehabilitants during their inpatient rehabilitation and found these contacts helpful in their recovery.

Half of the interviewed participants (group II and III) received a follow-up rehabilitation at home consisting of a few home visits and some telephone consultations, which influenced the way they performed their everyday activities.

Analysis provided insight into the different mechanisms by which this coaching changed the everyday activities of the participants by influencing the recovery process.

Emotional support Participants experienced the support of the therapist as truly helpful in their recovery to everyday life. Some participants experienced the support of the therapist as emotional support. They could talk about difficult activities, expressed by Mrs. M(III): 'I truly appreciated that

there was a follow-up because you suddenly go from being at the nursing home to being at home all on your own, and so it was very nice that there was somebody I could talk to about what was disappointing or what was going well'.

Boosting confidence Others expressed the support of the therapist as rebuilding or boosting self-confidence, as Mrs. N (II) expressed: 'The aftercare has been important; we discussed what I had done, and I felt more confident in doing difficult activities'. Some participants had experienced the fall at home as traumatic, and it still had a great impact on their everyday life. One participant, Mrs. J (II), expressed the support she felt from the therapist who helped her by going back to the place where she had her fall: 'She observed that I was dreading to go to the bathroom where I had my fall and where I had been lying on the floor for a long time. Therefore, she said to me: 'Shall we go to the bathroom?', and that was very important to me'.

Exercises and practical tips Other participants mentioned the practical tips and the practice of difficult activities at home with the therapist as very helpful. Mrs. J (II) stated, 'She was interested in the activities I wanted to do; she gave me tips and stimulated me to do these things again. It truly helped me. Also, it helps that you can ask questions about things you come upon when you have to do it yourself again'.

Technological support

A third of the respondents (group III) had received the same follow-up rehabilitation with coaching, as mentioned above, with the addition of sensor technology as a coaching tool. These participants experienced this technology as extra support in their recovery and described this support in different ways.

Insight in activity level The feedback of the sensor data helped some participants to become aware of the amount of movement or the activities they had performed. Some participants were extra motivated to move more because of the use of the sensors, as expressed by Mrs. M (III): 'It motivated me to move more, for example, in the evening when I didn't want to go on my home trainer, I thought by myself, I want to do it anyway because it is good to move. And when you had a look at the sensor data, it gave you such a good feeling, I've done so much'.

More personal engagement in the rehabilitation process Some of the participants were more engaged in their rehabilitation because they could see their results on the tablet and could make their own follow-up actions to reach their goals.

Mrs. O (III) said, 'When you looked back on the first month on the tablet and a few months later, I clearly observed the progress I made. I thought to myself, I did a good job. By means of the graphs, I realised that I truly did it all myself'.

Sensors are reassuring Some of the participants stated that having sensors at home made them feel safe because they

experienced a kind of control and therefore were daring to do more. Mrs. T (III) said, 'It made me feel happy because something is keeping an eye on me, and that is reassuring to me. I thought when something is going wrong, they will keep an eye on me'.

Category 4-performing everyday activities

Participants expressed how they were performing their everyday activities at the end of their recovery process. Most of them had found their daily routines in everyday activities; for a few of them, these routines were nearly the same as prior to the hip fracture. Most of the participants made some changes or looked for alternatives to manage their everyday activities.

Doing activities in the same manner as before or differently

Some of the participants were still doing the same activities as before the hip fracture and believed that they have to go on as before.

Mrs. K(III) explained, 'Look, if you want to walk to the shopping centre because you always walked that distance, you have to try and do that again. The first time you can plan your route so that you can stop and rest for a while sitting on a bench, and after a few times, you become better at it, and you can do it in the same way as you did before'. Most of the participants mentioned that they performed their everyday activities as before the hip fracture, but in a different way and in a way to cope with the implications of the hip fracture. Some of them performed their activities in a safer way. For example, according to Mrs. A (I), 'Yes, you find out all kinds of ways to do things safely, for example, watering flowers'.

Some of the participants make use of assistive technologies so that they can do the activities themselves.

Ceasing to do activities

Participants within this category stopped doing some of the social and physical activities that they did before their hip fracture. Mrs. A (I) explained this change as follows: 'I cancelled my travel insurance because I don't want to go on holiday anymore, and I therefore can't go to my children who are living abroad'.

Some participants rationalised this stopping of activities as a natural consequence of aging, as expressed by Mrs. G (II): 'So yes, you become older, and old age comes with restrictions, so I have to accept that I can't do some things anymore'.

Discussion and Implications

This study explored the experiences and perspectives of older adults after a hip fracture regarding aspects of the recovery process they perceive as most beneficial for their return to their everyday life.

Four major categories were identified: 'restrictions for everyday life', 'recovery process', 'resources for recovery' and 'performing everyday activities'. The findings suggest that physical and psychological restrictions are a consequence of hip fractures that older individuals must address during their recovery process and return to everyday life. Results show three types of resources that are beneficial for recovery: 'supporting and coaching', 'myself' and 'technological support'. These three resources influenced the recovery process, in which it is important to have successful experiences while trying out and practicing activities. A successful process can lead to older adults doing everyday activities in the same manner as before or differently. Alternatively, if activities are not tried out and practiced or lead to unsuccessful experiences, older individuals are inclined to cease certain everyday activities altogether.

In accordance with previous research, this study highlights the participants' struggles to cope with the restrictions they experience after their hip fracture [19–21]. Our findings add the difficulties participants experience in the transition from inpatient rehabilitation to home and show how they view support and coaching from therapists and co-rehabilitants. This finding is in line with work by Maganizer [8], who reported that the period of greatest change in the ability to perform activities of daily living after hip fracture is the 4–6 months after discharge. However, most traditional rehabilitation programmes focus on the first period of rehabilitation, and do not have a follow-up at home.

This study shows that resources for recovery, as described by the participants, activate facilitating mechanisms that help them with recovery. Coaching provides emotional support, which boosts self-confidence for practicing everyday activities, after which participants feel more secure in performing everyday activities. 'Myself' highlights the mechanisms of positive thinking or individuals' own motivation that influence their recovery. Technology encourages people to become more active in developing motivation for or engaging more fully in their recovery process.

Trying and practicing are central elements in the recovery process, together with successful and unsuccessful experiences. These results are in line with the Selection, Optimisation and Compensation model (SOC model of successful aging), a model that focuses on the processes individuals engage in to maximise gains and minimise losses in response to everyday demands and functional decline [22]. Selection focuses on the selection of goals or everyday activities that are most important for a person's everyday life [23]. Most participants chose to select activities that they truly want to do or made a choice to cease doing certain activities. Optimisation refers to the skills or strategies used to achieve goals in performing everyday activities, and Compensation focuses on the use of alternative ways to reach a goal [23, 24].

The findings suggest that participants choose ways of adaptation that they are better able to incorporate into their routines of everyday functioning despite their physical or psychological restrictions. This finding fits with the new

concept of health in which health is considered the dynamic ability to adapt and to manage one's own well-being [25] and is in line with the results of earlier research [24].

The findings highlight the added value of a follow-up rehabilitation after discharge to support older individuals in their return to their everyday functioning. In line with Fox [26], this study adds that a personalised approach in rehabilitation that is focused on everyday functioning is important for participants to regain more confidence during the recovery process in doing the activities that are important for them.

Finally, this research provides new insight that the combination of coaching and technology can support older individuals in adapting their activities to retain their functioning in everyday life. Some participants indicated that they are more motivated and engaged in their rehabilitation by using this technology because they can see and follow their own level of activity on a computer tablet. This finding is in line with recent research of a monitoring and feedback tool [27]. In accordance with previous research, privacy is not seen as an issue in the use of sensor technology [28–30].

The study highlights the added value for a follow-up rehabilitation at home to support participants in finding new routines in performing their everyday activities. Interventions must focus on the new perspectives on health as 'the ability to adapt and to self-manage [25] so that participants are more able to cope with their restrictions. Additionally, the combination of coaching and technology can be used to empower older adults to self-manage and adapt their activities for their return to everyday life.

Strengths and limitations

As with all aspects of qualitative research, the generalisation of the results to other contexts might be limited because of the small sample of 19 participants. A strength of the study is that we had interviews with 19 participants who were diverse in gender, age, physical and cognitive functioning and living conditions, which represents the Dutch general population of older adults who undergo rehabilitation after a hip fracture. Although we sampled this wide diversity of participants, we interviewed participants who had the ability to reflect on and articulate their experience. Therefore, it is possible that we did not interview participants with more severe (cognitive) limitations that might have influenced their experiences and perspectives concerning their recovery.

Because we purposive sampled from the SO-HIP trial, we interviewed participants who have had different rehabilitation interventions. This was, in one way, a strength of the study because we had a greater diversity of experiences in our sample. A limitation is that the experiences of the participants were influenced by the specific interventions they had received and therefore cannot be generalised. However, the study has generated interesting insight into the older adults' perspective of the recovery process from inpatient rehabilitation to home and might help to improve the

rehabilitation of community-living older adults who undergo geriatric rehabilitation after hip fracture.

Conclusion

We identified older adults' experiences and perspectives regarding the recovery process after hip fracture and the aspects they perceived as most beneficial for their return to everyday life. Participants highlight their own role as essential for recovery. Additionally, coaching provides emotional support, which boosts self-confidence in performing everyday activities. Furthermore, technology can encourage older adults to become more active and being engaged in the recovery process. As such, interventions that make use of both coaching and technology support the participants' own roles in their recovery, thereby empowering them. The way people adapted led to two ways of performing everyday activities at the end of recovery: ceasing to do activities and doing activities in the same manner as before or in a different manner. These findings can facilitate the development of interventions adapted to the needs of older adults after hip fracture that guide their transition from inpatient rehabilitation to recovery to everyday life at home.

Supplementary data mentioned in the text are available to subscribers in *Age and Ageing* online.

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References

1. Latham NK, Harris BA, Bean JF *et al.* Effect of a home-based exercise program on functional recovery following rehabilitation after hip fracture: a randomized clinical trial. *JAMA* 2014; 311: 700–8.
2. Hall MJ, DeFrances CJ, Williams SN, Golosinskiy A, Schwartzman A National Hospital Discharge Survey: 2007 Summary. US Department of Health and Human Services, Centers for Disease Control and Prevention. *Natl Health Stat Report* 2010; 29: 1–20.
3. Dhanwal DK, Dennison EM, Harvey NC, Cooper C. Epidemiology of hip fracture: worldwide geographic variation. *Indian J Orthop* 2011; 45: 15–22.
4. Landelijk netwerk acute zorg LTR Factsheet 2012 Acute ziekenhuisopnames voor heupfracturen. 2013. http://www.lnaz.nl/cms/LTR_2012_Factsheet-heupfracturen_140611.pdf

5. Crotty M, Unroe K, Cameron ID, Miller M, Ramirez G, Couzner L. Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people. *Cochrane Database Syst Rev* 2010; 1: CD007624.
6. Scheffer AC, Schuurmans MJ, van Dijk N, van der Hooft T, de Rooij SE. Fear of falling: measurement strategy, prevalence, risk factors and consequences among older persons. *Age Ageing* 2008; 37: 19–24.
7. Auais M, Morin S, Nadeau L, Finch L, Mayo N. Changes in frailty-related characteristics of the hip fracture population and their implications for healthcare services: evidence from Quebec, Canada. *Osteoporosis Int* 2013; 24: 2713–24.
8. Magaziner J, Hawkes W, Hebel JR *et al.* Recovery from hip fracture in eight areas of function. *J Gerontol A Biol Sci Med Sci* 2000; 55: M498–507.
9. Beaupre LA, Binder EF, Cameron ID *et al.* Maximising functional recovery following hip fracture in frail seniors. *Best Pract Res Clin Rheumatol* 2013; 27: 771–88.
10. Handoll HH, Sherrington C, Mak J. Interventions for improving mobility after hip fracture surgery in adults. *Cochrane Database Syst Rev* 2011. doi: 10.1002/14651858.CD001704.pub4
11. Latham NK, Harris BA, Bean JF *et al.* Effect of a home-based exercise program on functional recovery following rehabilitation after hip fracture: a randomized clinical trial. *JAMA* 2014; 311: 700–8.
12. Tseng M, Shyu YL, Liang J. Functional recovery of older hip-fracture patients after interdisciplinary intervention follows three distinct trajectories. *Gerontologist* 2012; 52: 833–42.
13. Magaziner J, Chiles N, Orwig D. Recovery after hip fracture: interventions and their timing to address deficits and desired outcomes—evidence from the Baltimore hip studies. *Nestle Nutr Inst Workshop Ser* 2015; 83: 71–81.
14. Zidén L, Scherman MH, Wenestam C. The break remains—elderly people's experiences of a hip fracture 1 year after discharge. *Disabil Rehabil* 2010; 32: 103–13.
15. McMillan L, Booth J, Currie K, Howe T. A grounded theory of taking control after fall-induced hip fracture. *Disabil Rehabil* 2012; 34: 2234–41.
16. Griffiths F, Mason V, Boardman F *et al.* Evaluating recovery following hip fracture: a qualitative interview study of what is important to patients. *BMJ Open* 2015; 5: e005406. 2014-005406.
17. Charmaz K. *Constructing Grounded Theory: A Practical Guide Through Qualitative Research*. London: Sage Publications Ltd, 2006.
18. Pol MC, ter Riet G, van Hartingsveldt M, Kröse B, de Rooij SE, Buurman BM. Effectiveness of sensor monitoring in an occupational therapy rehabilitation program for older individuals after hip fracture, the SO-HIP trial: study protocol of a three-arm stepped wedge cluster randomized trial. *BMC Health Serv Res* 2017; 17: 3.
19. Griffiths F, Mason V, Boardman F *et al.* Evaluating recovery following hip fracture: a qualitative interview study of what is important to patients. *BMJ Open* 2015; 5: e005406. 2014-005406.
20. Zidén L, Wenestam C, Hansson-Scherman M. A life-breaking event: early experiences of the consequences of a hip fracture for elderly people. *Clin Rehabil* 2008; 22: 801–11.
21. Zidén L, Scherman MH, Wenestam C. The break remains—elderly people's experiences of a hip fracture 1 year after discharge. *Disabil Rehabil* 2010; 32: 103–13.
22. Baltes MM, Carstensen LL. The process of successful ageing. *Ageing Soc* 1996; 16: 397–422.
23. Lang FR, Rieckmann N, Baltes MM. Adapting to aging losses: Do resources facilitate strategies of selection, compensation, and optimization in everyday functioning? *J Gerontol B Psychol Sci Soc Sci* 2002; 57: P501–9.
24. Carpentieri J, Elliott J, Brett CE, Deary IJ. Adapting to aging: older people talk about their use of selection, optimization, and compensation to maximize well-being in the context of physical decline. *J Gerontol B Psychol Sci Soc Sci* 2017; 72: 351–61.
25. Huber M, Knottnerus JA, Green L *et al.* How should we define health? *BMJ* 2011; 343: d4163.
26. Fox R. Recovery from hip fracture: A longitudinal qualitative study of patients' experiences. 2017. MPhil, University of the West of England. Available at <http://eprints.uwe.ac.uk/29968>
27. van der Weegen S, Verwey R, Spreeuwenberg M, Tange H, van der Weijden T, de Witte L. It's liFe! Mobile and web-based monitoring and feedback tool embedded in primary care increases physical activity: a cluster randomized controlled trial. *J Med Internet Res* 2015; 17: e184.
28. Pol M, van Nes F, van Hartingsveldt M, Buurman B, de Rooij S, Kroese B. Older people's perspectives regarding the use of sensor monitoring in their home. *Gerontologist* 2014; 56: 485–493.
29. Peek ST, Wouters EJ, van Hoof J, Luijkx KG, Boeije HR, Vrijhoef HJ. Factors influencing acceptance of technology for aging in place: a systematic review. *Int J Med Inform* 2014; 83: 235–48.
30. Peek ST, Luijkx KG, Rijnaard MD *et al.* Older adults' reasons for using technology while aging in place. *Gerontology* 2016; 62: 226–37.

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