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## Evaluating recovery following hip fracture: a qualitative study of what is important to patients

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4 **Evaluating recovery following hip fracture: a qualitative study of what is important to**  
5 **patients**  
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## Abstract

### Objective

To explore what patients consider important when evaluating their recovery from hip fracture and to consider how these priorities could be used in the evaluation of the quality of hip fracture services.

### Design

Semi-structured interviews exploring the experience of recovery from hip fracture at two time points - four weeks and four months post-operative hip fixation. Two approaches to analysis: thematic analysis of data specifically related to recovery from hip fracture; extraction of data into template to capture the participant's experience overall.

### Participants

31 participants recruited, of whom 20 were female and 12 were cognitively impaired. Mean age 81.5 years. Interviews provided by 19 patients, 14 carers, and 8 patient/carer dyad; 10 participants were interviewed twice.

### Setting

Single major trauma centre in the West Midlands of the UK.

### Results

Stable mobility for valued activities was considered most important by participants who had some pre-fracture mobility and were able to articulate what they valued during recovery.

Mobility was important for managing personal care, for day-to-day activities such as shopping and gardening, and maintenance of mental well-being. Some participants used assistive mobility devices or adapted to their limitations. Others maintained their previous limited function through increased care provision. Many participants were unable to articulate what they valued as hip fracture was perceived as part of their decline with age. The fracture and problems from other health conditions were an inseparable part of one health experience.

### Conclusions

Patients consistently valued stable mobility and its role in other basic health domains. While no one patient-reported outcome measure (PROM) could consistently evaluate recovery for all patients with hip fracture, general health-related quality of life tools may provide useful information for the majority of patients. These may need to be supplemented by specific tools for selected groups, especially those patients with high-levels of pre-injury function.

**Key words:** Hip fractures, Outcome assessment (Health Care), Interview, Frail older adults

## Article summary

### *Article focus*

- The UK NHS has identified the need to evaluate service provision for patients with a hip fracture
- There is increasing expectation that patient-reported outcome measures (PROM) are used within health service evaluation
- We asked the question: what do patients who have recently experienced a hip fracture consider important when evaluating their recovery?

### *Key messages*

- Patients active before their fracture value stable mobility to undertake valued activities but many patients consider fracture to be part of their decline with age.
- While no one PROM could evaluate all aspects of recovery for patients with hip fracture, general health-related quality of life tools may provide useful information for the majority of patients.

### *Strengths and limitations*

- The study sample was representative of the age profile, gender balance and dementia levels of NHS patients experiencing hip fractures
- It is possible that those not agreeing to be interviewed were struggling most with recovery.
- The data is limited by the difficulty the more physically and cognitively impaired patients had in giving a detailed account of their health experience.

## Introduction

Fragility fracture of the proximal femur (hip fracture) is one of the greatest challenges facing the healthcare community. In 1990, a global incidence of 1.31 million was reported and was associated with 740,000 deaths (1). Hip fractures constitute a heavy socioeconomic burden worldwide. The cost of this clinical problem is estimated at 1.75 million disability adjusted life years lost; 1.4% of the total healthcare burden in established market economies (1).

Among those experiencing fragility hip fracture in England, Wales and Northern Ireland, 70% are aged 80 years or older, 73% are female and 34% are cognitively impaired pre-operation. The mortality rate within 30 days of operation was 8.2% in 2013 (2)

The NHS has identified the need to evaluate the quality of service provision for patients with a hip fracture; this evaluation is conducted through the National Hip Fracture Audit Database (NHFD)(2). Currently, aspects of care such as time to surgery, length of patient stay and patient mortality in hospital and 30 day and 120 day follow up are recorded in the NHFD. These data are now used to guide payments to healthcare providers; the payment being increased if the provider supplies 'best practice' care (3). However, while important, there is interest from policy makers in the potential to enhance these currently reported data fields by including and an assessment of outcome as reported by patients. It is increasingly expected that healthcare evaluations should include domains of health that are important to patients (4), captured by well-developed patient-reported outcome measures (PROMs) which aim to assess how patients function and feel in relation to a health condition or associated treatment (5). PROMS capture information that cannot be obtained by other means (5, 6) complementing more traditional performance or process-based measures.

Our aim was to establish whether or not one PROM could be used with all patients who experience a fragility hip fracture as part of the evaluation of the quality of health care for hip fracture delivered by the NHS. For this patient group we were unable to identify a PROM specific to the assessment of hip fracture, and robust evidence of the quality and acceptability of non-hip fracture specific PROMs following completion by patients sustaining a hip fracture is limited (7). Moreover, clarity with regards to the outcomes of healthcare that these patients considers relevant and important does not exist. Appropriate and relevant PROM-based assessment should be underpinned by an understanding of what is important to patients in terms of the outcomes of healthcare. We therefore designed an interview study to explore

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3 with patients and, where appropriate, their carers, what they consider to be important  
4 outcomes and to explore variation across this patient group. Our research questions were:

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6 1. What do patients who have recently experienced a hip fracture consider important when  
7 evaluating their recovery?  
8  
9 2. Is there variation within this population about what is considered important?  
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11 These research questions are framed by the desire of policy makers to evaluate the quality of  
12 care for hip fracture through assessment of recovery from the perspective of the patient.  
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## 15 16 **Method**

### 17 18 *Study Design*

19 We conducted semi-structured interviews with patients and, where appropriate, their carers at  
20 two time points, at approximately four weeks and then again at four months after they had  
21 sustained a fragility hip fracture.  
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### 24 25 *Identification of patients with a hip fracture*

26 We recruited participants from an existing cohort study, the Warwick Hip Trauma Evaluation  
27 (8), that commenced January 2012. This is a cohort of all patients admitted with a hip fracture  
28 to a single major trauma centre in the West Midlands of the United Kingdom. As part of their  
29 pre-operative assessment, patients were assessed for their capacity to consent using clinical  
30 assessment and the Abbreviated Mental Test Score (AMTS) (9). The AMTS is a 10-item  
31 measure used to rapidly assess the possibility of cognitive impairment in elderly people. A  
32 score below 8 suggests cognitive impairment (10). Scores less than 8 were taken to indicate  
33 that a patient was unlikely to be able to consent for themselves. Those deemed to have  
34 capacity for consenting to surgery, based on clinical assessment and AMTS, were considered  
35 able to consent for this study. Following the emergency surgery for their fracture, those with  
36 capacity gave written consent to be approached for interview. For those deemed not to have  
37 capacity due to cognitive impairment, verbal consent was obtained from their consultee (11).  
38 Ethical approval was granted by NHS REC London - Camberwell and St Giles (11/LO/0927)  
39 on the 18<sup>th</sup> August 2011.  
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### 53 54 *Sampling*

55 During the data collection period for this study, February to August 2012, we purposefully  
56 sampled cohort participants who had reached 4 weeks or 4 months following their hip  
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3 fracture and had consented to be approached for interview. The time points were chosen to be  
4 the same as those used for data collection for the NHFD (12). If a PROM were to be used  
5 with this patient population to assess quality of care, patients would be asked to complete the  
6 PROM at these time points. Our sampling strategy ensured a diverse mix of patients with  
7  
8 PROM at these time points. Our sampling strategy ensured a diverse mix of patients with  
9  
10 respect to the following factors: age, gender, AMTS (9) and EQ-5D score (13).

### 11 12 13 *Interview recruitment and consent process*

14 We contacted eligible patients and carers just prior to 4 weeks and/or 4 months following hip  
15 fracture to arrange an interview. If patients declined to participate, the reasons offered were  
16 recorded. Patients with capacity to consent were contacted directly. For those patients  
17 deemed not to have capacity, we contacted their consultee. Patients able to consent for  
18 themselves signed their own consent forms. For those unable to consent the consultee signed  
19 an agreement form and we aimed to interview a carer as well as the patient (patient/carer  
20 dyad). Carers who were interviewed signed a consent form. The study flow diagram is at  
21 Figure 1.  
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### 29 30 *Interview process*

31 We interviewed participants at their current residence (own home, residential or nursing  
32 home) or in hospital. The interviewer was trained in interviewing but did not have clinical  
33 knowledge of hip fracture, its treatment or prognosis. Where possible, patients and carers  
34 were interviewed alone, however where the carer and patient requested a joint interview  
35 (whether or not the patient had cognitive impairment), they were interviewed together. The  
36 aim of the interviews was to understand each participant's lived experience of hip fracture  
37 (14) and the influence of their social context and pre-fracture health. The interviewer  
38 encouraged participants to talk about the experience in whatever order they chose and using  
39 terms meaningful to them. Later in the interview we prompted, where necessary, for  
40 clarification about what in the patient experience was related to the hip fracture. Towards the  
41 end of the interview we directly asked what was important to them in terms of recovery if this  
42 had not already been talked about by the participant. Consideration was given to the potential  
43 challenges associated with interviewing older adults, for example by giving potential  
44 participants sufficient time to decide whether or not to participate and minimising burden and  
45 fatigue through streamlining questions (15). The interview process, questions and prompts  
46 were refined by the study team during the initial stage of data collection. Interviews were  
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3 audio recorded and transcribed verbatim. For one interview, audio recording was not feasible  
4 due to the noisy environment so extensive field notes were taken and transcribed.  
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### 7 8 *Analysis*

9 Interview transcripts were checked, anonymised and uploaded into Nvivo software (16).  
10 Initial analysis involved data immersion, reading and re-reading each transcript, discussion of  
11 the interview transcripts by the research team. All team members read at least five transcripts.  
12 The key issues crystallised from this process (17). We found that the interviews at four weeks  
13 and four months covered very similar issues, although at four months reporting of fracture  
14 specific recovery was more advanced. For analysis, we therefore treated all the interviews  
15 related to one participant as one set of data. During data interpretation we took account of  
16 whether the interview data was from a patient or carer or patient/carer dyad. Two different  
17 approaches to analysis were then undertaken in response to our research questions.  
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26 To answer our first research question, we searched the transcripts for any mention of what  
27 was important during recovery from hip fracture and coded this text. As coding proceeded,  
28 we reviewed these codes and combined them into themes. After coding ten transcripts no  
29 additional themes were identified in the data. Double coding was undertaken for one in four  
30 transcripts and coding compared and discussed.  
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36 To answer our second research question, from close reading of the interview transcripts, we  
37 developed and refined a template for summarising the key issues of relevance to recovery  
38 from the hip fracture. The template included: current and recent past living arrangements and  
39 environment, day-to-day life now and in the recent past, the impact of the hip fracture and its  
40 management, what was changing in day-to-day life as they recovered, the extent to which the  
41 patient referred specifically to the fracture and their ability to engage in the interview. The  
42 data from each patient or patient/carer dyad was summarised with a second research team  
43 member reviewing each summary against the data. The summaries were then compared.  
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### 50 51 **Results**

52 Twenty one patients were interviewed on one occasion and 10 were interviewed twice giving  
53 a total of 31 patient participants and 41 interviews. Of the 31 patient participants, 20 (64.5%)  
54 were female, the mean age was 81.5 years (SD 9.2, range 61-96) and 12 scored less than  
55 eight on the AMTS. Of the 41 interviews, 24 were conducted three to nine weeks, and 17  
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3 were conducted 14 to 23 weeks after the hip fracture. Nineteen interviews were with the  
4 patient only, 14 with carer only, and eight with patient/carer dyads. Despite framing the  
5 interview for interviewees as exploring the experience of hip fracture, many interviewees  
6 talked about general health issues. Although we prompted to clarify what was related to their  
7 fracture, in many interviews it was difficult to disentangle the impact of the fracture from the  
8 impact of other health problems. Some interviews contained almost no data that was clearly  
9 related to the fracture. From the perspective of the patient, all their health problems were part  
10 of one experience. The absence of data clearly related to the fracture was more marked in the  
11 four month compared to two month interviews. We therefore decided not to attempt  
12 interviews at 12 months post fracture as originally planned (8). The following sections report  
13 our analysis. Illustrative quotations from data are labelled with the age and gender of the  
14 patient, time since hip fracture and whether the quotation was from the patient or carer.  
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#### 24 What is important to patients when evaluating their recovery

25 From our systematic search of the interviews for data related to recovery from the hip  
26 fracture we identified the following themes: mobility, valued day-to-day activities, self-care,  
27 pain, mental wellbeing, fear of falling and leg shortening. When talking about mobility, day-  
28 to-day activities or self-care participants also talked about their level of independence.  
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#### 34 *Mobility*

35 This was the most prominent theme, although when talking about mobility the interviewees  
36 often mentioned other themes. Mobile participants reported limited mobility in the weeks  
37 post operation and valued any improvement.  
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43 I'm walking with a walking stick at the moment. I've been down the park and back...I  
44 can usually get around [the house] without the walking stick, and I can get up and  
45 down stairs no problem. I get upstairs with my good leg and downstairs with my bad  
46 leg. (Participant 6, male, age 78, 5 weeks post operation)  
47

48 By four months, for many participants mobility had improved, and they were happy that they  
49 were returning to normal mobility.  
50  
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52 I can't rush round like I did, but eventually that will come...I mean it's pretty normal  
53 now, but I think it's going to be a while before I can actually walk as I did and I  
54 probably won't walk as I did... when I came home [from hospital] I was still  
55 hobbling... but now I'm more or less...walking normal, especially with the stick  
56 (Participant 10, female, age 83, 18 weeks post operation)  
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3 For those with limited mobility before hip fracture any unaided improvement was limited to  
4 the pre-fracture level but also valued.  
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6 The operation was successful and got him back to normal right from the start, right  
7 from the very first day that he had it done. He was able to then walk pain free with a  
8 Zimmer frame to the toilet. The staff were all saying it was amazing how well he was  
9 walking and he would soon be back to normal, but what they didn't realise was that  
10 he was walking normally. (Carer of participant 1, male, age 84, 16 weeks post  
11 operation)  
12

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14 Other participants were using mobility aids that they had not been using regularly before the  
15 fracture. For some, the addition of mobility aids enabled greater security of mobility than  
16 prior to their fracture.  
17

18 Her mobility's getting better. I think she'll cope with the frame. She's had a couple of  
19 falls in the home, earlier when she was forgetting that she had to use the frame. She'd  
20 get out of bed and not use the frame and consequently fall. But she's got in the habit  
21 of using it now... she's not falling, which is a bonus. (Carer of participant 13, female,  
22 age 87, 14 weeks post operation)  
23  
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#### 25 26 *Valued day-to-day activities*

27 Those who were active prior to their fracture talked about the frustration of the restriction in  
28 their activities particularly in the weeks following the fracture.  
29

30  
31 I'm back on what I call domestic duties – washing up! But the thing that is frustrating  
32 is that I can't get outside and do any gardening. (Participant 12, male, age 78, 6 weeks  
33 post operation)  
34

35 I just miss getting up and getting out. I never stayed in. I'd go out in the morning and  
36 come back and then I'd go out again, I just used to go out looking round the shops. I  
37 just get these crossword books and I do those. (Participant 20, female, age 92, 5  
38 weeks post operation)  
39

40 Participants who were active before their fracture were usually able to resume valued  
41 activities but had some limitations which remained a frustration.  
42

43  
44 I can do little (gardening) jobs but because I haven't got as much movement in the  
45 hip joints, I find it difficult to go down on my hands and knees... If I go down on one  
46 knee it's difficult to get up again so that's not possible but I can do things that are  
47 higher up, I can trim. (Participant 15, female, age 61, 15 weeks post operation)  
48  
49

50  
51 I'm tackling a little bit of cooking now. I started to cook myself some nice lunches  
52 and I haven't got round to the... scones ... I made one lot when I came home and I  
53 thought, I can't be bothered anymore. (Participant 10, female, age 83, 18 weeks post  
54 operation)  
55

56 Some participants returned to valued activities through adapting how they did them, this  
57 participant using a wheelchair for the first time.  
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4 Over the last three weeks, when we go out shopping now, I can't go down the aisles,  
5 so [daughter] gets me a (wheel)chair and I can sit in the chair and then say what  
6 shopping I need, that is very good. (Participant 9, female, age 92, 18 weeks post  
7 operation)  
8  
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10 Participants who no longer undertook valued activities that involved significant mobility  
11 were content to continue as they were, for example, occupying themselves with visits from  
12 family and reading.  
13  
14

#### 15 *Personal care*

16  
17 Washing, dressing and getting to the toilet was talked about in interviews, but in many cases  
18 it was not clear whether difficulties with personal care were specifically due to the fracture. A  
19 few interviewees talked about problems with incontinence but again it was unclear whether  
20 this was specific to the fracture. Most patients had a commode or had arranged to sleep near  
21 the bathroom in the weeks immediately after the fracture. Some participants were able to  
22 describe problems with self-care specific to the hip fracture.  
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30 I'm ...not able to put a sock or anything on my injured leg. I can manage now with  
31 my trouser leg and throw these jogging trousers and hook my leg into them but I have  
32 to ask my husband if I need to put a sock or a shoe, or my slipper on that foot.  
33 (Participant 15, female, age 61, 6 weeks post operation)  
34

35 At the second interview this participant was pleased to report that she now needed very little  
36 help with self-care, at least in part through wearing alternative footwear.  
37

38  
39 I still have to throw my clothes and hook them onto the foot to get dressed. I couldn't  
40 wear lace-up shoes or anything like that because I couldn't tie them up, but things like  
41 slip-ons and sandals I can get on quite easily, so I'm fairly independent – I am  
42 independent really, I just need help with cutting my toenails and that – those on the  
43 right foot that's all. (Participant 15, female, age 61, 15 weeks post operation)  
44

#### 45 *Pain*

46  
47 Although pain was talked about by some interviewees it was not considered a major problem.  
48

49 So here I am, four or five weeks [post operation], I get a little bit of pain, not a lot.  
50 (Participant 7, female, age 70, 5 weeks post operation)  
51

52  
53 The pain was so bad before I had it done, and I just couldn't believe the relief after the  
54 operation when I was walking in the hospital and I had one of those pushers you  
55 know. And there was no pain. And I kept thinking, I can't believe this, and that's how  
56 it's been. I've never had any pain, not at all.  
57 (Participant 10, female, age 83, 18 weeks post operation)  
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3 There's several times, like when I have got to get up those steps. I put my right foot  
4 first and bring my left foot up, and once or twice... you step on your left, and it's still  
5 there, lets you know it's still tender. (Participant 12, male, age 78, 16 weeks post  
6 operation)  
7

### 8 9 *Mental wellbeing*

10 Low mood or depression associated with the reduced mobility due to the fracture was  
11 reported by a few interviewees, emphasising the great value placed by interviewees on being  
12 independently mobile.  
13  
14

15 He can't walk and that, to him he'd rather die. I'll be honest with you he's said it once  
16 or twice, "Let me go". And I said, "No you're not going no-where". And then the  
17 other day for the first time, but he hasn't said it since, "I'm going to commit suicide",  
18 I said, "No you're not, you're not". (Carer of participant 31, male, age 84, 5 week post  
19 operation)  
20  
21

22 For me it was a massive problem and caused me depression. To me is the most  
23 important thing, the mental aspect of taking away somebody's freedom to be able to  
24 move around and go to the shops and do all that sort of thing.  
25 (Participant 7, female, age 70, 23 weeks post operation)  
26  
27

### 28 29 *Fear of falling*

30 The experience of the fracture left a few participants with a fear of falling and sustaining a  
31 further fracture.  
32

33 I think it frightened him more than anything else. He's frightened he'll fall over again  
34 and do it again, that bothers him more than anything else. Because now when he  
35 stands up at all to try and walk he's frightened he's going to fall over and the same  
36 thing will happen all over again. (Carer of participant 11, male, age 84, 7 weeks post  
37 operation)  
38  
39

40 I've got to watch what I'm doing. If I catch my foot on [paving stone], I can go over  
41 again. (Participant 12, male, age 78, 16 weeks post operation)  
42

43 The fear of falling was sometimes expressed by a family member. When talking about his  
44 frustration at not being able to work in the garden, participant 6 added  
45

46 All the rain has made it very slippery, and [wife] says, "No way do you go out there."  
47 (Participant 12, male, age 78, 6 weeks post operation)  
48  
49

50 This emphasises the value given to stable mobility by interviewees.  
51

### 52 53 *Leg shortening*

54 This is a problem that is common following extra-capsular fracture of the proximal femur.

55 One interviewee described her concerns about this.  
56

57 One leg is now shorter than the other so that makes walking a bit difficult because it  
58 gives me back pain. (Participant 15, female, age 61, 15 weeks post operation)  
59  
60

### Variation in how patients talk about recovery from a hip fracture

Our sample included patients from across a spectrum that extended from those who were physically and mentally active prior to their fracture through to those who, pre-fracture, had been immobile due to conditions such as multiple sclerosis, chronic obstructive airways disease and arthritis, and those with severe cognitive impairment. In Box 1 we present condensed versions of the interview summaries for participants chosen to represent the whole spectrum of patients. We indicate whether the data was provided by patient, carer or both.

### *Recovery as a return to pre-fracture state or as part of aging and decline*

Every patient interviewed had experienced a hip fracture and surgery, so in physical terms all of them had, for a period of time, been somewhat impaired compared to their pre-fracture state. Four weeks post-operation, those who were active pre-fracture talked in terms of regaining a recovered state that was similar to their pre-fracture state although with some minor adaptations (participants 15 and 20 in box 1). Whilst these participants expressed worry about how well they might function in the future, there was, nevertheless, determination to progress to as full a recovery as possible. Four months post-operation many of these participants had all but regained their pre-fracture level of activity. Among participants with severely limited mobility pre-fracture, some were able to identify specific activities which were more difficult post-fracture than pre-fracture, such as putting on socks and getting in and out of bed. Some were also able to identify specific improvements in mobility post operation (see participants 9 and 15 in box 1). These participants described a process of recovery although it was very limited.

In contrast, for other participants, the fracture was just one part of a process of aging and decline. For example, participant 11 (see box 1) had been very limited in his activities before the fracture. Post fracture he needed adaptations to his home and increased care support post fracture to enable him to continue to manage at home. The mobility of participant 18 had declined and she had started using a wheelchair instead of her mobility scooter to get out of the house. However, it was unclear whether the decline was due to the concurrent heart failure or the fracture. Those who were the most physically or cognitively impaired pre-fracture did not talk about regaining a recovered state but about a state of no change. They continued with their limited activities as before (for example: participants 23 and 26 in box 1). For one participant, the only change was her move to a new nursing home (participant 5 in



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2  
3 box 1). Participants with cognitive impairment were often unaware of having experienced a  
4 fracture (Participant 1 box 1).  
5  
6

### 7 8 *Recovery through adaptation*

9  
10 In the face of their physical limitations, most participants made adaptations that mitigated the  
11 effect of the fracture; for example employing a cleaner, moving to a nursing home or using a  
12 walking aid or other assistive device. For those who were active pre-fracture, adaptation was  
13 mostly considered temporary, although at 4 months there was some evidence that active  
14 patients had adapted to some limitations such as being unable to kneel for gardening or  
15 limiting time spent shopping to avoid exhaustion. For some participants who had been  
16 experiencing decline in their mobility pre-fracture, the fracture precipitated adaptations that  
17 they had not previously considered but made their life easier. These included using a  
18 wheelchair for shopping, having a new ramp built for getting in and out of the house in a  
19 wheelchair, using a walking aid or employing professional carers to assist with personal care.  
20 For some, their own or their carer's fear of further falls limited their mobility or at least  
21 limited how far they tested their ability to walk. Poor weather conditions exacerbated this  
22 fear, but adaptations to the environment such as walking aids or handrails lessened the fear.  
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### 32 **Discussion**

33  
34 Following hip fracture, for those who had some pre-fracture mobility and able to articulate  
35 what they value during recovery, stable mobility, that is, mobility without the experience of  
36 or fear of falling, and mobility that that allows people to undertake valued activities are most  
37 valued. The ability to walk is important but so too are other leg movements needed for  
38 activities such as gardening or using transport. For some participants, maintaining mobility,  
39 however limited, was achieved by using assistive devices or working out new ways of doing  
40 an activity. Some participants adapted to their limitations, for example wearing different  
41 footwear or adjusting their expectations of what they could achieve. Others maintained their  
42 previous limited function through increased care provision.  
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51 Patients also consistently valued certain basic domains of health, such as pain (or lack of it),  
52 day-to-day activities, personal care and mental well-being. However, many participants in  
53 this study were unable to articulate what was important to them in terms of recovery from hip  
54 fracture. The hip fracture was just one part of their decline with age and its impact could not  
55 be disentangled from the impact of other health issues.. The level of recovery perceived by a  
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3 participant was influenced by their pre-fracture state and their ability to make adaptations  
4 during recovery.  
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### 7 8 *Strengths and weaknesses of the study*

9  
10 When the mortality rate post operation is taken into account, including the higher mortality  
11 amongst older females, the study sample was broadly representative of the age profile and  
12 gender balance of the population of England, Wales and Northern Ireland experiencing hip  
13 fractures (2). We used a higher cut off for assessment of cognitive impairment (score of 8 on  
14 AMTS) compared to the NHFD (score of 6 on AMTS). This is likely to explain our higher  
15 proportion of participants with cognitive impairment compared to the average in the NHFD.  
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20  
21 More research time was spent on recruitment than any other aspect of the study as it proved  
22 difficult. When contacted about the interview study, potential participants talked about other  
23 priorities or concerns that prevented them agreeing to interview, or they simply did not wish  
24 to be interviewed. It is possible that those not interviewed were struggling most with  
25 recovery. Our data is also limited by the difficulty some frail older adults have in giving a  
26 detailed account of their health experience (18). Interview data is jointly constructed by  
27 interviewer and interviewee (19) and our interviewer had no clinical knowledge of hip  
28 fractures. This reduced the likelihood of the interviewer influencing the data. A clinician  
29 undertaking the interviews would have the knowledge to help the patient tease out whether  
30 health problems were fracture related or not. However, this would have obscured the  
31 important finding, that participants often experienced their fracture as part of, rather than  
32 separate to, their other existing health problems. For those with cognitive impairment, some  
33 carers were unable to give a detailed account of recovery due to limited day-to-day contact  
34 with the participant.  
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### 45 46 *Comparison with other studies*

47  
48 There are similarities between our findings and other qualitative studies of similar  
49 populations. A Swedish team that explored engagement with rehabilitation post hip fracture  
50 found a similar spectrum of participants (20). They classified their participants as: those who  
51 were frail and in need of support but did not request it; those who were dependent and took  
52 no active part in rehabilitation and those who were self-sufficient. Another Swedish study,  
53 undertaken with people 12 months after their hip fracture found that mobility and a return to  
54 normal activities were key outcomes for patients (21). An Australian study of mobility post-  
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3 fracture found that reduced level of mobility was associated with fear of falling, physical  
4 limitations from other illness and social/environmental factors (22). Our results also echo  
5 findings from across the research literature on the experience of health and illness. For  
6 example, the difficulty disentangling the impact of one health condition from other co-  
7 morbidities has been found for mental health conditions (23). The acceptance of an acute  
8 health problem as being part of the aging process has been found for conditions such as  
9 stroke (24). Recalibration to altered circumstances in response to a sudden injury has also  
10 been described (25), as have the adaptations- both physical and psychological- that people  
11 make in order to maintain their quality of life (26). Reduced expectations of health and  
12 acceptance of limited function have been described among elderly women (27). Fear of  
13 falling is common among older people generally (28). The consistency between our findings  
14 and other studies suggests that we now have sufficient qualitative evidence to inform policy  
15 decisions about the choice of appropriate PROMS for assessing recovery from hip fracture.  
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#### 25 26 *Implications for clinicians and policymakers*

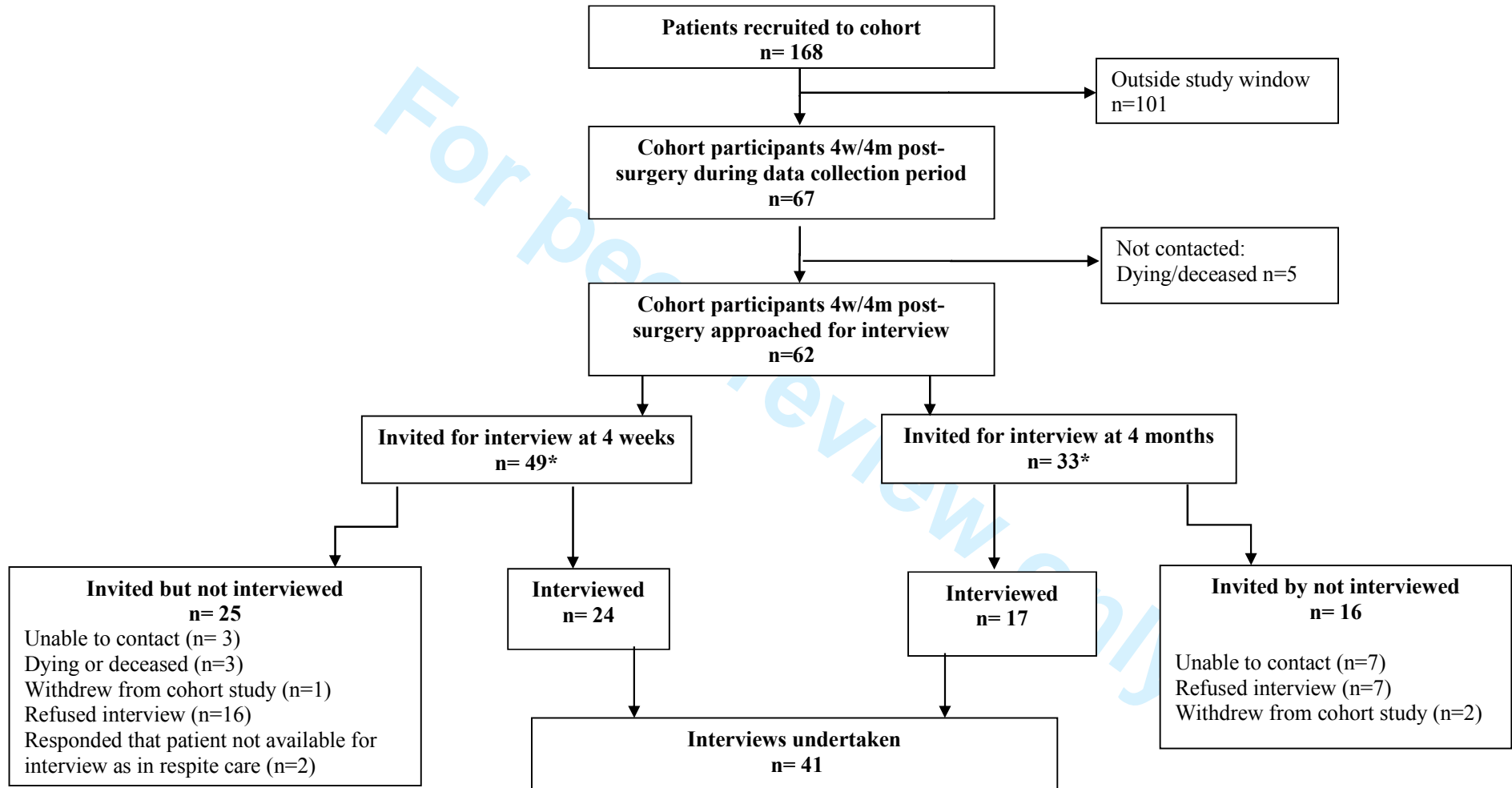
27  
28 This study was undertaken in response to a potential policy change involving the use of a  
29 PROM to assess patient recovery from hip fracture, the results of which would form part of  
30 the evaluation of the quality of care provided for hip fracture. For the population  
31 experiencing fragility hip fractures, it is unlikely that a single PROM specific to hip fracture  
32 could be developed which is relevant to the whole spectrum of patients. Several of the themes  
33 described by our more active interviewees - mobility, day-to-day activities, self-care, pain  
34 and mental wellbeing, are similar to the domains included in currently available generic  
35 measures including the EuroQoL EQ-5D (13), the Short Form 36-item Health Survey (SF-36)  
36 (29) and the WHOQoL-BREF (30). Both the EQ-5D (3L) and the SF-36 (version 1) have  
37 been widely used in trials of people sustaining hip fractures, but for both measures evidence  
38 of essential measurement and practical properties is limited (7). In the context of a clinical  
39 trial where patients are randomised to an intervention and control arm, these measures may  
40 be appropriate but they may need to be supplemented by specific tools for selected groups,  
41 especially those patients with high-levels of pre-injury function,  
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52 In the context of assessing quality of care for a patient population as diverse as those  
53 experiencing hip fracture, it may be impossible to devise a single PROM that will be  
54 appropriate for all patients. Although quality of care may be one factor that will influence  
55 recovery as perceived by a patient, their pre-fracture state, adaptations that they or their carers  
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3 make to their reduced mobility, and their perception of whether or not they are at the stage in  
4 life where decline is inevitable will all influence how they answer questions contained within  
5 a PROM.  
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Figure 1 Flow chart of study recruitment



Notes: \* 20 participants were invited for interview at both 4 weeks and 4 months post operation

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4 61 year old female social worker who lives with her husband. Before her fracture she was  
5 working full time and, for recreation, taking country walks, undertaking all types of  
6 gardening activities and playing with her grandchildren. Post fracture fixation (6 weeks) she  
7 described using crutches to get around the garden and shops, needing help with putting on  
8 socks and cutting toe nails, and was unable to climb stairs. She talked in terms of  
9 improvement and expectation of returning to work and full activity including cleaning and  
10 gardening. By the second interview she was frustrated that recovery was so slow but she  
11 could identify the ways in which she had continued to recover. (Participant 15, interviewed 6  
12 weeks and 15 weeks post operation)  
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14

15 92 year old female who lives alone in her own flat within a sheltered housing complex. Prior  
16 to the hip fracture she looked after herself and did her own washing, but had a cleaner to  
17 undertake heavy household chores. She spent most of each day out and about at the shops,  
18 engaging in social activities, bingo and on outings. She had no other illnesses. Post-fracture  
19 fixation she talked about having some initial pain and problems lifting her leg after the  
20 operation but was now mobile about her home with a walking frame. The housing complex  
21 has a lift which she now used. She was intending to return to getting out and about as she was  
22 before her fracture. (Participant 20, interviewed 5 weeks post operation)  
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25 92 year old female lives alone with husband. Daughter visits several times a week to help.  
26 Poor hearing. Difficult to disentangle what was before and after fracture. Seems to have been  
27 able to walk around house, undertake self-care and microwave own meals pre-fracture. Post  
28 fixation of the hip fracture, patient slowly improved walking. Life seems very similar to  
29 before fracture except need for walking aid, inability to put on socks and husband now  
30 microwaves the meals. (Participant 9, interviewed 9 weeks post operation)  
31  
32

33 70 year old male retired painter and decorator who lives with his wife and enjoys almost daily  
34 visits from his grandchildren. Mobility restricted to 5-6 metres for more than two years prior  
35 to fracture due to knee pain and chronic obstructive pulmonary disease. When interviewed  
36 he describes struggling to get up the stairs, get in and out of bed, put his shoes and socks on,  
37 and bend down. Although his mobility was severely restricted prior to his fracture, he  
38 described being unable get around as much as he had done before the fracture. He noted some  
39 improvement over recent weeks, as he no longer needed two sticks for walking, only one.  
40 (Participant 3, interviewed 15 weeks post operation)  
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43 84 year old male with dementia, who has some lucid moments and some recall of falling and  
44 hurting himself. He lives with his wife who looks after him and they have a cleaner to do  
45 heavy housework. Wife provided interview, involving the patient in the latter half when he  
46 woke up. Patient's walking was gradually slowing and he had a number of falls before his  
47 fracture. Fracture occurred while walking in shopping area with his wife. Since fixation of the  
48 fracture patient has required assistance with personal care, has professional carers four times  
49 a day, and the bathroom has been adapted for his limited mobility. The interviewee had  
50 difficulty distinguishing decline due to old age and change due to the fracture. The patient  
51 complained of some pain but it was unclear whether this was from the fracture or previously  
52 established osteoarthritis. Before the fracture both patient and wife had ceased all non-  
53 essential activities except for a weekly trip to the shops so daily life had changed little except  
54 for more care provision. (Participant 11, interviewed 7 weeks post operation)  
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57 74 year old female who lives with husband. Patient lived with severe rheumatoid arthritis for  
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3 30 years. Developed heart failure and admitted to hospital with shortness of breath and  
4 confusion. Fell while in hospital and fractured her hip. Mobility before hip fracture very  
5 limited – able to walk slowly in house and garden, undertake light chores, and use scooter to  
6 go shopping. Became worse with breathing difficulty. Mobility remained reduced after  
7 hospital admission. Able to take step slowly in house with support. Uses wheelchair to go out  
8 of house – a new ramp improved this by second interview. Unclear how much mobility  
9 change was due to the fracture and how much due to heart failure. (Participant 18,  
10 interviewed 6 weeks and 18 weeks post operation)  
11

12  
13 88 year old female retired teacher, who lives with her son and has a diagnosis of multiple  
14 sclerosis. The patient wove together pre and post injury experience in her account, making it  
15 difficult to disentangle. She said her son does the cooking and cleaning and her daughter  
16 assists with self-care. She has a close family, feels well supported and has lots of visitors –  
17 friends, grandchildren and great grandchildren. Her main interest beyond seeing friends and  
18 family is reading. She described being content with life. Prior to her fracture she was unwell  
19 with an infection and recounts using a frame for mobility which she still uses. (Participant  
20 23, interviewed 5 weeks post operation)  
21

22  
23 85 year old female living in a nursing home. Her daughter visits alternate days. Her daughter  
24 provided the interview data. The patient has dementia but otherwise had been well before the  
25 fracture. Patient gets up and walks about herself, and takes herself to the toilet. She enjoys  
26 sitting and chatting. The patient does not remember the injury. Her life has not changed from  
27 how it was pre injury. The daughter did not mention any fracture-specific issues related to  
28 recovery. (Participant 26, interviewed 6 weeks post operation)  
29

30  
31 84 year old female with limited English language. Pre-injury she had carers to assist her with  
32 all her personal needs. The injury had occurred whilst being hoisted. Post injury her main  
33 concern was that at discharge from hospital, after a three month stay, she was sent to a  
34 nursing home where she knew no-one. The patient repeatedly expressed distress about being  
35 in the nursing home but did not talk about the fracture.  
36 (Participant 5, interviewed 18 weeks post operation)  
37

38  
39 84 year old male who has dementia. He lives alone but received visits three times a day from  
40 his son who provides meals. Son was interviewed. Arthritis of knee limited mobility before  
41 the fracture. Spent most of the day sitting. At weekends prior to fracture patient went to  
42 neighbour's house for evening meal. Patient fell and sustained fracture while walking to  
43 neighbour's house. Patient does not recall fracture. At time of interview, the patient was as  
44 mobile as pre operation limited by pain and stiffness from arthritis. Not yet visiting neighbour  
45 but this was because family was discouraging this in case he falls again rather than due to  
46 mobility. (Participant 1, interviewed 16 weeks post operation)  
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49  
50 **Box 1 Summaries of the data about individual patients and their recovery from a hip**  
51 **fracture**  
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### Competing interest statement

All authors have completed the Unified Competing Interest form at [www.icmje.org/coi\\_disclosure.pdf](http://www.icmje.org/coi_disclosure.pdf) (available on request from the corresponding author) and declare: funding from the National Institute of Health Research, University of Warwick, and University Hospitals Coventry and Warwickshire NHS trust.

### Authorship

MC, FG, JA, XG, KH and FB contributed to the conception and design of the study. All authors contributed to analysis and interpretation of data. FG, KD and VM drafted the article and all authors revised it critically for important intellectual content. All authors gave final approval of the version to be published.

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### Access to study data

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**Data sharing:** no additional data available

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8 **~~The assessment of health care quality~~ Evaluating recovery following hip fracture: a**  
9 **qualitative study of what is important to patients ~~during recovery~~**

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## Abstract

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### Objective

To explore what patients ~~who have recently experienced a fracture of the proximal femur (hip fracture)~~ consider important when evaluating their recovery from hip fracture and to consider how these priorities could be used in the evaluation of the quality of hip fracture services.

### Design

Semi-structured interviews exploring the experience of recovery from hip fracture at two time points - four weeks and four months post-operative hip fixation. Two approaches to analysis: thematic analysis of data specifically related to recovery from hip fracture; extraction of data into template to capture the participant's experience overall; ~~thematic analysis of data specifically related to recovery from hip fracture.~~

### Participants

31 participants recruited, of whom 20 were female and 12 were cognitively impaired. Mean age ~~was~~ 81.5 years. Interviews ~~were~~ provided by 19 patients ~~with hip fracture~~, 14 carers, and 8 patient/carer dyad; 10 participants were interviewed twice.

### Setting

~~Participants recruited from a single~~ Single major trauma centre in the West Midlands of the UK.

### Results

~~Active and frail patients talk about the experience of recovery from a hip fracture very differently. Active patients provided detailed descriptions of their recovery and what was important to them. For frail patients, all their health problems were part of one experience and they were unable to separate out what was due to the fracture and what was due to other conditions. Active patients saw recovery as a return to their pre-fracture state whereas for frailer patients the fracture was considered part of their decline with age. Post fracture, many patients made adaptations to their daily living. Among those able to articulate what was important to them during recovery the following themes were most prominent: mobility, return to activities, self care, pain, mental wellbeing and fear of falling.~~

Stable mobility for valued activities was considered most important by participants who had some pre-fracture mobility and were able to articulate what they valued during recovery.

Mobility was important for managing personal care, for day-to-day activities such as shopping and gardening, and maintenance of mental well-being. Some participants used

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7 assistive mobility devices or adapted to their limitations. Others maintained their previous  
8 limited function through increased care provision. Many participants were unable to articulate  
9 what they valued as hip fracture was perceived as part of their decline with age. The fracture  
10 and problems from other health conditions were an inseparable part of one health experience.

## 11 **Conclusions**

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14 ~~There is no evidence that frail and active patients consider the same outcomes as important.~~  
15 ~~Adaptation by the patient complicates assessment of recovery from hip fracture including~~  
16 ~~using assistive devices, recalibration of expectations of health, protective response of carers~~  
17 ~~and changes to the patient's environment.~~

18  
19 Patients consistently valued stable mobility and its role in other basic health domains. While  
20 no one patient-reported outcome measure (PROM) could consistently evaluate recovery for  
21 all patients with hip fracture, general health-related quality of life tools may provide useful  
22 information for the majority of patients. These may need to be supplemented by specific tools  
23 for selected groups, especially those patients with high-levels of pre-injury function.

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28 **Key words:** Hip fractures, Outcome assessment (Health Care), Interview, Frail older adults

## 29 **Article summary**

### 30 *Article focus*

- 31 • The UK NHS has identified the need to evaluate service provision for patients with a
- 32 hip fracture
- 33 • There is increasing expectation that patient-reported ~~outcomes~~outcome measures
- 34 (PROM) are used within health service evaluation
- 35 • We asked the question: what do patients who have recently experienced a hip fracture
- 36 consider important when evaluating their recovery?

### 37 *Key messages*

- 38 • Patients active before their fracture ~~consider recovery as return to their pre-fracture~~  
39 ~~state whereas more frail~~value stable mobility to undertake valued activities but many  
40 patients consider fracture to be part of their decline with age.
- 41 • ~~It would be possible to develop a PROM based on what active patients articulate as~~  
42 ~~important during recovery but there is no evidence that frail and active patients~~  
43 ~~consider the same outcomes as important~~While no one PROM could evaluate all  
44 aspects of recovery for patients with hip fracture, general health-related quality of life  
45 tools may provide useful information for the majority of patients.

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7 *Strengths and limitations*

- 8 • The study sample was representative of the age profile, gender balance and dementia  
9 levels of ~~the UK population~~ NHS patients experiencing hip fractures  
10 • It is possible that those not agreeing to be interviewed were struggling most with  
11 recovery.  
12 • The data is limited by the difficulty ~~some frail older adults have~~ the more physically  
13 and cognitively impaired patients had in giving a detailed account of their health  
14 experience.  
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## Introduction

Fragility fracture of the proximal femur (hip fracture) is one of the greatest challenges facing the healthcare community. In 1990, a global incidence of 1.31 million was reported and was associated with 740,000 deaths (1). Hip fractures constitute a heavy socioeconomic burden worldwide. The cost of this clinical problem is estimated at 1.75 million disability adjusted life years lost; 1.4% of the total healthcare burden in established market economies (1).

Among those experiencing fragility hip fracture in England, Wales and Northern Ireland, 70% are aged 80 years or older, 73% are female and 34% are cognitively impaired pre-operation. The mortality rate within 30 days of operation was 8.2% in 2013 (2)

The NHS has identified the need to evaluate the quality of service provision for patients with a hip fracture; this evaluation is conducted through the National Hip Fracture Audit Database (NHFD) ~~(2)-(2)~~. Currently, aspects of care such as time to surgery, length of patient stay and patient mortality in hospital and 30 day and 120 day follow up are recorded in the NHFD. ~~Furthermore, these~~ These data are now used to guide payments to healthcare providers; the payment being increased if the provider supplies 'best practice' care (3). However, while important, ~~we suggest that~~ there is interest from policy makers in the potential to enhance these currently reported data fields ~~are by including and~~ an ~~incomplete~~ assessment of outcome:

as reported by patients. It is increasingly expected that healthcare evaluations should include domains of health that are important to patients; (4), captured by well-developed patient-reported outcome measures (PROMs) which aim to assess how patients function and feel in relation to a health condition or associated treatment (5). PROMS capture information that cannot be obtained by other means (5, 6) complementing more traditional performance or process-based measures. ~~However, for~~

Our aim was to establish whether or not one PROM could be used with all patients who have sustained experience a fragility hip fracture, guidance for PROM-based assessment is not available, as part of the evaluation of the quality of health care for hip fracture delivered by the NHS. For this patient group we were unable to identify a PROM specific to the assessment of hip fractures does not exist fracture, and robust evidence of the quality and acceptability of non-hip fracture specific PROMs following completion by patients sustaining

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7 a hip fracture is limited (7). Moreover, clarity with regards to the outcomes of healthcare that  
8 ~~this group of these~~ patients considers relevant and important does not exist. Appropriate and  
9 relevant PROM-based assessment ~~must~~should be underpinned by an understanding of  
10 ~~what's~~what is important to patients in terms of the outcomes of healthcare ~~following a hip~~  
11 ~~fracture.~~ We therefore designed an interview study to explore with patients and, where  
12 appropriate, their carers, what they consider to be important outcomes and to explore  
13 variation across this patient group. Our research questions were:

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18 1. In response to these gaps in understanding, we proposed the following research question: ←

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21 What do patients who have recently experienced a hip fracture consider important when  
22 evaluating their recovery?To answer this question, we undertook an interview study with  
23 patients and, where appropriate, their carers to explore the key outcomes of healthcare  
24 that they regarded as important following a hip fracture, and which may inform  
25 subsequent PROM based assessment.

26  
27 2. Is there variation within this population about what is considered important?

28 These research questions are framed by the desire of policy makers to evaluate the quality of  
29 care for hip fracture through assessment of recovery from the perspective of the patient.

## 30 31 32 33 **Method**

### 34 35 36 *Study Design*

37 ~~Semi~~We conducted semi-structured interviews ~~were conducted~~ with patients and, where  
38 appropriate, their carers at two time points, at approximately four weeks and then again at  
39 four months after ~~sustaining they had sustained~~ a fragility hip fracture ~~of the hip~~.

### 40 41 42 *Identification of patients with a hip fracture*

43 ~~Participants were~~We recruited participants from an existing cohort study, the Warwick Hip  
44 Trauma Evaluation (8), that commenced January 2012. This is a cohort of all patients  
45 admitted with a hip fracture to a single major trauma centre in the West Midlands of the  
46 United Kingdom. As part of their pre-operative assessment, patients were assessed for their  
47 capacity to consent using clinical assessment and the Abbreviated Mental Test Score (AMTS)  
48 (9). The AMTS is a 10-item measure used to rapidly assess the possibility of cognitive  
49 impairment in elderly people. A score below 8 suggests cognitive impairment (10). Scores  
50 less than 8 were taken to indicate that a patient was unlikely to be able to consent for  
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7 themselves. Those deemed to have capacity for consenting to surgery, based on clinical  
8 assessment and AMTS, were considered able to consent for this study. Following the  
9 emergency surgery for their fracture, those with capacity gave written consent to be  
10 approached for interview. ~~For those deemed not to have capacity due to cognitive~~  
11 ~~impairment, verbal consent was obtained from their consultee (11).~~ For those deemed not to  
12 have capacity due to cognitive impairment, verbal consent was obtained from their consultee  
13 (11). Ethical approval was granted by NHS REC London - Camberwell and St Giles  
14 (11/LO/0927) on the 18<sup>th</sup> August 2011.  
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### 19 *Sampling*

20  
21 During the data collection period for this study, February to August 2012, we purposefully  
22 sampled cohort participants who had reached 4 weeks or 4 months following their hip  
23 fracture and had consented to be approached for interview. The time points were chosen to be  
24 the same as those used for data collection for the NHFD (12). ~~The~~ If a PROM were to be used  
25 with this patient population to assess quality of care, patients would be asked to complete the  
26 PROM at these time points. Our sampling strategy ensured a diverse mix of patients with  
27 respect to the following factors: age, gender, AMTS (9) and EQ-5D score (13).  
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### 32 *Interview recruitment and consent process*

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34 ~~Eligible~~ We contacted eligible patients and carers ~~were contacted~~ just prior to 4 weeks and/or  
35 4 months following hip fracture to arrange an interview. If patients declined to participate, the  
36 reasons offered were recorded. Patients with capacity to consent were contacted directly. For  
37 those patients deemed not to have capacity, we contacted their consultee ~~was contacted.~~  
38 ~~Where patients were.~~ Patients able to consent for themselves ~~they~~ signed their own consent  
39 forms. For those unable to consent the consultee signed an agreement form. ~~For these patients~~  
40 and we aimed to interview a carer as well as the patient (patient/carer dyad) ~~and for these~~  
41 interviews the carer. Carers who were interviewed signed a consent form. The study flow  
42 diagram is at Figure 1.  
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### 48 *Interview process*

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50 ~~Participants were~~ We interviewed participants at their current residence (own home,  
51 residential or nursing home) or in hospital. ~~Interviews were undertaken by a researcher~~  
52 ~~who~~ The interviewer was trained in interviewing but did not have clinical knowledge of hip  
53 fracture, its treatment or prognosis. Where possible, patients and carers were interviewed  
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7 alone, however where the carer and patient requested a joint interview (whether or not the  
8 patient had cognitive impairment) ~~they were interviewed together. The semi-structured~~  
9 ~~interviews at both time points focused on the experience of the fracture and the patient's~~  
10 ~~recovery), they were interviewed together. The aim of the interviews was to understand each~~  
11 ~~participant's lived experience of hip fracture (14) and the influence of their social context and~~  
12 ~~pre-fracture health.~~ The interviewer encouraged participants to talk about the experience in  
13 ~~As~~ ~~Later in~~ the interview  
14 ~~proceeded, the interviewer~~ ~~we~~ prompted ~~participants to clarify, where necessary, for~~  
15 ~~clarification about~~ what ~~in~~ the patient ~~experience~~ was ~~ablerelated~~ to ~~do just before~~ the ~~hip~~  
16 fracture, ~~what was changing during their recovery, and.~~ Towards the end of the interview ~~we~~  
17 ~~directly asked~~ what was important to them in terms of recovery. ~~Where the participants if this~~  
18 ~~had not already been~~ talked about ~~health issues, by~~ the interviewer prompted them to clarify  
19 ~~whether these related to the fracture. During the interview process, consideration~~ ~~participant.~~  
20 Consideration was given to the potential challenges associated with interviewing older adults,  
21 for example by giving potential participants sufficient time to decide whether or not to  
22 participate and minimising ~~the~~ burden and fatigue through streamlining questions (14).  
23 ~~During the initial stage of data collection the interview process, questions and prompts were~~  
24 ~~refined by the study team using a process of iterative review and adjustment.(15). The~~  
25 ~~interview process, questions and prompts were refined by the study team during the initial~~  
26 ~~stage of data collection.~~ Interviews were audio recorded and transcribed verbatim. For one  
27 interview, audio recording was not feasible due to the noisy environment so extensive field  
28 notes were taken and transcribed.

### Analysis

29 ~~Interviews transcripts were checked, anonymised and uploaded into NVivo software (15).~~  
30 ~~Initial analysis involved data immersion, reading and re-reading the transcripts, and~~  
31 ~~discussion of interview transcripts by the research team. All team members read at least five~~  
32 ~~transcripts. Issues and themes crystallised from this process (16). For data collection and~~  
33 ~~analysis we took a phenomenological approach in that we sought to understand participant's~~  
34 ~~experience of hip fracture and the influence of their context on this (17) and concurrently we~~  
35 ~~took a selective realist position (18) in that we recognised hip fracture as an event identifiable~~  
36 ~~by means other than through the participant's account.~~

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7 ~~Some interviewees had difficulty articulating anything about their fracture and their~~  
8 ~~interviews contained almost no data that could be clearly identified as related to the fracture~~  
9 ~~itself. In many interviews the interviewees talked mostly about general health issues and~~  
10 ~~required considerable prompting to clarify what was related to their fracture. We therefore~~  
11 ~~followed two different analysis processes reflecting our dual theoretical approaches. The first~~  
12 ~~captured the overall sense of the interviewee's experience and how they talked about it, and~~  
13 ~~the second focused on data specifically related to recovery from the hip fracture.~~

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18 ~~For the first analysis, through comparison of the transcripts~~ Interview transcripts were  
19 checked, anonymised and uploaded into Nvivo software (16). Initial analysis involved data  
20 immersion, reading and re-reading each transcript, discussion of the interview transcripts by  
21 the research team. All team members read at least five transcripts. The key issues crystallised  
22 from this process (17). We found that the interviews at four weeks and four months covered  
23 very similar issues, although at four months reporting of fracture specific recovery was more  
24 advanced. For analysis, we therefore treated all the interviews related to one participant as  
25 one set of data. During data interpretation we took account of whether the interview data was  
26 from a patient or carer or patient/carer dyad. Two different approaches to analysis were then  
27 undertaken in response to our research questions.

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34 To answer our first research question, we searched the transcripts for any mention of what  
35 was important during recovery from hip fracture and coded this text. As coding proceeded,  
36 we reviewed these codes and combined them into themes. After coding ten transcripts no  
37 additional themes were identified in the data. Double coding was undertaken for one in four  
38 transcripts and coding compared and discussed.

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43 To answer our second research question, from close reading of the interview transcripts, we  
44 developed and refined a template for summarising the key issues of relevance to recovery  
45 from the hip fracture based on the interview data and refined the template after using it with  
46 four interviews. The template included: current and recent past living arrangements and  
47 environment, day-to-day life now and in the recent past, the impact of the hip fracture and its  
48 management, what was changing in day-to-day life as they recovered, the extent to which the  
49 patient referred specifically to the fracture and their ability to engage in the interview. The  
50 data from each patient or patient/carer dyad was summarised with a second research team  
51 member reviewing each summary against the data. The summaries were then compared.

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## Results

Twenty one patients were interviewed on one occasion and 10 were interviewed twice giving a total of 31 patient participants and 41 interviews. Of the 31 patient participants, 20 (64.5%) were female, the mean age was 81.5 years (SD 9.2, range 61-96) and 12 scored less than eight on the AMTS. Of the 41 interviews, 24 were conducted three to nine weeks, and 17 were conducted 14 to 23 weeks after the hip fracture. One team member then extracted and summarised into the template the data from each patient or patient/carer dyad. The wider team reviewed the extractions with the transcripts. This analysis involved very close reading of the interviews and piecing the data together from across all of the interviews related to each patient. For the second analysis, we searched the transcripts for any mention of what was important during recovery from the hip fracture and coded this text. The coding framework was reviewed and finalised after coding ten transcripts. Double coding was undertaken for one in four transcripts. The whole team reviewed the extracted data and the coded data. As analysis proceeded we found that the interviews at four weeks and four months covered very similar issues, although at four months fracture specific recovery, where this was articulated, was more advanced. We therefore treated the interviews from each time point as one dataset for analysis. In the four month interviews we found that the ability of participants to articulate hip specific recovery was even less than in the interviews undertaken at four weeks. Nineteen interviews were with the patient only, 14 with carer only, and eight with patient/carer dyads. Despite framing the interview for interviewees as exploring the experience of hip fracture, many interviewees talked about general health issues. Although we prompted to clarify what was related to their fracture, in many interviews it was difficult to disentangle the impact of the fracture from the impact of other health problems. Some interviews contained almost no data that was clearly related to the fracture. From the perspective of the patient, all their health problems were part of one experience. The absence of data clearly related to the fracture was more marked in the four month compared to two month interviews. We therefore decided not to attempt interviews at 12 months post fracture as originally planned (8). During the following sections report our analysis. Illustrative quotations from data interpretation we took account are labelled with the age and gender of the patient, time since hip fracture and whether the interview data quotation was from the patient or carer or patient/carer dyad.

What is important to patients when evaluating their recovery

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7 From our systematic search of the interviews for data related to recovery from the hip  
8 fracture we identified the following themes: mobility, valued day-to-day activities, self-care,  
9 pain, mental wellbeing, fear of falling and leg shortening. When talking about mobility, day-  
10 to-day activities or self-care participants also talked about their level of independence.

### 13 Mobility

14  
15 This was the most prominent theme, although when talking about mobility the interviewees  
16 often mentioned other themes. Mobile participants reported limited mobility in the weeks  
17 post operation and valued any improvement.

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21 I'm walking with a walking stick at the moment. I've been down the park and back...I  
22 can usually get around [the house] without the walking stick, and I can get up and  
23 down stairs no problem. I get upstairs with my good leg and downstairs with my bad  
24 leg. (Participant 6, male, age 78, 5 weeks post operation)

25  
26 By four months, for many participants mobility had improved, and they were happy that they  
27 were returning to normal mobility.

28  
29 I can't rush round like I did, but eventually that will come...I mean it's pretty normal  
30 now, but I think it's going to be a while before I can actually walk as I did and I  
31 probably won't walk as I did... when I came home [from hospital] I was still  
32 hobbling... but now I'm more or less...walking normal, especially with the stick  
33 (Participant 10, female, age 83, 18 weeks post operation)

34  
35 For those with limited mobility before hip fracture any unaided improvement was limited to  
36 the pre-fracture level but also valued.

37  
38 The operation was successful and got him back to normal right from the start, right  
39 from the very first day that he had it done. He was able to then walk pain free with a  
40 Zimmer frame to the toilet. The staff were all saying it was amazing how well he was  
41 walking and he would soon be back to normal, but what they didn't realise was that  
42 he was walking normally. (Carer of participant 1, male, age 84, 16 weeks post  
43 operation)

44  
45 Other participants were using mobility aids that they had not been using regularly before the  
46 fracture. For some, the addition of mobility aids enabled greater security of mobility than  
47 prior to their fracture.

48  
49 Her mobility's getting better. I think she'll cope with the frame. She's had a couple of  
50 falls in the home, earlier when she was forgetting that she had to use the frame. She'd  
51 get out of bed and not use the frame and consequently fall. But she's got in the habit  
52 of using it now... she's not falling, which is a bonus. (Carer of participant 13, female,  
53 age 87, 14 weeks post operation)

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7 Valued day-to-day activities

8 Those who were active prior to their fracture talked about the frustration of the restriction in  
9 their activities particularly in the weeks following the fracture.

10 I'm back on what I call domestic duties – washing up! But the thing that is frustrating  
11 is that I can't get outside and do any gardening. (Participant 12, male, age 78, 6 weeks  
12 post operation)

13  
14 I just miss getting up and getting out. I never stayed in. I'd go out in the morning and  
15 come back and then I'd go out again, I just used to go out looking round the shops. I  
16 just get these crossword books and I do those. (Participant 20, female, age 92, 5  
17 weeks post operation)

18  
19 Participants who were active before their fracture were usually able to resume valued  
20 activities but had some limitations which remained a frustration.

21  
22 I can do little (gardening) jobs but because I haven't got as much movement in the  
23 hip joints, I find it difficult to go down on my hands and knees...If I go down on one  
24 knee it's difficult to get up again so that's not possible but I can do things that are  
25 higher up, I can trim. (Participant 15, female, age 61, 15 weeks post operation)

26  
27  
28 I'm tackling a little bit of cooking now. I started to cook myself some nice lunches  
29 and I haven't got round to the... scones ... I made one lot when I came home and I  
30 thought, I can't be bothered anymore. (Participant 10, female, age 83, 18 weeks post  
31 operation)

32  
33 Some participants returned to valued activities through adapting how they did them, this  
34 participant using a wheelchair for the first time.

35  
36 Over the last three weeks, when we go out shopping now, I can't go down the aisles,  
37 so [daughter] gets me a (wheel)chair and I can sit in the chair and then say what  
38 shopping I need, that is very good. (Participant 9, female, age 92, 18 weeks post  
39 operation)

40  
41 Participants who no longer undertook valued activities that involved significant mobility  
42 were content to continue as they were, for example, occupying themselves with visits from  
43 family and reading.

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46 Personal care

47 Washing, dressing and getting to the toilet was talked about in interviews, but in many cases  
48 it was not clear whether difficulties with personal care were specifically due to the fracture. A  
49 few interviewees talked about problems with incontinence but again it was unclear whether  
50 this was specific to the fracture. Most patients had a commode or had arranged to sleep near  
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7 the bathroom in the weeks immediately after the fracture. Some participants were able to  
8 describe problems with self-care specific to the hip fracture.  
9

10 I'm ...not able to put a sock or anything on my injured leg. I can manage now with  
11 my trouser leg and throw these jogging trousers and hook my leg into them but I have  
12 to ask my husband if I need to put a sock or a shoe, or my slipper on that foot.  
13 (Participant 15, female, age 61, 6 weeks post operation)  
14

15 At the second interview this participant was pleased to report that she now needed very little  
16 help with self-care, at least in part through wearing alternative footwear.  
17

18 I still have to throw my clothes and hook them onto the foot to get dressed. I couldn't  
19 wear lace-up shoes or anything like that because I couldn't tie them up, but things like  
20 slip-ons and sandals I can get on quite easily, so I'm fairly independent – I am  
21 independent really, I just need help with cutting my toenails and that – those on the  
22 right foot that's all. (Participant 15, female, age 61, 15 weeks post operation)  
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### 24 Pain

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26 Although pain was talked about by some interviewees it was not considered a major problem.

27 So here I am, four or five weeks [post operation], I get a little bit of pain, not a lot.  
28 (Participant 7, female, age 70, 5 weeks post operation)  
29

30 The pain was so bad before I had it done, and I just couldn't believe the relief after the  
31 operation when I was walking in the hospital and I had one of those pushers you  
32 know. And there was no pain. And I kept thinking, I can't believe this, and that's how  
33 it's been. I've never had any pain, not at all.  
34 (Participant 10, female, age 83, 18 weeks post operation)  
35

36 There's several times, like when I have got to get up those steps. I put my right foot  
37 first and bring my left foot up, and once or twice... you step on your left, and it's still  
38 there, lets you know it's still tender. (Participant 12, male, age 78, 16 weeks post  
39 operation)  
40

### 41 Mental wellbeing

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42 Low mood or depression associated with the reduced mobility due to the fracture was  
43 reported by a few interviewees, emphasising the great value placed by interviewees on being  
44 independently mobile.  
45

46 He can't walk and that, to him he'd rather die. I'll be honest with you he's said it once  
47 or twice, "Let me go". And I said, "No you're not going no-where". And then the  
48 other day for the first time, but he hasn't said it since, "I'm going to commit suicide".  
49 I said, "No you're not, you're not". (Carer of participant 31, male, age 84, 5 week post  
50 operation)  
51

52 For me it was a massive problem and caused me depression. To me is the most  
53 important thing, the mental aspect of taking away somebody's freedom to be able to  
54 move around and go to the shops and do all that sort of thing.  
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(Participant 7, female, age 70, 23 weeks post operation)

### Fear of falling

The experience of the fracture left a few participants with a fear of falling and sustaining a further fracture.

I think it frightened him more than anything else. He's frightened he'll fall over again and do it again, that bothers him more than anything else. Because now when he stands up at all to try and walk he's frightened he's going to fall over and the same thing will happen all over again. (Carer of participant 11, male, age 84, 7 weeks post operation)

I've got to watch what I'm doing. If I catch my foot on [paving stone], I can go over again. (Participant 12, male, age 78, 16 weeks post operation)

The fear of falling was sometimes expressed by a family member. When talking about his frustration at not being able to work in the garden, participant 6 added

All the rain has made it very slippery, and [wife] says, "No way do you go out there." (Participant 12, male, age 78, 6 weeks post operation)

This emphasises the value given to stable mobility by interviewees.

### Leg shortening

This is a problem that is common following extra-capsular fracture of the proximal femur.

One interviewee described her concerns about this.

One leg is now shorter than the other so that makes walking a bit difficult because it gives me back pain. (Participant 15, female, age 61, 15 weeks post operation)

### Variation in how **Results**

~~Twenty one patients were interviewed on one occasion and 10 were interviewed twice giving a total of 31 individual patients. Of these, 20 (64.5%) were female. Mean age of the patients was 81.5 years (SD 9.2, range 61-96). Of the 31 patients, 12 scored less than eight on the AMTS. Of the 41 interviews, 24 were conducted three to nine weeks, and 17 were conducted 14 to 23 weeks after the hip fracture. Nineteen patient only interviews, 14 carer only, and eight patient/carer dyad interviews were conducted.~~

~~Active and frail patients talk about recovery from a hip fracture very differently~~

~~Our sample included patients from across a spectrum that extended from those who, prior to the fracture, were relatively physically and mentally active were able to provide a detailed description of their recovery, including what was important to them. At the opposite~~

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7 end of the spectrum, physically and/or mentally frail patients said almost nothing about their  
8 prior to their fracture through to those who, pre-fracture. They talked about many health  
9 problems but with little clarity about when these health problems occurred. Even with  
10 probing, it was difficult to distinguish what experiences were related to their fracture and  
11 what to other health problems, had been immobile due to conditions such as multiple  
12 sclerosis, chronic obstructive airways disease and arthritis or difficulty with breathing. From  
13 the perspective of the patient, all their health problems were part of one experience.  
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18 Within the frail group we include, and those with severe cognitive impairment, many of  
19 whom were unable to report on their experience. In Box 1 we present condensed versions of  
20 the interview summaries for themselves. A few carers were able to give a clear account of  
21 mobility and how it had changed since the hip fracture. However, most carers provided more  
22 limited accounts from which it was difficult to discern what problems related specifically to  
23 the hip fracture. These carers included relatives who provided some care for the patient but  
24 did not live with them, and professional carers in nursing or residential homes.  
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30 The participants chosen to represent the whole spectrum of patients from active through to  
31 frail is illustrated in table 1 where we provide condensed versions of interview summaries.  
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33 We indicate whether the data was provided by patient, carer or both.  
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35 *Recovery as a return to pre-fracture state or subsumed within the as part of aging*  
36 *trajectory and decline*

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38 Every patient interviewed had experienced a hip fracture and surgery with the associated  
39 reduced mobility and pain, so in physical terms, all the patients of them had, for a period of  
40 time, been somewhat frailer than impaired compared to their pre-fracture status for a period of  
41 time. However, the way the participants talked about their recovery varied.  
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46 state. Four weeks post-operation, those who were active pre-fracture talked in terms of  
47 regaining a recovered state that was similar to their pre-fracture state although with some  
48 minor adaptations (participants 15 and 20 in table box 1) although they also). Whilst these  
49 participants expressed worry about how well they might function in the future. However,  
50 there was, nevertheless, determination to progress to as full a recovery as possible. Four  
51 weeks months post-operation many of these participants had all but regained their pre-fracture  
52 level of activity. Among participants with severely limited mobility pre-fracture, some were  
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7 able to identify specific activities which were more difficult post-fracture than pre-fracture,  
8 such as putting on socks and getting in and out of bed. Some were also able to identify  
9 specific improvements in mobility post operation (see participants 9 and 15 in box 1). These  
10 participants described a process of recovery although it was very limited.

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14 In contrast, for other participants, the fracture was just one part of a process of aging and  
15 decline. For example, participant 11 (see box 1) had been very limited in his activities before  
16 the fracture. Post fracture he needed adaptations to his home and increased care support post  
17 fracture to enable him to continue to manage at home. The mobility of participant 18 had  
18 declined and she had started using a wheelchair instead of her mobility scooter to get out of  
19 the house. However, it was unclear whether the decline was due to the concurrent heart  
20 failure or the fracture. Those who were ~~frail~~ the most physically or cognitively impaired pre-  
21 fracture did not talk about regaining a recovered state but about a state of no change. They  
22 continued with their limited activities as before (for example: participants 23 and 26 in table  
23 4), or box 1). For one participant, the only change ~~only in external circumstances (for~~  
24 example was her move to a new nursing home (participant 5 in table 1) at both interview time  
25 points; box 1). Participants with cognitive impairment were often unaware of having  
26 experienced a fracture. ~~Some of the frail participants mentioned a specific aspect of daily~~  
27 living that had changed. For example, one participant described being able to walk with one  
28 stick instead of two, another had regained the ability to dress herself and another mentioned  
29 that the initial post-operative pain had disappeared.

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38 For those between the two extremes of the spectrum it was often difficult to disentangle the  
39 impact of the fracture from the impact of other health problems at both interview time points.  
40 Participants with severely limited mobility pre fracture were able to identify specific actions  
41 that were difficult post fracture (for example: participants 3 and 9 in table 1). Other  
42 participants tended to see themselves or the person they cared for, as on an aging trajectory  
43 with the fracture being just one part of this (for example: participant 11 in table 1). They were  
44 often unclear as to what was due to the ageing process or concurrent health problems and  
45 what was due to the fracture (for example: participant 18 in table Participant 1 box 1).

#### 50 51 *Recovery through adaptation*

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53 In the face of their physical limitations, most participants made adaptations that mitigated  
54 against the effect of the fracture; for example employing a cleaner, moving to a residential or  
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7 nursing home or using a walking aid or other assistive device. For those who were active pre-  
8 fracture, adaptation was mostly considered temporary, although at 4 months there was some  
9 evidence that active patients had adapted to some limitations such as being unable to kneel  
10 for gardening or ~~finding it exhausting to walk around town, limiting time spent shopping to~~  
11 ~~avoid exhaustion~~. For some participants who had been experiencing decline in their mobility  
12 pre-fracture, the fracture precipitated adaptations that ~~made life easier but they~~ had not  
13 previously ~~been~~ considered ~~but made their life easier~~. These included using a wheelchair for  
14 shopping, having a new ramp built for getting in and out of the house in a wheelchair, using a  
15 walking aid or employing professional carers to assist with personal care. For some, their  
16 own or their carer's fear of further falls limited their mobility or at least limited how far they  
17 tested their ability to walk. Poor weather conditions exacerbated this fear, but adaptations to  
18 the environment such as walking aids or handrails lessened the fear.  
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## 24 Discussion

### 25 *Changes specific to recovery from hip fractures*

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27 This section reports on the results of our second analysis approach which involved searching  
28 the interviews systematically for data related to recovery from the Following hip fracture.  
29 The data was coded under the following themes: mobility, activities, self-care, pain, mental  
30 wellbeing, fear of falling and leg shortening. Each theme is illustrated with quotations in table  
31 2 where we illustrate the range of experiences among, for those interviewees who were had  
32 some pre-fracture mobility and able to articulate what was specifically related to the hip  
33 fracture. For each quotation we indicate the age and gender of the patient, time since hip  
34 fracture and whether the quotation was from the patient or carer.  
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41 ~~Mobility was the most prominent theme although when talking about they value during~~  
42 ~~recovery, stable mobility the interviewees often mentioned other themes (see table 2), that~~  
43 ~~is, Personal care such as washing, dressing and getting to the toilet was talked about in~~  
44 ~~interviews, but in many cases it was not clear whether difficulties with personal care were~~  
45 ~~specifically due to the fracture. A few interviewees talked about problems with incontinence~~  
46 ~~but again it was unclear whether this was specific to the fracture. Most patients had a~~  
47 ~~commode or had arranged to sleep near the bathroom in the weeks immediately after the~~  
48 ~~fracture. Activities beyond personal care were talked about by those who were active prior to~~  
49 ~~their fracture. Independence was commonly linked to mobility or ability to undertake~~  
50 ~~activities or ability to self care, without the Pain was described by fewer interviewees than~~  
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7 mobility, and some of these interviewees spoke about the lack of pain. ~~Mental wellbeing~~ and  
8 ~~fear of falling~~ were mentioned by a few interviewees, sometimes linked to mobility or  
9 ~~activities that they were avoiding~~. One interviewee described experiencing shortening of the  
10 ~~leg and her concern that she might require a raised shoe and be prone to back pain~~.

## 11 12 13 **Discussion**

14  
15 The population undergoing surgery for hip fracture includes those who were becoming frail  
16 or were already frail before the fracture. These patients have difficulty articulating which  
17 aspects of their health experience relate to the fracture and which to other conditions. Those  
18 who were active prior to fracture are more able to identify outcomes of or fear of falling, and  
19 mobility that that are allows people to undertake valued activities are most valued. The ability  
20 to walk is important to them and specific to their fracture. There is no evidence from our  
21 study that we can assume that frail and active patients consider the same outcomes as  
22 important. Although but so too are other leg movements needed for activities such as  
23 gardening or using transport. For some older people see themselves as able to recover from  
24 their fracture, many of those who are becoming frail or are already frail see the fracture as  
25 part of the aging process. Those able to articulate what was important to them when  
26 recovering from their fracture identified mobility, return to activities, self care, independence,  
27 pain and mental wellbeing. For a small number of this group, fear of falling is an issue and  
28 one participant in our study was worried about the consequences of leg shortening.  
29 Assessment of recovery from hip fracture is complicated by the adaptations patients and  
30 carers make; adapting to physical limitations participants, maintaining mobility, however  
31 limited, was achieved by using assistive devices or changing activities, recalibration of  
32 working out new ways of doing an activity. Some participants adapted to their limitations, for  
33 example wearing different footwear or adjusting their expectations of health, protective  
34 response of carers including what they could achieve. Others maintained their previous  
35 limited function through increased care provision, and changes to the patient's environment.  
36 These adaptations affect how patients and their carers respond to questions about outcome  
37 from a hip fracture.

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Patients also consistently valued certain basic domains of health, such as pain (or lack of it),  
day-to-day activities, personal care and mental well-being. However, many participants in  
this study were unable to articulate what was important to them in terms of recovery from hip  
fracture. The hip fracture was just one part of their decline with age and its impact could not

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7 be disentangled from the impact of other health issues.. The level of recovery perceived by a  
8 participant was influenced by their pre-fracture state and their ability to make adaptations  
9 during recovery.

#### 10 11 12 *Strengths and weaknesses of the study*

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14 ~~The study sample was representative of the age profile, gender balance and dementia levels~~  
15 ~~of the UK population experiencing hip fractures (2, 12), with a majority of our sample being~~  
16 ~~older women and the proportion of patients with cognitive impairment being marginally~~  
17 ~~higher than the age matched wider UK population.~~

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21 When the mortality rate post operation is taken into account, including the higher mortality  
22 amongst older females, the study sample was broadly representative of the age profile and  
23 gender balance of the population of England, Wales and Northern Ireland experiencing hip  
24 fractures (2). We used a higher cut off for assessment of cognitive impairment (score of 8 on  
25 AMTS) compared to the NHFD (score of 6 on AMTS). This is likely to explain our higher  
26 proportion of participants with cognitive impairment compared to the average in the NHFD.

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31 More research time was spent on recruitment than any other aspect of the study as it proved  
32 difficult. When contacted about the interview study, potential participants talked about other  
33 priorities or concerns that prevented them agreeing to interview, or they simply did not wish  
34 to be interviewed. It is possible that those not interviewed were struggling most with  
35 recovery. Our data is also limited by the difficulty some frail older adults have in giving a  
36 detailed account of their health experience (19),(18). Interview data is jointly constructed by  
37 interviewer and interviewee (20) ~~and our interviewer had no clinical knowledge of hip~~  
38 ~~fractures reducing the interviewer's influence on the data.(19) and our interviewer had no~~  
39 ~~clinical knowledge of hip fractures. This reduced the likelihood of the interviewer influencing~~  
40 ~~the data.~~ A clinician undertaking the interviews would have the knowledge to help the patient  
41 tease out whether health problems were fracture related or not. However, this would  
42 ~~obscure~~ have obscured the important finding, that participants often experienced their fracture  
43 as part of, rather than separate to, their other existing health problems. For those with  
44 cognitive impairment, some carers were unable to give a detailed account of recovery due to  
45 limited day-to-day contact with the participant.

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*Comparison with other studies*

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7 There are similarities between our findings and other qualitative studies of similar  
8 populations. ~~The spectrum from frail to active patients is similar to that found in a study from~~  
9 ~~a Swedish team that explored engagement with rehabilitation post hip fracture (21). They~~  
10 ~~classified their participants as: those who were frail and in need of support but did not request~~  
11 ~~it; those who were dependent and took no active part in rehabilitation and those who were~~  
12 ~~self-sufficient. Another Swedish study, undertaken with people 12 months after their hip~~  
13 ~~fracture found that mobility and a return to normal activities were key outcomes for patients~~  
14 ~~(22). An Australian study of mobility post-fracture found that reduced level of mobility was~~  
15 ~~associated with fear of falling, physical limitations from other illness and~~  
16 ~~social/environmental factors (23). Our results also echo findings from across the research~~  
17 ~~literature on the experience of health and illness. For example, the difficulty disentangling the~~  
18 ~~impact of one health condition from other co-morbidities has been found for mental health~~  
19 ~~conditions (24). The acceptance of an acute health problem as being part of the aging process~~  
20 ~~has been found for conditions such as stroke.~~ A Swedish team that explored engagement with  
21 rehabilitation post hip fracture found a similar spectrum of participants (20). They classified  
22 their participants as: those who were frail and in need of support but did not request it; those  
23 who were dependent and took no active part in rehabilitation and those who were self-  
24 sufficient. Another Swedish study, undertaken with people 12 months after their hip fracture  
25 found that mobility and a return to normal activities were key outcomes for patients (21). An  
26 Australian study of mobility post-fracture found that reduced level of mobility was associated  
27 with fear of falling, physical limitations from other illness and social/environmental factors  
28 (22). Our results also echo findings from across the research literature on the experience of  
29 health and illness. For example, the difficulty disentangling the impact of one health  
30 condition from other co-morbidities has been found for mental health conditions (23). The  
31 acceptance of an acute health problem as being part of the aging process has been found for  
32 conditions such as stroke (25)(24). Recalibration to altered circumstances in response to a  
33 sudden injury has also been described (26) as have the adaptations, both physical and  
34 psychological that people make in order to maintain their quality of life (27). Reduced  
35 expectations of health and acceptance of limited function has been described among elderly  
36 women (28). Fear of falling is common among older people generally (29). Recalibration to  
37 altered circumstances in response to a sudden injury has also been described (25), as have the  
38 adaptations- both physical and psychological- that people make in order to maintain their  
39 quality of life (26). Reduced expectations of health and acceptance of limited function have  
40 been described among elderly women (27). Fear of falling is common among older people  
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7 generally (28). The consistency between our findings and other studies suggests that we now  
8 have sufficient qualitative evidence to inform policy decisions about the choice of  
9 appropriate PROMS for assessing recovery from hip fracture.

#### 11 12 *Implications for clinicians and policymakers*

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14 This study was undertaken in response to a potential policy change involving the use of a  
15 PROM to assess patient recovery from hip fracture, the results of which would form part of  
16 the evaluation of the quality of care provided for hip fracture. For the population  
17 experiencing fragility hip fractures, it is unlikely that a single PROM specific to hip fracture  
18 could be developed which is relevant to the whole spectrum of patients ~~from the active~~  
19 ~~through to the frail.~~ Several of the themes described by our ~~less frail~~ more active interviewees  
20 - mobility, day-to-day activities, self-care, pain and mental wellbeing, are similar to the  
21 domains included in currently available generic measures including the EuroQoL EQ-5D  
22 (13), the Short Form 36-item Health Survey (SF-36) ~~(30)~~ (29) and the WHOQoL-BREF  
23 ~~(31)~~ (30). Both the EQ-5D (3L) and the SF-36 (version 1) have been widely used in trials of  
24 people sustaining hip fractures, but for both measures evidence of essential measurement and  
25 practical properties is limited (7). ~~However, these themes were most clearly derived from~~  
26 ~~people representing the less frail end of the spectrum. Evaluating the relative benefit of~~  
27 ~~healthcare in patients representing the frailer end of the spectrum, even with generic~~  
28 ~~measures, is more challenging.~~ In the context of a clinical trial where patients are randomised  
29 to an intervention and control arm, these measures may be appropriate but they may need to  
30 be supplemented by specific tools for selected groups, especially those patients with high-  
31 levels of pre-injury function.

#### 32 33 *Unanswered questions and future research*

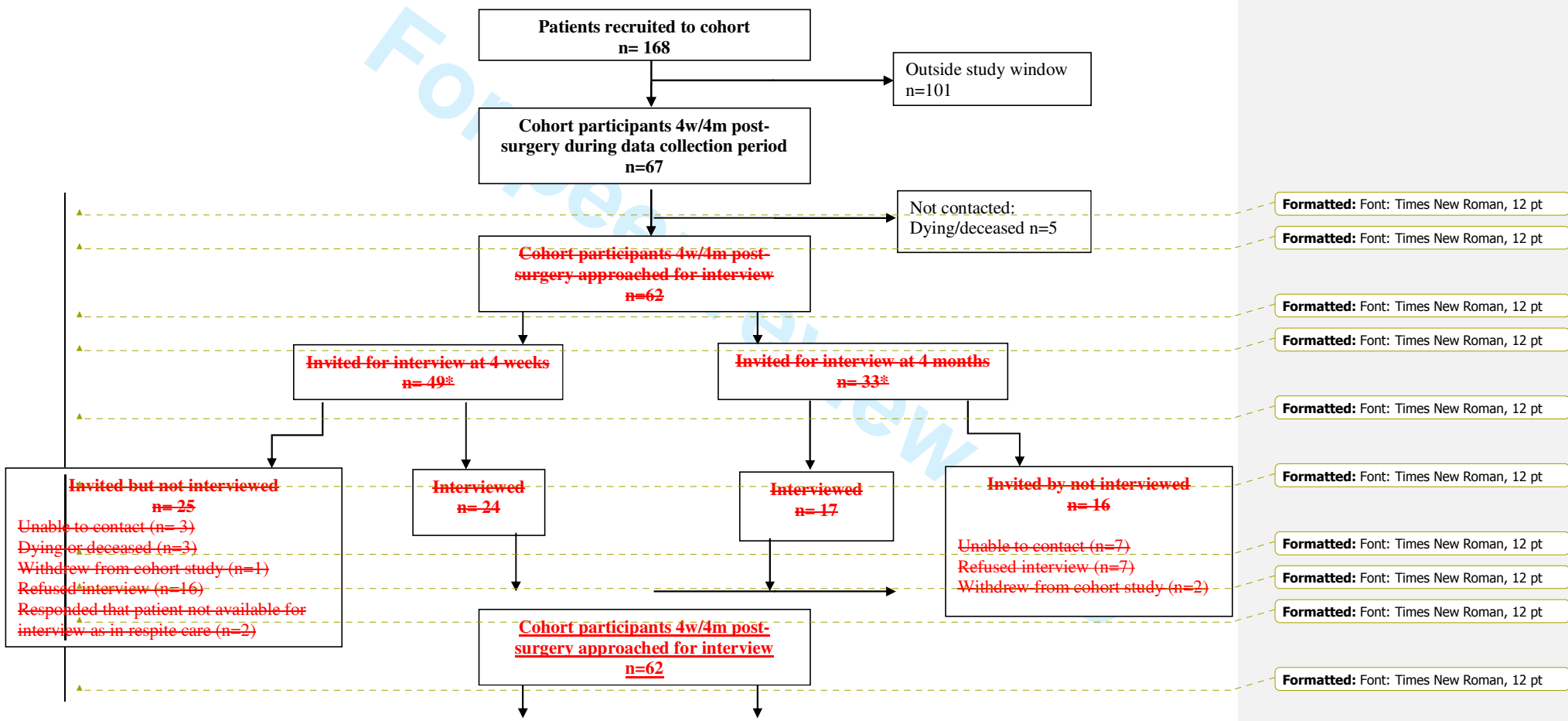
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35 ~~Our data can provide the basis for the selection of a generic PROM with potential for~~  
36 ~~assessing the quality of care following hip fracture. However, further research would be~~  
37 ~~needed to test its psychometric and practical properties when completed by the diversity of~~  
38 ~~patients and proxies in this population, and to assess its ability to reflect variation in care~~  
39 ~~quality rather than variation in patient and carers adaptability.~~

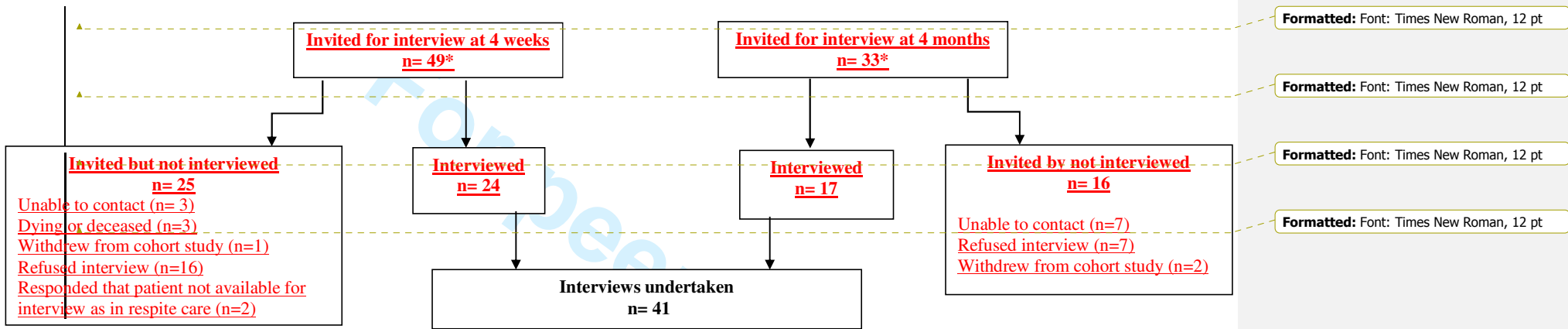
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41 In the context of assessing quality of care for a patient population as diverse as those  
42 experiencing hip fracture, it may be impossible to devise a single PROM that will be  
43 appropriate for all patients. Although quality of care may be one factor that will influence  
44 recovery as perceived by a patient, their pre-fracture state, adaptations that they or their carers  
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7 make to their reduced mobility, and their perception of whether or not they are at the stage in  
8 life where decline is inevitable will all influence how they answer questions contained within  
9 a PROM.  
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Figure 1 Flow chart of study recruitment





Notes: \* 20 participants were invited for interview at both 4 weeks and 4 months post operation

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**Active people who provided a clear account of fracture, recovery, and intention to get back to being as active as prior to the hip fracture**

61-year-old female social worker who lives with her husband. Before her fracture she was working full time and, for recreation, taking country walks, undertaking all types of gardening activities and playing with her grandchildren. Post fracture fixation (6 weeks) she described using crutches to get around the garden and shops, needing help with putting on socks and cutting toe nails, and was unable to climb stairs. She had noted shortening of her fractured leg which was causing her concern for the future (back pain, need for built up shoe). She had adapted temporarily to her mobility difficulties by living downstairs in her house, making changes that enabled her to get into the garden, adapted the way she prepared food and paid a cleaner to do housework. She talked in terms of improvement and expectation of returning to work and full activity including cleaning and gardening. During the interview she was able to specifically identify the limitations due to the hip fracture and how these were changing as she recovered. By the second interview she was frustrated that recovery was so slow but she could identify the ways in which she had continued to recover. (Participant 15, interviewed 6 weeks and 15 weeks post operation)

92-year-old female who lives alone in her own flat within a sheltered housing complex. Prior to the hip fracture she looked after herself and did her own washing, but had a cleaner to undertake heavy household chores. She spent most of each day out and about at the shops, engaging in social activities, bingo and on outings. She has a daughter who visits at least weekly. She had no other illnesses. Post fracture fixation she talked about having some initial pain and problems lifting her leg after the operation but was now mobile about her home with a walking frame. The housing complex has a lift which she now used. She was intending to return to getting out and about as she was before her fracture. (Participant 20, interviewed 5 weeks post operation)

**Frail people for whom the hip fracture had made almost no difference to their health experience, except where external circumstances changed**

88-year-old female retired teacher, who lives with her son. Other relatives live nearby. The patient wove together pre and post injury experience in her account, making it difficult to disentangle. She also spoke so softly she was difficult to hear. She said her son does the cooking and cleaning and her daughter assists with self care. She has a close family, feels well supported and has lots of visitors — friends, grandchildren and great grandchildren. She did not feel her physical health restricted her activities before her fracture, although acknowledged that she depended on her children. Her main interest beyond seeing friends and family is reading. She described being content with life. She mentioned having a diagnosis of multiple sclerosis but its impact on her health was unclear. Prior to her fracture she was unwell with an infection and recounts using a frame for mobility which she still uses. (Participant 23, interviewed 5 weeks post operation)

85-year-old female living in a nursing home. Her daughter visits alternate days. Her daughter provided the interview data. The patient has dementia but otherwise had been well before the fracture. Patient gets up and walks about herself, and takes herself to the toilet. She enjoys sitting and chatting. The patient does not remember the injury. Her life has not changed from

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7 how it was pre-injury. The daughter did not mention any fracture-specific issues related to  
8 recovery. (Participant 26, interviewed 6 weeks post operation)

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10 84 year old female with limited English language. Pre-injury she had carers to assist her with  
11 all her personal needs. The injury had occurred whilst being hoisted. Post injury her main  
12 concern was that at discharge from hospital, after a three month stay, she was sent to a  
13 nursing home where she knew no one. She mentioned some pain but it was unclear whether  
14 this was distinct from back pain which she had experienced for many decades. The  
15 interviewer found it difficult to engage the patient on questions about her hip fracture. The  
16 patient repeatedly expressed distress about being in the nursing home. During the interview,  
17 the nurse, who had known the patient since moving to the nursing home, provided an account  
18 of the patient's general function but nothing specific to recovery from the hip fracture.  
19 (Participant 5, interviewed 18 weeks post operation)

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61 year old female social worker who lives with her husband. Before her fracture she was working full time and, for recreation, taking country walks, undertaking all types of gardening activities and playing with her grandchildren. Post fracture fixation (6 weeks) she described using crutches to get around the garden and shops, needing help with putting on socks and cutting toe nails, and was unable to climb stairs. She talked in terms of improvement and expectation of returning to work and full activity including cleaning and gardening. By the second interview she was frustrated that recovery was so slow but she could identify the ways in which she had continued to recover. (Participant 15, interviewed 6 weeks and 15 weeks post operation)

92 year old female who lives alone in her own flat within a sheltered housing complex. Prior to the hip fracture she looked after herself and did her own washing, but had a cleaner to undertake heavy household chores. She spent most of each day out and about at the shops, engaging in social activities, bingo and on outings. She had no other illnesses. Post-fracture fixation she talked about having some initial pain and problems lifting her leg after the operation but was now mobile about her home with a walking frame. The housing complex has a lift which she now used. She was intending to return to getting out and about as she was before her fracture. (Participant 20, interviewed 5 weeks post operation)

92 year old female lives alone with husband. Daughter visits several times a week to help. Poor hearing. Difficult to disentangle what was before and after fracture. Seems to have been able to walk around house, undertake self-care and microwave own meals pre-fracture. Post fixation of the hip fracture, patient slowly improved walking. Life seems very similar to before fracture except need for walking aid. **People in between the extremes of the spectrum from active through to frail**, inability to put on socks and husband now microwaves the meals. (Participant 9, interviewed 9 weeks post operation)

70 year old male retired painter and decorator who lives with his wife and enjoys almost daily visits from his grandchildren. Mobility restricted to 5-6 metres for more than two years prior to fracture due to knee pain and chronic obstructive pulmonary disease. ~~Known to have osteoporosis pre fracture.~~ When interviewed he describes struggling to get up the stairs, get in and out of bed, put his shoes and socks on, and bend down. ~~However, it was difficult to disentangle the specific impact of the hip fracture on his activity.~~ Although his mobility was severely restricted prior to his fracture, he described being unable get around as much, ~~nor as much~~ as he had done before the fracture. ~~The fracture seems to have been a pivotal event as the patient felt his life had changed.~~ He noted some improvement over recent weeks, as he no longer needed two sticks for walking, only one. (Participant 3, interviewed 15 weeks post operation)

84 year old male with dementia, who has some lucid moments and some recall of falling and hurting himself. He lives with his wife who looks after him and they have a cleaner to do heavy housework. Wife provided interview, involving the patient in the latter half when he woke up. Patient's walking was gradually slowing and he had a number of falls before his fracture. Fracture occurred while walking in shopping area with his wife. Since fixation of the fracture patient has required assistance with personal care, has professional carers four times a day, and the bathroom has been adapted for his limited mobility. The interviewee had difficulty distinguishing decline due to old age and change due to the fracture. The patient complained of some pain but it was unclear whether this was from the fracture or previously

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7 established osteoarthritis. Before the fracture both patient and wife had ceased all non-  
8 essential activities except for a weekly trip to the shops so daily life had changed little except  
9 for more care provision. ~~The interviewee commented that the fracture would have had more~~  
10 ~~impact on their lives if the patient had been younger and fitter.~~ (Participant 11, interviewed 7  
11 weeks post operation)

12 ~~84 year old male who has dementia. He lives alone but received visits three times a day from~~  
13 ~~his son who provides meals. Son was interviewed. Arthritis of knee limited mobility before~~  
14 ~~the fracture. Spent most of the day sitting. At weekends prior to fracture patient went to~~  
15 ~~neighbour's house for evening meal. Patient fell and sustained fracture while walking to~~  
16 ~~neighbour's house. Patient does not recall fracture. At time of interview, the patient was as~~  
17 ~~mobile as pre operation limited by pain and stiffness from arthritis. Not yet visiting neighbour~~  
18 ~~but this was because family was discouraging this in case he falls again rather than due to~~  
19 ~~mobility. (Participant 1, interviewed 16 weeks post operation)~~

20  
21 ~~92 year old female lives alone with husband. Daughter visits several times a week to help her~~  
22 ~~parents. Poor hearing. Interview was full of mishearing and jokes between patient and her~~  
23 ~~husband. Difficult to disentangle what was about before and after fracture. Seems to have~~  
24 ~~been able to walk around house, undertake self care and microwave own meals pre fracture.~~  
25 ~~Post fixation of the hip fracture, patient slowly improved walking. Life seems very similar to~~  
26 ~~before fracture except need for walking aid and inability to put on socks. Husband now~~  
27 ~~microwaves the meals. (Participant 9, interviewed 9 weeks post operation)~~

28  
29 74 year old female who lives with husband. Patient lived with severe rheumatoid arthritis for  
30 30 years. Developed heart failure and admitted to hospital with shortness of breath and  
31 confusion. Fell while in hospital and fractured her hip. Mobility before hip fracture very  
32 limited – able to walk slowly in house and garden, undertake light chores, and use scooter to  
33 go shopping. Became worse with breathing difficulty. Mobility remained reduced after  
34 hospital admission. Able to take step slowly in house with support. Uses wheelchair to go out  
35 of house – a new ramp improved this by second interview. Unclear how much mobility  
36 change was due to the fracture and how much due to heart failure. (Participant 18,  
37 interviewed 6 weeks and 18 weeks post operation)

38  
39 88 year old female retired teacher, who lives with her son and has a diagnosis of multiple  
40 sclerosis. The patient wove together pre and post injury experience in her account, making it  
41 difficult to disentangle. She said her son does the cooking and cleaning and her daughter  
42 assists with self-care. She has a close family, feels well supported and has lots of visitors –  
43 friends, grandchildren and great grandchildren. Her main interest beyond seeing friends and  
44 family is reading. She described being content with life. Prior to her fracture she was unwell  
45 with an infection and recounts using a frame for mobility which she still uses. (Participant  
46 23, interviewed 5 weeks post operation)

47 85 year old female living in a nursing home. Her daughter visits alternate days. Her daughter  
48 provided the interview data. The patient has dementia but otherwise had been well before the  
49 fracture. Patient gets up and walks about herself, and takes herself to the toilet. She enjoys  
50 sitting and chatting. The patient does not remember the injury. Her life has not changed from  
51 how it was pre injury. The daughter did not mention any fracture-specific issues related to  
52 recovery. (Participant 26, interviewed 6 weeks post operation)

53  
54 84 year old female with limited English language. Pre-injury she had carers to assist her with  
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7 all her personal needs. The injury had occurred whilst being hoisted. Post injury her main  
8 concern was that at discharge from hospital, after a three month stay, she was sent to a  
9 nursing home where she knew no-one. The patient repeatedly expressed distress about being  
10 in the nursing home but did not talk about the fracture.  
11 (Participant 5, interviewed 18 weeks post operation)

12 84 year old male who has dementia. He lives alone but received visits three times a day from  
13 his son who provides meals. Son was interviewed. Arthritis of knee limited mobility before  
14 the fracture. Spent most of the day sitting. At weekends prior to fracture patient went to  
15 neighbour's house for evening meal. Patient fell and sustained fracture while walking to  
16 neighbour's house. Patient does not recall fracture. At time of interview, the patient was as  
17 mobile as pre operation limited by pain and stiffness from arthritis. Not yet visiting neighbour  
18 but this was because family was discouraging this in case he falls again rather than due to  
19 mobility. (Participant 1, interviewed 16 weeks post operation)  
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46 **TableBox 1** Summaries of the data about individual patients ~~illustrating the spectrum of~~  
47 ~~patients from active through to frail~~ and their recovery from a hip fracture.

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Theme	Examples from interviews
<p><b>Mobility</b> Walking and other manoeuvres with the legs.</p>	<p>I'm walking with a walking stick at the moment. I've been down the park and back...I can usually get around [the house] without the walking stick, and I can get up and down stairs no problem. I get upstairs with my good leg and downstairs with my bad leg. (Participant 6, male, age 78, 5 weeks post operation)</p> <p>I can walk with crutches, but some days it's a lot slower than other days. (Participant 7, female, age 70, 5 weeks post operation)</p> <p>Her mobility's getting better. I think she'll cope with the frame. She's had a couple of falls in the home, earlier when she was forgetting that she had to use the frame. She'd get out of bed and not use the frame and consequently fall. But she's got in the habit of using it now... she's not falling, which is a bonus. (Carer of participant 13, female, age 87, 14 weeks post operation)</p> <p>I went to see the specialist and I told him I can't put my full weight on it. I walk with a stick now. (Participant 3, male, age 70, 15 weeks post operation)</p> <p>The operation was successful and got him back to normal right from the start, right from the very first day that he had it done. He was able to then walk pain free with a Zimmer frame to the toilet. The staff were all saying it was amazing how well he was walking and he would soon be back to normal, but what they didn't realise was that he was walking normally and it looked slightly less good than normal because of his knees. So I think he was as right as rain right from the start. I think the operation was a fantastic success. (Carer of participant 1, male, age 84, 16 weeks post operation)</p> <p>I have used my stick quite a bit although I have walked a long way while I have been [on holiday]. I try sometimes to walk without the stick but I do it with a bit of a limp. (Participant 6, male, age 78, 16 weeks post operation)</p> <p>When I was in hospital I couldn't get out of bed... but now when I've been in bed all night I can push myself over... I can pick up my leg and just swing it out of bed... to me, [that] is a bonus, a big bonus. (Participant 9, female, age 92, 16 weeks post operation)</p> <p>When I get out of the car I have to release my seat and take it back, put my right foot out first, then get hold of the bottom of my trouser leg, lift that up and lift my leg out. It is a bit awkward lifting my leg up. (Participant 12, male, age 78, 16 weeks post operation)</p> <p>Well it is a bit different because I'm not... I can't rush round like I did, but eventually that will come... I mean it's pretty normal now, but I think it's going to be a while before I can actually walk as I did and I probably won't walk as I did... when I came home [from hospital] I was still hobbling... but now I'm more or less... walking normal, especially with the stick... I couldn't climb a step ladder or anything like that,</p>

		<p>well I'd be a bit nervous anyway, whereas before if I wanted to decorate a room I would go ahead and do it. ... I would go for long walks and that's something I cannot do. (Participant 10, female, age 83, 18 weeks post operation)</p>
<p><b>Activities</b> Activities beyond personal care.</p>		<p>I just miss getting up and getting out. I never stayed in. I'd go out in the morning and come back and then I'd go out again, I just used to go out looking round the shops. I just get these crossword books and I do those. (Participant 20, female, age 92, 5 weeks post operation)</p> <p>I'm back on what I call domestic duties—washing up! But the thing that is frustrating is that I can't get outside and do any gardening. We've got a hawthorn hedge, and for me to do it, it'd take me about an hour. And of course, I can just go along and do it. All the rain has made it very slippery, and [wife] says, "No way do you go out there." (Participant 12, male, age 78, 6 weeks post operation)</p> <p>Everything is affected really. I haven't been able to go out in the garden to do any gardening, even though we had nice weather, because I can't get down on my knees. I haven't been able to wash the windows. I couldn't wash my own car, my husband did that, but normally I would have done it myself. The only thing I'm still able to do that I used to do is read. I've read a lot and I've got a Kindle so I've been able to download books, so I haven't been relying on having to go out and buy books or borrow books. The other thing that remains the same is, I can watch television. (Participant 15, female, age 61, 6 weeks post operation)</p> <p>Whenever we fancied the day out, we would drive to [list of local UK towns]. She would hire a scooter and go into town and just have a nice day. Go and have lunch. But this has put a top hat on that up to now anyway. Because at the moment she can't get on a scooter. (Husband of participant 18, female, age 74, 6 weeks post operation)</p> <p>I can do little jobs but because I haven't got as much movement in the hip joints, I find it difficult to go down on my hands and knees. With gardening you need to get down on your hands and knees for planting and things, and that is not possible. If I go down on one knee it's difficult to get up again so that's not possible but I can do things that are higher up, I can trim. (Participant 15, female, age 61, 15 weeks post operation)</p> <p>Over the last three weeks, when we go out shopping now, I can't go down the aisles, so [daughter] gets me a chair and I can sit in the chair and then say what shopping I need, that is very good. (Participant 9, female, age 92, 18 weeks post operation)</p> <p>I'm tackling a little bit of cooking now. I started to cook myself some nice lunches and I haven't got round to the... scones ... I made one lot when I came home and I thought, I can't be bothered anymore. (Participant 10, female, age 83, 18 weeks post operation)</p>
<p><b>Self care</b> (washing, dressing) limited</p>		<p>I can wash and dress myself, at least, up to a point I can. I mean I can't stand up for very long so I mean I have to have a wash sitting down. It is a bit difficult to try and get dressed and undressed, at the moment anyway, because I can't stand for long. (Participant 28, female, age 89, 4 weeks post operation)</p>

<p>due to fracture.</p>	<p>I'm also worried about how much movement I will have in my hip, because I'm still not able to put a sock or anything on my injured leg. I can manage now with my trouser leg and throw these jogging trousers and hook my leg into them but I have to ask my husband if I need to put a sock or a shoe, or my slipper on that foot. I have to ask him. (Participant 15, female, age 61, 6 weeks post operation)</p> <p>Something that he [husband] would never do that he did. Last night I was struggling in there [bathroom] to get my clothes off and he opened the door and says, "Come on, come on, let's have your feet up". He lifted my feet up, took my socks off, because I was struggling. So he did and I thought he wouldn't have done that. (Participant 9, female, age 92, 9 weeks post operation)</p> <p>I still have to throw my clothes and hook them onto the foot to get dressed. I couldn't wear lace-up shoes or anything like that because I couldn't tie them up, but things like slip-ons and sandals I can get on quite easily, so I'm fairly independent—I am independent really, I just need help with cutting my toenails and that—those on the right foot that's all. (Participant 15, female, age 61, 15 weeks post operation)</p>
<p><b>Pain</b> Pain specifically from the hip fracture.</p>	<p>So here I am, four or five weeks [post operation], I get a little bit of pain, not a lot. (Participant 7, female, age 70, 5 weeks post operation)</p> <p>When anybody asked if he was in pain he said it was his hip on both sides and his knee on both sides and the leg break was on the thigh and he said that was fine. If they asked him how he was he'd say oh that's fine no problem and I don't think he ever felt pain from that once the operation had been done. (Carer of participant 1, male, age 84, 16 weeks post operation)</p> <p>There's several times, like when I have got to get up those steps. I put my right foot first and bring my left foot up, and once or twice... you step on your left, and it's still there, lets you know it's still tender. (Participant 12, male, age 78, 16 weeks post operation)</p> <p>The pain was so bad before I had it done, and I just couldn't believe the relief after the operation when I was walking in the hospital and I had one of those pushers you know. And there was no pain. And I kept thinking, I can't believe this, and that's how it's been. I've never had any pain, not at all. (Participant 10, female, age 83, 18 weeks post operation)</p> <p>Not at all, not at all. I don't get any pain at all or... I'm walking quite normal now. (Participant 7, female, age 70, 23 weeks post operation)</p>
<p><b>Mental wellbeing</b> Depression or low mood specifically attributed to the experience of</p>	<p>He can't walk and that, to him he'd rather die. I'll be honest with you he's said it once or twice, "Let me go". And I said, "No you're not going nowhere". And then the other day for the first time, but he hasn't said it since, "I'm going to commit suicide", I said, "No you're not, you're not". I said, "You'll get over this [patient's name], you'll beat it". And he will. (Carer of participant 31, male, age 84, 5 week post operation)</p>

<p>fragility fracture and recovery.</p>	<p>Lowness of mood does come on sometimes and I think, oh god, you know, why did that happen (Participant 10, female, age 83, 18 weeks post operation)</p> <p>It is not just in terms of the physical aspect but in terms of the mental, that to me is much more important, especially to somebody who is active. If they're not such an active person perhaps they don't mind sitting in a chair all day and all night, some people might not find that a problem. For me it was a massive problem and caused me depression. To me is the most important thing, the mental aspect of taking away somebody's freedom to be able to move around and go to the shops and do all that sort of thing. (Participant 7, female, age 70, 23 weeks post operation)</p>
<p><b>Fear of falling</b> Fear of a further fall expressed by patient or carer.</p>	<p>I think it frightened him more than anything else. He's frightened he'll fall over again and do it again, that bothers him more than anything else. Because now when he stands up at all to try and walk he's frightened he's going to fall over and the same thing will happen all over again. But I think apart from that, if he gets to the state where he can walk about by himself, alright with his stick or you know a part of his chair and walk about, he's going to be quite happy. It's going to make his life a lot better. It's just that initial, I think getting over this fear of falling and having the same thing happen all over again. (Carer of participant 11, male, age 84, 7 weeks post operation)</p> <p>The only thing sometimes you get worried about is falling over, it's strange falling over, you wouldn't believe it really. At one time you would fall over and pick yourself up and dust yourself off and carry on. (Participant 6, male, age 78, 16 weeks post operation)</p> <p>I've got to watch what I'm doing. If I catch my foot on [paving stone], I can go over again. (Participant 12, male, age 78, 16 weeks post operation)</p>
<p><b>Leg shortening</b> A problem well known clinically following extra-capsular fracture of the proximal femur.</p>	<p>One leg is now shorter than the other so that makes walking a bit difficult because it gives me back pain and it gives me pain funnily enough at the bottom part of my leg, not at the top, between the knee and the ankle that's very p but I am able to walk. (Participant 15, female, age 61, 15 weeks post operation)</p>

**Table 2 Themes and illustrative quotations from interviews with patients able to articulate what is important to them during recovery post hip fracture**

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# BMJ Open

## Evaluating recovery following hip fracture: a qualitative interview study of what is important to patients

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4 **important to patients**  
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## Abstract

### Objective

To explore what patients consider important when evaluating their recovery from hip fracture and to consider how these priorities could be used in the evaluation of the quality of hip fracture services.

### Design

Semi-structured interviews exploring the experience of recovery from hip fracture at two time points - four weeks and four months post-operative hip fixation. Two approaches to analysis: thematic analysis of data specifically related to recovery from hip fracture; summarising the participant's experience overall.

### Participants

31 participants recruited, of whom 20 were female and 12 were cognitively impaired. Mean age 81.5 years. Interviews provided by 19 patients, 14 carers, and 8 patient/carer dyad; 10 participants were interviewed twice.

### Setting

Single major trauma centre in the West Midlands of the UK.

### Results

Stable mobility (without falls or fear of falls), for valued activities was considered most important by participants who had some pre-fracture mobility and were able to articulate what they valued during recovery. Mobility was important for managing personal care, for day-to-day activities such as shopping and gardening, and maintenance of mental well-being. Some participants used assistive mobility devices or adapted to their limitations. Others maintained their previous limited function through increased care provision. Many participants were unable to articulate what they valued as hip fracture was perceived as part of their decline with age. The fracture and problems from other health conditions were an inseparable part of one health experience.

### Conclusions

Patients consistently valued stable mobility and its role in other basic health domains. For evaluating service quality, no one patient-reported outcome measure (PROM) could consistently evaluate recovery for patients with hip fracture. General health-related quality of life tools may provide useful information within clinical trials but may need to be supplemented by specific tools for selected groups, especially those patients with high-levels of pre-injury function.

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5 **Key words:** Hip fractures, Outcome assessment (Health Care), Interview, Frail older adults  
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7 **Article summary**  
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9 *Article focus*  
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- 11 • The UK NHS has identified the need to evaluate service provision for patients with a  
12 hip fracture
- 13 • There is increasing expectation that patient-reported outcome measures (PROM) are  
14 used within health service evaluation
- 15 • We asked the question: what do patients who have recently experienced a hip fracture  
16 consider important when evaluating their recovery?  
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18 *Key messages*  
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- 20 • Patients active before their fracture value mobility without falls or fear of falls, to  
21 undertake valued activities but many patients consider fracture to be part of their  
22 decline with age.  
23
- 24 • While no one PROM could evaluate all aspects of recovery for patients with hip  
25 fracture, general health-related quality of life tools may provide useful information for  
26 the majority of patients.  
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30 *Strengths and limitations*  
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- 32 • The study sample was representative of the age profile, gender balance and dementia  
33 levels of NHS patients experiencing hip fractures
- 34 • It is possible that those not agreeing to be interviewed were struggling most with  
35 recovery.  
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- 37 • The data is limited by the difficulty the more physically and cognitively impaired  
38 patients had in giving a detailed account of their health experience.  
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## Introduction

Fragility fracture of the proximal femur (hip fracture) is one of the greatest challenges facing the healthcare community. In 1990, a global incidence of 1.31 million was reported and was associated with 740,000 deaths (1). Hip fractures constitute a heavy socioeconomic burden worldwide. The cost of this clinical problem is estimated at 1.75 million disability adjusted life years lost; 1.4% of the total healthcare burden in established market economies (1).

Among those experiencing fragility hip fracture in England, Wales and Northern Ireland, 70% are aged 80 years or older, 73% are female and 34% are cognitively impaired pre-operation. The mortality rate within 30 days of operation was 8.2% in 2013 (2).

The NHS has identified the need to evaluate the quality of service provision for patients with a hip fracture; this evaluation is conducted through the National Hip Fracture Audit Database (NHFD)(2). Currently, aspects of care such as time to surgery, length of patient stay and patient mortality in hospital and 30 day and 120 day follow up are recorded in the NHFD. These data are now used to guide payments to healthcare providers; the payment being increased if the provider supplies 'best practice' care (3). However, while important, there is interest from policy makers in the potential to enhance these currently reported data fields by including and an assessment of outcome as reported by patients. It is increasingly expected that healthcare evaluations should include domains of health that are important to patients (4), captured by well-developed patient-reported outcome measures (PROMs) which aim to assess how patients function and feel in relation to a health condition or associated treatment (5). PROMS capture information that cannot be obtained by other means (5, 6) complementing more traditional performance or process-based measures.

Our aim was to establish whether or not one PROM could be used with all patients who experience a fragility hip fracture as part of the evaluation of the quality of health care for hip fracture delivered by the NHS. For this patient group we were unable to identify a PROM specific to the assessment of hip fracture, and robust evidence of the quality and acceptability of non-hip fracture specific PROMs following completion by patients sustaining a hip fracture is limited (7). Moreover, clarity with regards to the outcomes of healthcare that these patients considers relevant and important does not exist. Appropriate and relevant PROM-based assessment should be underpinned by an understanding of what is important to patients in terms of the outcomes of healthcare. We therefore designed an interview study to explore

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3 with patients and, where appropriate, their carers, what they consider to be important  
4 outcomes and to explore variation across this patient group. Our research questions were:

- 5  
6 1. What do patients who have recently experienced a hip fracture consider important when  
7 evaluating their recovery?  
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9 2. Is there variation within this population of the experience of what is considered important  
10 in recovery from hip fracture?  
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13 These research questions are framed by the desire of policy makers to evaluate the quality of  
14 care for hip fracture through assessment of recovery from the perspective of the patient.  
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## 17 18 **Method**

### 19 20 *Study Design*

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22 We conducted semi-structured interviews with patients and, where appropriate, their carers at  
23 two time points, at approximately four weeks and then again at four months after they had  
24 sustained a fragility hip fracture.  
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### 28 29 *Identification of patients with a hip fracture*

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31 We recruited participants from an existing cohort study, the Warwick Hip Trauma Evaluation  
32 (8), that commenced January 2012. This is a cohort of all patients admitted with a hip fracture  
33 to a single major trauma centre in the West Midlands of the United Kingdom. As part of their  
34 pre-operative assessment, patients were assessed for their capacity to consent using clinical  
35 assessment and the Abbreviated Mental Test Score (AMTS) (9). The AMTS is a 10-item  
36 measure used to rapidly assess the possibility of cognitive impairment in elderly people. A  
37 score below 8 suggests cognitive impairment (10). Scores less than 8 were taken to indicate  
38 that a patient was unlikely to be able to consent for themselves. Those deemed to have  
39 capacity for consenting to surgery, based on clinical assessment and AMTS, were considered  
40 able to consent for this study. Following the emergency surgery for their fracture, those with  
41 capacity gave written consent to be approached for interview. For those deemed not to have  
42 capacity due to cognitive impairment, verbal consent was obtained from their consultee (11).  
43  
44 Ethical approval was granted by NHS REC London - Camberwell and St Giles (11/LO/0927)  
45 on the 18<sup>th</sup> August 2011.  
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### 55 56 *Sampling*

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3 During the data collection period for this study, February to August 2012, we purposefully  
4 sampled cohort participants who had reached 4 weeks or 4 months following their hip  
5 fracture and had consented to be approached for interview. The time points were chosen to be  
6 the same as those used for data collection for the NHFD (12). If a PROM were to be used  
7 with this patient population to assess quality of care, patients would be asked to complete the  
8 PROM at these time points. Our sampling strategy ensured a diverse mix of patients with  
9 respect to the following factors: age, gender, AMTS (9) and EQ-5D score (13).  
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#### 14 15 16 *Interview recruitment and consent process*

17 We contacted eligible patients and carers by telephone just prior to 4 weeks and/or 4 months  
18 following hip fracture first to invite them to be interviewed, then to arrange an interview. If  
19 patients declined to participate, the reasons offered were recorded. Patients with capacity to  
20 consent were contacted directly. For those patients deemed not to have capacity, we  
21 contacted their consultee. Patients able to consent for themselves signed their own consent  
22 forms. For those unable to consent the consultee signed an agreement form and we aimed to  
23 interview a carer as well as the patient (patient/carers dyad). Carers who were interviewed  
24 signed a consent form. Recruitment continued to data saturation at the first time point. The  
25 study flow diagram is at Figure 1.  
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#### 34 35 *Interview process*

36 We interviewed participants at their current residence (own home, residential or nursing  
37 home) or in hospital. The interviewer was trained in interviewing but did not have clinical  
38 knowledge of hip fracture, its treatment or prognosis. Where possible, patients and carers  
39 were interviewed alone, however where the carer and patient requested a joint interview  
40 (whether or not the patient had cognitive impairment), they were interviewed together. The  
41 aim of the interviews was to understand each participant's lived experience of hip fracture  
42 (14) and the influence of their social context and pre-fracture health. We use the following  
43 questions:  
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- 47 • What is a normal day like for you now?
  - 48 • How bothersome are you finding your hip?
  - 49 • What is different about your life now compared to just before your injury?
  - 50 • Compared to just before your injury what has stayed the same?
  - 51 • Which of these make the most difference to your life?
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55 The interviewer encouraged participants to talk about the experience in whatever order they  
56 chose and using terms meaningful to them. Later in the interview we prompted, where  
57 necessary, for clarification about what in the patient experience was related to the hip  
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3 fracture. Towards the end of the interview we directly asked what was important to them in  
4 terms of recovery if this had not already been talked about by the participant, using the  
5 following questions:  
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- 7 • What is important to you in terms of your recovery?
- 8 • Where would you like to see yourself in the future in relation to your recovery (i.e. the  
9 next few weeks and months)?
- 10 • If a friend or neighbour were asking you now about how well you are recovering –  
11 what has been important to you that you would tell them about?
- 12 • If a doctor or nurse was asking you now about how well you are recovering – what  
13 would be important for the doctor or nurse to ask about?  
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18 Consideration was given to the potential challenges associated with interviewing older adults,  
19 for example by giving potential participants sufficient time to decide whether or not to  
20 participate and minimising burden and fatigue through streamlining questions (15). The  
21 interview process, questions and prompts were refined by the study team during the initial  
22 stage of data collection. Questions were similar for both patient and carer. Interviews were  
23 audio recorded and transcribed verbatim. For one interview, audio recording was not feasible  
24 due to the noisy environment so extensive field notes were taken and transcribed. For all  
25 interviews the researcher made field notes to assist interpretation of the interview data.  
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### 32 *Analysis*

33 Interview transcripts were checked, anonymised and uploaded into Nvivo software (16).  
34 Initial analysis involved data immersion, reading and re-reading each transcript and  
35 discussion of the interview transcripts by the research team. All team members read at least  
36 five transcripts so all transcripts were read by at least two team members. From the data we  
37 identified and crystallised what was important for participants that was specific to hip  
38 fracture recovery (17). We found that the interviews at four weeks and four months covered  
39 very similar issues, although, as would be expected, what the participants reported about each  
40 issue four weeks and at four months was different, as recovery was more advanced at four  
41 months. As our analysis aimed to identify what patients consider important when evaluating  
42 their recovery rather than the detail of recovery itself, we treated all the interviews related to  
43 one participant as one set of data. During data interpretation we took account of the timing of  
44 the interview, whether the interview data was from a patient or carer or patient/carer dyad,  
45 and field notes. Two different approaches to analysis were then undertaken in response to our  
46 research questions.  
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3 To answer our first research question, we searched the transcripts for any mention by the  
4 participants of what was important to them during recovery from hip fracture. These were  
5 discussed at team analysis meetings. Transcripts were then coded in NVivo. As coding  
6 proceeded, we reviewed these codes at our team analysis meetings and combined them into  
7 themes. After we had read, discussed and then coded ten transcripts we found no additional  
8 themes in the remaining data. Double coding was undertaken for one in four transcripts and  
9 coding compared and discussed to check consistency of final coding. During analysis we  
10 became aware that although the data from different participants could be coded under the  
11 same theme such as mobility, there was variation in the experience of recovery. This led us to  
12 our second research question and analysis approach.  
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21 To answer our second research question, from close reading of the first five interview  
22 transcripts we developed, from the data, a template for summarising the experience of hip  
23 fracture recovery for each patient carer dyad. This involved considering each set of  
24 interviews as a whole, reading and rereading the text and writing a summary of the  
25 patient/carer journey and all that influenced it. We reviewed the summaries at our data  
26 analysis meetings and from these initial summaries we developed a draft template. We  
27 refined the template as we summarised and discussed further transcripts. The template  
28 included: current and recent past living arrangements and environment, day-to-day life now  
29 and in the recent past, the impact of the hip fracture and its management, what was changing  
30 in day-to-day life as they recovered, the extent to which the patient referred specifically to the  
31 fracture and their ability to engage in the interview. The data from each patient or  
32 patient/carer dyad was summarised with a second research team member reviewing each  
33 summary against the data. To qualitatively understand the variation in the experience of what  
34 was considered important for recovery, we compared these summaries.  
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## 46 **Results**

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48 Twenty one patients were interviewed on one occasion and 10 were interviewed twice giving  
49 a total of 31 patient participants and 41 interviews. Of the 31 patient participants, 20 (64.5%)  
50 were female, the mean age was 81.5 years (SD 9.2, range 61-96) and 12 (39%) scored less  
51 than eight on the AMTS. Of the 41 interviews, 24 were conducted three to nine weeks, and  
52 17 were conducted 14 to 23 weeks after the hip fracture. Nineteen interviews were with the  
53 patient only, 14 with carer only, and eight with patient/carer dyads. Interviews lasted between  
54 20 and 90 minutes. Despite framing the interview for interviewees as exploring the  
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3 experience of hip fracture, many interviewees talked about general health issues. Although  
4 we prompted to clarify what was related to their fracture, in many interviews it was difficult  
5 to disentangle the impact of the fracture from the impact of other health problems. Some  
6 interviews contained almost no data that was clearly related to the fracture. From the  
7 perspective of the patient, all their health problems were part of one experience. The absence  
8 of data clearly related to the fracture was more marked in the four month compared to four  
9 week interviews. We therefore decided not to attempt interviews at 12 months post fracture  
10 as originally planned (8). The following sections report our analysis. Illustrative quotations  
11 from data are labelled with the age and gender of the patient, time since hip fracture and  
12 whether the quotation was from the patient or carer.  
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### 21 What is important to patients when evaluating their recovery?

22 From our systematic search of the interviews for data related to recovery from the hip  
23 fracture we identified the following themes: mobility, valued day-to-day activities, self-care,  
24 pain, mental wellbeing, fear of falling and leg shortening. When talking about mobility, day-  
25 to-day activities or self-care participants also talked about their level of independence.  
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#### 31 *Mobility*

32 This was the most prominent theme, although when talking about mobility the interviewees  
33 often mentioned other themes. Mobile participants reported limited mobility in the weeks  
34 post operation and valued any improvement.  
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39 I'm walking with a walking stick at the moment. I've been down the park and back...I  
40 can usually get around [the house] without the walking stick, and I can get up and  
41 down stairs no problem. I get upstairs with my good leg and downstairs with my bad  
42 leg. (Participant 6, male, age 78, 5 weeks post operation)  
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45 By four months, for many participants mobility had improved, and they were happy that they  
46 were returning to normal mobility.  
47

48 I can't rush round like I did, but eventually that will come...I mean it's pretty normal  
49 now, but I think it's going to be a while before I can actually walk as I did and I  
50 probably won't walk as I did... when I came home [from hospital] I was still  
51 hobbling... but now I'm more or less...walking normal, especially with the stick  
52 (Participant 10, female, age 83, 18 weeks post operation)  
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55 For those with limited mobility before hip fracture any unaided improvement was limited to  
56 the pre-fracture level but also valued.  
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3 The operation was successful and got him back to normal right from the start, right  
4 from the very first day that he had it done. He was able to then walk pain free with a  
5 Zimmer frame to the toilet. The staff were all saying it was amazing how well he was  
6 walking and he would soon be back to normal, but what they didn't realise was that  
7 he was walking normally. (Carer of participant 1, male, age 84, 16 weeks post  
8 operation)  
9

10  
11 Other participants were using mobility aids that they had not been using regularly before the  
12 fracture. For some, the addition of mobility aids enabled greater security of mobility than  
13 prior to their fracture.  
14

15 Her mobility's getting better. I think she'll cope with the frame. She's had a couple of  
16 falls in the home, earlier when she was forgetting that she had to use the frame. She'd  
17 get out of bed and not use the frame and consequently fall. But she's got in the habit  
18 of using it now... she's not falling, which is a bonus. (Carer of participant 13, female,  
19 age 87, 14 weeks post operation)  
20  
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### 22 *Valued day-to-day activities*

23 Those who were active prior to their fracture talked about the frustration of the restriction in  
24 their activities particularly in the weeks following the fracture.  
25  
26

27 I'm back on what I call domestic duties – washing up! But the thing that is frustrating  
28 is that I can't get outside and do any gardening. (Participant 12, male, age 78, 6 weeks  
29 post operation)  
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31

32 I just miss getting up and getting out. I never stayed in. I'd go out in the morning and  
33 come back and then I'd go out again, I just used to go out looking round the shops. I  
34 just get these crossword books and I do those. (Participant 20, female, age 92, 5  
35 weeks post operation)  
36  
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38 Participants who were active before their fracture were usually able to resume valued  
39 activities but had some limitations which remained a frustration.  
40  
41

42 I can do little (gardening) jobs but because I haven't got as much movement in the  
43 hip joints, I find it difficult to go down on my hands and knees... If I go down on one  
44 knee it's difficult to get up again so that's not possible but I can do things that are  
45 higher up, I can trim. (Participant 15, female, age 61, 15 weeks post operation)  
46  
47

48 I'm tackling a little bit of cooking now. I started to cook myself some nice lunches  
49 and I haven't got round to the... scones ... I made one lot when I came home and I  
50 thought, I can't be bothered anymore. (Participant 10, female, age 83, 18 weeks post  
51 operation)  
52

53 Some participants returned to valued activities through adapting how they did them, this  
54 participant using a wheelchair for the first time.  
55  
56

57 Over the last three weeks, when we go out shopping now, I can't go down the aisles,  
58 so [daughter] gets me a (wheel)chair and I can sit in the chair and then say what  
59  
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3 shopping I need, that is very good. (Participant 9, female, age 92, 18 weeks post  
4 operation)  
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6

7 Participants who no longer undertook valued activities that involved significant mobility  
8 were content to continue as they were, for example, occupying themselves with visits from  
9 family and reading.  
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### 12 *Personal care*

13  
14 Washing, dressing and getting to the toilet was talked about in interviews, but in many cases  
15 it was not clear whether difficulties with personal care were specifically due to the fracture. A  
16 few interviewees talked about problems with incontinence but again it was unclear whether  
17 this was specific to the fracture. Most patients had a commode or had arranged to sleep near  
18 the bathroom in the weeks immediately after the fracture. Some participants were able to  
19 describe problems with self-care specific to the hip fracture.  
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26 I'm ...not able to put a sock or anything on my injured leg. I can manage now with  
27 my trouser leg and throw these jogging trousers and hook my leg into them but I have  
28 to ask my husband if I need to put a sock or a shoe, or my slipper on that foot.  
29 (Participant 15, female, age 61, 6 weeks post operation)  
30  
31

32 At the second interview this participant was pleased to report that she now needed very little  
33 help with self-care, at least in part through wearing alternative footwear.  
34

35 I still have to throw my clothes and hook them onto the foot to get dressed. I couldn't  
36 wear lace-up shoes or anything like that because I couldn't tie them up, but things like  
37 slip-ons and sandals I can get on quite easily, so I'm fairly independent – I am  
38 independent really, I just need help with cutting my toenails and that – those on the  
39 right foot that's all. (Participant 15, female, age 61, 15 weeks post operation)  
40  
41

### 42 *Pain*

43 Although pain was talked about by some interviewees it was not considered a major problem.  
44

45 So here I am, four or five weeks [post operation], I get a little bit of pain, not a lot.  
46 (Participant 7, female, age 70, 5 weeks post operation)  
47  
48

49 The pain was so bad before I had it done, and I just couldn't believe the relief after the  
50 operation when I was walking in the hospital and I had one of those pushers you  
51 know. And there was no pain. And I kept thinking, I can't believe this, and that's how  
52 it's been. I've never had any pain, not at all.  
53 (Participant 10, female, age 83, 18 weeks post operation)  
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56 There's several times, like when I have got to get up those steps. I put my right foot  
57 first and bring my left foot up, and once or twice... you step on your left, and it's still  
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3 there, lets you know it's still tender. (Participant 12, male, age 78, 16 weeks post  
4 operation)  
5

### 6 *Mental wellbeing*

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8 Low mood or depression associated with the reduced mobility due to the fracture was  
9 reported by a few interviewees, emphasising the great value placed by interviewees on being  
10 independently mobile.  
11

12  
13 He can't walk and that, to him he'd rather die. I'll be honest with you he's said it once  
14 or twice, "Let me go". And I said, "No you're not going no-where". And then the  
15 other day for the first time, but he hasn't said it since, "I'm going to commit suicide",  
16 I said, "No you're not, you're not". (Carer of participant 31, male, age 84, 5 week post  
17 operation)  
18

19  
20 For me it was a massive problem and caused me depression. To me is the most  
21 important thing, the mental aspect of taking away somebody's freedom to be able to  
22 move around and go to the shops and do all that sort of thing.  
23 (Participant 7, female, age 70, 23 weeks post operation)  
24

### 25 *Fear of falling*

26  
27 The experience of the fracture left a few participants with a fear of falling and sustaining a  
28 further fracture.  
29

30  
31 I think it frightened him more than anything else. He's frightened he'll fall over again  
32 and do it again, that bothers him more than anything else. Because now when he  
33 stands up at all to try and walk he's frightened he's going to fall over and the same  
34 thing will happen all over again. (Carer of participant 11, male, age 84, 7 weeks post  
35 operation)  
36

37  
38 I've got to watch what I'm doing. If I catch my foot on [paving stone], I can go over  
39 again. (Participant 12, male, age 78, 16 weeks post operation)  
40

41 The fear of falling was sometimes expressed by a family member. When talking about his  
42 frustration at not being able to work in the garden, participant 6 added  
43

44 All the rain has made it very slippery, and [wife] says, "No way do you go out there."  
45 (Participant 12, male, age 78, 6 weeks post operation)  
46

47 This emphasises the value given to mobility without falls or fear of falls by interviewees.  
48

### 49 *Leg shortening*

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51 This is a problem that is common following extra-capsular fracture of the proximal femur.  
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53 One interviewee described her concerns about this.  
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55 One leg is now shorter than the other so that makes walking a bit difficult because it  
56 gives me back pain. (Participant 15, female, age 61, 15 weeks post operation)  
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3 Is there variation within this population of the experience of what is considered important in  
4 recovery from hip fracture?  
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6 Our sample included patients from across a spectrum that extended from those who were  
7 physically and mentally active prior to their fracture through to those who, pre-fracture, had  
8 been immobile due to conditions such as multiple sclerosis, chronic obstructive airways  
9 disease and arthritis, and those with severe cognitive impairment. Although when talking  
10 about what was important to them when evaluating their recovery from hip fracture, patients  
11 from across this spectrum talked about similar themes, their experiences of what was  
12 important varied. In Box 1 we present condensed versions of the interview summaries  
13 developed during our second analysis approach, for participants chosen to represent the  
14 whole spectrum of patients. We indicate whether the data was provided by patient, carer or  
15 both.  
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24 *Recovery as a return to pre-fracture state or as part of aging and decline*

25 Every patient interviewed had experienced a hip fracture and surgery, so in physical terms all  
26 of them had, for a period of time, been somewhat impaired compared to their pre-fracture  
27 state. Four weeks post-operation, those who were active pre-fracture talked in terms of  
28 regaining a recovered state that was similar to their pre-fracture state although with some  
29 minor adaptations (participants 15 and 20 in box 1). Whilst these participants expressed  
30 worry about how well they might function in the future, there was, nevertheless,  
31 determination to progress to as full a recovery as possible. Four months post-operation many  
32 of these participants had all but regained their pre-fracture level of activity. Among  
33 participants with severely limited mobility pre-fracture, some were able to identify specific  
34 activities which were more difficult post-fracture than pre-fracture, such as putting on socks  
35 and getting in and out of bed. Some were also able to identify specific improvements in  
36 mobility post operation (see participants 9 and 15 in box 1). These participants described a  
37 process of recovery although it was very limited.  
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49 In contrast, for other participants, the fracture was just one part of a process of aging and  
50 decline. For example, participant 11 (see box 1) had been very limited in his activities before  
51 the fracture. Post fracture he needed adaptations to his home and increased care support post  
52 fracture to enable him to continue to manage at home. The mobility of participant 18 had  
53 declined and she had started using a wheelchair instead of her mobility scooter to get out of  
54 the house. However, it was unclear whether the decline was due to the concurrent heart  
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3 failure or the fracture. Those who were the most physically or cognitively impaired pre-  
4 fracture did not talk about regaining a recovered state but about a state of no change. They  
5 continued with their limited activities as before (for example: participants 23 and 26 in box  
6 1). For one participant, the only change was her move to a new nursing home (participant 5 in  
7 box 1). Participants with cognitive impairment were often unaware of having experienced a  
8 fracture (Participant 1 box 1).  
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### 13 14 15 *Recovery through adaptation*

16 In the face of their physical limitations, most participants made adaptations that mitigated the  
17 effect of the fracture; for example employing a cleaner, moving to a nursing home or using a  
18 walking aid or other assistive device. For those who were active pre-fracture, adaptation was  
19 mostly considered temporary, although at 4 months there was some evidence that active  
20 patients had adapted to some limitations such as being unable to kneel for gardening or  
21 limiting time spent shopping to avoid exhaustion. For some participants who had been  
22 experiencing decline in their mobility pre-fracture, the fracture precipitated adaptations that  
23 they had not previously considered but made their life easier. These included using a  
24 wheelchair for shopping, having a new ramp built for getting in and out of the house in a  
25 wheelchair, using a walking aid or employing professional carers to assist with personal care.  
26 For some, their own or their carer's fear of further falls limited their mobility or at least  
27 limited how far they tested their ability to walk. Poor weather conditions exacerbated this  
28 fear, but adaptations to the environment such as walking aids or handrails lessened the fear.  
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### 39 **Discussion**

40 Following hip fracture, for those who had some pre-fracture mobility and able to articulate  
41 what they value during recovery, stable mobility, that is, mobility without the experience of  
42 or fear of falling, and mobility that that allows people to undertake valued activities are most  
43 valued. The ability to walk is important but so too are other leg movements needed for  
44 activities such as gardening or using transport. For some participants, maintaining mobility,  
45 however limited, was achieved by using assistive devices or working out new ways of doing  
46 an activity. Some participants adapted to their limitations, for example wearing different  
47 footwear or adjusting their expectations of what they could achieve. Others maintained their  
48 previous limited function through increased care provision.  
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3 Patients also consistently valued certain basic domains of health, such as pain (or lack of it),  
4 day-to-day activities, personal care and mental well-being. However, many participants in  
5 this study were unable to articulate what was important to them in terms of recovery from hip  
6 fracture. The hip fracture was just one part of their decline with age and its impact could not  
7 be disentangled from the impact of other health issues. The level of recovery perceived by a  
8 participant was influenced by their pre-fracture state and their ability to make adaptations  
9 during recovery.  
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#### 14 15 16 *Strengths and weaknesses of the study*

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18 When the mortality rate post operation is taken into account, including the higher mortality  
19 amongst older females, the study sample was broadly representative of the age profile and  
20 gender balance of the population of England, Wales and Northern Ireland experiencing hip  
21 fractures (2). We used a higher cut off for assessment of cognitive impairment (score of 8 on  
22 AMTS) compared to the NHFD (score of 6 on AMTS). This is likely to explain our higher  
23 proportion of participants with cognitive impairment compared to the average in the NHFD.  
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30 More research time was spent on recruitment than any other aspect of the study as it proved  
31 difficult. When contacted about the interview study, potential participants talked about other  
32 priorities or concerns that prevented them agreeing to interview, or they simply did not wish  
33 to be interviewed. It is possible that those not interviewed were struggling most with  
34 recovery. Our data is also limited by the difficulty some frail older adults have in giving a  
35 detailed account of their health experience (18). Interview data is jointly constructed by  
36 interviewer and interviewee (19) and our interviewer had no clinical knowledge of hip  
37 fractures. This reduced the likelihood of the interviewer influencing the data. A clinician  
38 undertaking the interviews would have the knowledge to help the patient tease out whether  
39 health problems were fracture related or not. However, this would have obscured the  
40 important finding, that participants often experienced their fracture as part of, rather than  
41 separate to, their other existing health problems. We relied on carer's accounts for some  
42 participants. We found they talked about the same themes as the participants. However, for  
43 those with cognitive impairment, some carers were unable to provide detailed data as they  
44 had limited day-to-day contact with the participant.  
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#### 55 56 *Comparison with other studies*

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3 There are similarities between our findings and other qualitative studies of similar  
4 populations. A Swedish team that explored engagement with rehabilitation post hip fracture  
5 found a similar spectrum of participants (20). They classified their participants as: those who  
6 were frail and in need of support but did not request it; those who were dependent and took  
7 no active part in rehabilitation and those who were self-sufficient. Another Swedish study,  
8 undertaken with people 12 months after their hip fracture found that mobility and a return to  
9 normal activities were key outcomes for patients (21). An Australian study of mobility post-  
10 fracture found that reduced level of mobility was associated with fear of falling, physical  
11 limitations from other illness and social/environmental factors (22). Our results also echo  
12 findings from across the research literature on the experience of health and illness. For  
13 example, the difficulty disentangling the impact of one health condition from other co-  
14 morbidities has been found for mental health conditions (23). The acceptance of an acute  
15 health problem as being part of the aging process has been found for conditions such as  
16 stroke (24). Recalibration to altered circumstances in response to a sudden injury has also  
17 been described (25), as have the adaptations- both physical and psychological- that people  
18 make in order to maintain their quality of life (26). Reduced expectations of health and  
19 acceptance of limited function have been described among elderly women (27). Fear of  
20 falling is common among older people generally (28). The consistency between our findings  
21 and other studies suggests that there is now sufficient qualitative evidence to inform policy  
22 decisions about the choice of appropriate PROMS for assessing recovery from hip fracture.  
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### 38 *Implications for clinicians and policymakers*

39 This study was undertaken in response to a potential policy change involving the use of a  
40 PROM to assess patient recovery from hip fracture, the results of which would form part of  
41 the evaluation of the quality of care provided for hip fracture. For the population  
42 experiencing fragility hip fractures, it is unlikely that a single PROM specific to hip fracture  
43 could be developed which is relevant to the whole spectrum of patients. Several of the themes  
44 described by interviewees - mobility, day-to-day activities, self-care, pain and mental  
45 wellbeing, are similar to the domains included in currently available generic measures  
46 including the EuroQoL EQ-5D (13), the Short Form 36-item Health Survey (SF-36) (29) and  
47 the WHOQoL-BREF (30). Both the EQ-5D (3L) and the SF-36 (version 1) have been widely  
48 used in trials of people sustaining hip fractures, but for both measures evidence of essential  
49 measurement and practical properties is limited (7). In the context of a clinical trial where  
50 patients are randomised to an intervention and control arm, these generic measures may be  
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3 appropriate but they may need to be supplemented by specific tools for selected groups, such  
4 as patients with high-levels of pre-injury function.  
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7 In the context of assessing quality of care for a patient population as diverse as those  
8 experiencing hip fracture, it may be impossible to devise a single PROM that will be  
9 appropriate for all patients. Although quality of care may be one factor that will influence  
10 recovery as perceived by a patient, their pre-fracture state, adaptations that they or their carers  
11 make to their reduced mobility, and their perception of whether or not they are at the stage in  
12 life where decline is inevitable will all influence how they answer questions contained within  
13 a PROM.  
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4 61 year old female social worker who lives with her husband. Before her fracture she was  
5 working full time and, for recreation, taking country walks, undertaking all types of  
6 gardening activities and playing with her grandchildren. Post fracture fixation (6 weeks)  
7 she described using crutches to get around the garden and shops, needing help with putting  
8 on socks and cutting toe nails, and was unable to climb stairs. She talked in terms of  
9 improvement and expectation of returning to work and full activity including cleaning and  
10 gardening. By the second interview she was frustrated that recovery was so slow but she  
11 could identify the ways in which she had continued to recover. (Participant 15, interviewed  
12 6 weeks and 15 weeks post operation)  
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15  
16 92 year old female who lives alone in her own flat within a sheltered housing complex.  
17 Prior to the hip fracture she looked after herself and did her own washing, but had a cleaner  
18 to undertake heavy household chores. She spent most of each day out and about at the  
19 shops, engaging in social activities, bingo and on outings. She had no other illnesses. Post-  
20 fracture fixation she talked about having some initial pain and problems lifting her leg after  
21 the operation but was now mobile about her home with a walking frame. The housing  
22 complex has a lift which she now used. She was intending to return to getting out and  
23 about as she was before her fracture. (Participant 20, interviewed 5 weeks post operation)  
24

25 92 year old female lives alone with husband. Daughter visits several times a week to help.  
26 Poor hearing. Difficult to disentangle what was before and after fracture. Seems to have  
27 been able to walk around house, undertake self-care and microwave own meals pre-  
28 fracture. Post fixation of the hip fracture, patient slowly improved walking. Life seems  
29 very similar to before fracture except need for walking aid, inability to put on socks and  
30 husband now microwaves the meals. (Participant 9, interviewed 9 weeks post operation)  
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33 70 year old male retired painter and decorator who lives with his wife and enjoys almost  
34 daily visits from his grandchildren. Mobility restricted to 5-6 metres for more than two  
35 years prior to fracture due to knee pain and chronic obstructive pulmonary disease. When  
36 interviewed he describes struggling to get up the stairs, get in and out of bed, put his shoes  
37 and socks on, and bend down. Although his mobility was severely restricted prior to his  
38 fracture, he described being unable get around as much as he had done before the fracture.  
39 He noted some improvement over recent weeks, as he no longer needed two sticks for  
40 walking, only one.  
41 (Participant 3, interviewed 15 weeks post operation)  
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43

44 84 year old male with dementia, who has some lucid moments and some recall of falling  
45 and hurting himself. He lives with his wife who looks after him and they have a cleaner to  
46 do heavy housework. Wife provided interview, involving the patient in the latter half when  
47 he woke up. Patient's walking was gradually slowing and he had a number of falls before  
48 his fracture. Fracture occurred while walking in shopping area with his wife. Since fixation  
49 of the fracture patient has required assistance with personal care, has professional carers  
50 four times a day, and the bathroom has been adapted for his limited mobility. The  
51 interviewee had difficulty distinguishing decline due to old age and change due to the  
52 fracture. The patient complained of some pain but it was unclear whether this was from the  
53 fracture or previously established osteoarthritis. Before the fracture both patient and wife  
54 had ceased all non-essential activities except for a weekly trip to the shops so daily life had  
55 changed little except for more care provision. (Participant 11, interviewed 7 weeks post  
56 operation)  
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4 74 year old female who lives with husband. Patient lived with severe rheumatoid arthritis  
5 for 30 years. Developed heart failure and admitted to hospital with shortness of breath and  
6 confusion. Fell while in hospital and fractured her hip. Mobility before hip fracture very  
7 limited – able to walk slowly in house and garden, undertake light chores, and use scooter  
8 to go shopping. Became worse with breathing difficulty. Mobility remained reduced after  
9 hospital admission. Able to take step slowly in house with support. Uses wheelchair to go  
10 out of house – a new ramp improved this by second interview. Unclear how much mobility  
11 change was due to the fracture and how much due to heart failure. (Participant 18,  
12 interviewed 6 weeks and 18 weeks post operation)  
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16 88 year old female retired teacher, who lives with her son and has a diagnosis of multiple  
17 sclerosis. The patient wove together pre and post injury experience in her account, making  
18 it difficult to disentangle. She said her son does the cooking and cleaning and her daughter  
19 assists with self-care. She has a close family, feels well supported and has lots of visitors –  
20 friends, grandchildren and great grandchildren. Her main interest beyond seeing friends  
21 and family is reading. She described being content with life. Prior to her fracture she was  
22 unwell with an infection and recounts using a frame for mobility which she still uses.  
23 (Participant 23, interviewed 5 weeks post operation)  
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25  
26 85 year old female living in a nursing home. Her daughter visits alternate days. Her  
27 daughter provided the interview data. The patient has dementia but otherwise had been  
28 well before the fracture. Patient gets up and walks about herself, and takes herself to the  
29 toilet. She enjoys sitting and chatting. The patient does not remember the injury. Her life  
30 has not changed from how it was pre injury. The daughter did not mention any fracture-  
31 specific issues related to recovery. (Participant 26, interviewed 6 weeks post operation)  
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33  
34 84 year old female with limited English language. Pre-injury she had carers to assist her  
35 with all her personal needs. The injury had occurred whilst being hoisted. Post injury her  
36 main concern was that at discharge from hospital, after a three month stay, she was sent to  
37 a nursing home where she knew no-one. The patient repeatedly expressed distress about  
38 being in the nursing home but did not talk about the fracture.  
39 (Participant 5, interviewed 18 weeks post operation)  
40

41  
42 84 year old male who has dementia. He lives alone but received visits three times a day  
43 from his son who provides meals. Son was interviewed. Arthritis of knee limited mobility  
44 before the fracture. Spent most of the day sitting. At weekends prior to fracture patient  
45 went to neighbour's house for evening meal. Patient fell and sustained fracture while  
46 walking to neighbour's house. Patient does not recall fracture. At time of interview, the  
47 patient was as mobile as pre operation limited by pain and stiffness from arthritis. Not yet  
48 visiting neighbour but this was because family was discouraging this in case he falls again  
49 rather than due to mobility. (Participant 1, interviewed 16 weeks post operation)  
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52 **Box 1 Summaries of the data about individual patients and their recovery from a hip**  
53 **fracture**  
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### Competing interest statement

All authors have completed the Unified Competing Interest form at [www.icmje.org/coi\\_disclosure.pdf](http://www.icmje.org/coi_disclosure.pdf) (available on request from the corresponding author) and declare: funding from the National Institute of Health Research, University of Warwick, and University Hospitals Coventry and Warwickshire NHS trust.

### Authorship

MC, FG, JA, XG, KH and FB contributed to the conception and design of the study. FB, VM and KD conducted the interviews. All authors contributed to analysis and interpretation of data. FG, KD and VM drafted the article and all authors revised it critically for important intellectual content. All authors gave final approval of the version to be published.

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**Data sharing:** no additional data available

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### Access to study data

All authors had full access to all of the data in the study and can take responsibility for the integrity of the data and the accuracy of the data analysis

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7 **Evaluating recovery following hip fracture: a qualitative interview study of what is**  
8 **important to patients**  
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**Data sharing:** no additional data available

## Abstract

### Objective

To explore what patients consider important when evaluating their recovery from hip fracture and to consider how these priorities could be used in the evaluation of the quality of hip fracture services.

### Design

Semi-structured interviews exploring the experience of recovery from hip fracture at two time points - four weeks and four months post-operative hip fixation. Two approaches to analysis: thematic analysis of data specifically related to recovery from hip fracture; ~~extraction of data into template to capture~~ summarising the participant's experience overall.

### Participants

31 participants recruited, of whom 20 were female and 12 were cognitively impaired. Mean age 81.5 years. Interviews provided by 19 patients, 14 carers, and 8 patient/carer dyad; 10 participants were interviewed twice.

### Setting

Single major trauma centre in the West Midlands of the UK.

### Results

Stable mobility (without falls or fear of falls), for valued activities was considered most important by participants who had some pre-fracture mobility and were able to articulate what they valued during recovery. Mobility was important for managing personal care, for day-to-day activities such as shopping and gardening, and maintenance of mental well-being. Some participants used assistive mobility devices or adapted to their limitations. Others maintained their previous limited function through increased care provision. Many participants were unable to articulate what they valued as hip fracture was perceived as part of their decline with age. The fracture and problems from other health conditions were an inseparable part of one health experience.

### Conclusions

Patients consistently valued stable mobility and its role in other basic health domains.

~~While~~For evaluating service quality, no one patient-reported outcome measure (PROM) could consistently evaluate recovery for ~~all~~ patients with hip fracture. ~~general~~. General health-related quality of life tools may provide useful information ~~for the majority of patients~~.



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7 | These within clinical trials but may need to be supplemented by specific tools for selected  
8 groups, especially those patients with high-levels of pre-injury function.  
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11 **Key words:** Hip fractures, Outcome assessment (Health Care), Interview, Frail older adults  
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### 13 **Article summary**

#### 14 *Article focus*

- 15 • The UK NHS has identified the need to evaluate service provision for patients with a  
16 hip fracture
- 17 • There is increasing expectation that patient-reported outcome measures (PROM) are  
18 used within health service evaluation
- 19 • We asked the question: what do patients who have recently experienced a hip fracture  
20 consider important when evaluating their recovery?  
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#### 23 *Key messages*

- 24 | • Patients active before their fracture value ~~stable~~-mobility without falls or fear of falls,  
25 to undertake valued activities but many patients consider fracture to be part of their  
26 decline with age.
- 27 • While no one PROM could evaluate all aspects of recovery for patients with hip  
28 fracture, general health-related quality of life tools may provide useful information for  
29 the majority of patients.  
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#### 33 *Strengths and limitations*

- 34 • The study sample was representative of the age profile, gender balance and dementia  
35 levels of NHS patients experiencing hip fractures
- 36 • It is possible that those not agreeing to be interviewed were struggling most with  
37 recovery.
- 38 • The data is limited by the difficulty the more physically and cognitively impaired  
39 patients had in giving a detailed account of their health experience.  
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## Introduction

Fragility fracture of the proximal femur (hip fracture) is one of the greatest challenges facing the healthcare community. In 1990, a global incidence of 1.31 million was reported and was associated with 740,000 deaths ~~(1)~~. Hip fractures constitute a heavy socioeconomic burden worldwide. The cost of this clinical problem is estimated at 1.75 million disability adjusted life years lost; 1.4% of the total healthcare burden in established market economies ~~(1)~~. Among those experiencing fragility hip fracture in England, Wales and Northern Ireland, 70% are aged 80 years or older, 73% are female and 34% are cognitively impaired pre-operation. The mortality rate within 30 days of operation was 8.2% in 2013 ~~(2)~~.

The NHS has identified the need to evaluate the quality of service provision for patients with a hip fracture; this evaluation is conducted through the National Hip Fracture Audit Database (NHFD)(2). Currently, aspects of care such as time to surgery, length of patient stay and patient mortality in hospital and 30 day and 120 day follow up are recorded in the NHFD. These data are now used to guide payments to healthcare providers; the payment being increased if the provider supplies 'best practice' care ~~(3)~~. However, while important, there is interest from policy makers in the potential to enhance these currently reported data fields by including an assessment of outcome as reported by patients. It is increasingly expected that healthcare evaluations should include domains of health that are important to patients ~~(4)~~, captured by well-developed patient-reported outcome measures (PROMs) which aim to assess how patients function and feel in relation to a health condition or associated treatment (5). PROMS capture information that cannot be obtained by other means (5, 6) complementing more traditional performance or process-based measures.

Our aim was to establish whether or not one PROM could be used with all patients who experience a fragility hip fracture as part of the evaluation of the quality of health care for hip fracture delivered by the NHS. For this patient group we were unable to identify a PROM specific to the assessment of hip fracture, and robust evidence of the quality and acceptability of non-hip fracture specific PROMs following completion by patients sustaining a hip fracture is limited ~~(7)~~. Moreover, clarity with regards to the outcomes of healthcare that these patients consider relevant and important does not exist. Appropriate and relevant PROM-based assessment should be underpinned by an understanding of what is important to patients in terms of the outcomes of healthcare. We therefore designed an interview study to

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7 explore with patients and, where appropriate, their carers, what they consider to be important  
8 outcomes and to explore variation across this patient group. Our research questions were:

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10 1. What do patients who have recently experienced a hip fracture consider important when  
11 evaluating their recovery?  
12 2. Is there variation within this population ~~about~~of the experience of what is considered  
13 important in recovery from hip fracture?

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15 These research questions are framed by the desire of policy makers to evaluate the quality of  
16 care for hip fracture through assessment of recovery from the perspective of the patient.  
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## 18 19 20 **Method**

### 21 22 *Study Design*

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24 We conducted semi-structured interviews with patients and, where appropriate, their carers at  
25 two time points, at approximately four weeks and then again at four months after they had  
26 sustained a fragility hip fracture.  
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### 28 29 30 *Identification of patients with a hip fracture*

31 We recruited participants from an existing cohort study, the Warwick Hip Trauma Evaluation  
32 ~~(8)~~(8), that commenced January 2012. This is a cohort of all patients admitted with a hip  
33 fracture to a single major trauma centre in the West Midlands of the United Kingdom. As part  
34 of their pre-operative assessment, patients were assessed for their capacity to consent using  
35 clinical assessment and the Abbreviated Mental Test Score (AMTS) ~~(9)~~(9). The AMTS is a  
36 10-item measure used to rapidly assess the possibility of cognitive impairment in elderly  
37 people. A score below 8 suggests cognitive impairment ~~(10)~~(10). Scores less than 8 were  
38 taken to indicate that a patient was unlikely to be able to consent for themselves. Those  
39 deemed to have capacity for consenting to surgery, based on clinical assessment and AMTS,  
40 were considered able to consent for this study. Following the emergency surgery for their  
41 fracture, those with capacity gave written consent to be approached for interview. For those  
42 deemed not to have capacity due to cognitive impairment, verbal consent was obtained from  
43 their consultee ~~(11)~~(11). Ethical approval was granted by NHS REC London - Camberwell  
44 and St Giles (11/LO/0927) on the 18<sup>th</sup> August 2011.  
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### 51 52 53 *Sampling*

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During the data collection period for this study, February to August 2012, we purposefully sampled cohort participants who had reached 4 weeks or 4 months following their hip fracture and had consented to be approached for interview. The time points were chosen to be the same as those used for data collection for the NHFD ~~(12)~~(12). If a PROM were to be used with this patient population to assess quality of care, patients would be asked to complete the PROM at these time points. Our sampling strategy ensured a diverse mix of patients with respect to the following factors: age, gender, AMTS ~~(9)~~(9) and EQ-5D score ~~(13)~~.

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#### *Interview recruitment and consent process*

We contacted eligible patients and carers by telephone just prior to 4 weeks and/or 4 months following hip fracture first to invite them to be interviewed, then to arrange an interview. If patients declined to participate, the reasons offered were recorded. Patients with capacity to consent were contacted directly. For those patients deemed not to have capacity, we contacted their consultee. Patients able to consent for themselves signed their own consent forms. For those unable to consent the consultee signed an agreement form and we aimed to interview a carer as well as the patient (patient/carer dyad). Carers who were interviewed signed a consent form. Recruitment continued to data saturation at the first time point. The study flow diagram is at Figure 1.

#### *Interview process*

We interviewed participants at their current residence (own home, residential or nursing home) or in hospital. The interviewer was trained in interviewing but did not have clinical knowledge of hip fracture, its treatment or prognosis. Where possible, patients and carers were interviewed alone, however where the carer and patient requested a joint interview (whether or not the patient had cognitive impairment), they were interviewed together. The aim of the interviews was to understand each participant's lived experience of hip fracture ~~(14)~~(14) and the influence of their social context and pre-fracture health. We use the following questions:

- What is a normal day like for you now?
- How bothersome are you finding your hip?
- What is different about your life now compared to just before your injury?
- Compared to just before your injury what has stayed the same?
- Which of these make the most difference to your life?

The interviewer encouraged participants to talk about the experience in whatever order they chose and using terms meaningful to them. Later in the interview we prompted, where necessary, for clarification about what in the patient experience was related to the hip

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fracture. Towards the end of the interview we directly asked what was important to them in terms of recovery if this had not already been talked about by the participant-, using the following questions:

- What is important to you in terms of your recovery?
- Where would you like to see yourself in the future in relation to your recovery (i.e. the next few weeks and months)?
- If a friend or neighbour were asking you now about how well you are recovering – what has been important to you that you would tell them about?
- If a doctor or nurse was asking you now about how well you are recovering – what would be important for the doctor or nurse to ask about?

Consideration was given to the potential challenges associated with interviewing older adults, for example by giving potential participants sufficient time to decide whether or not to participate and minimising burden and fatigue through streamlining questions ~~(+5)~~(15). The interview process, questions and prompts were refined by the study team during the initial stage of data collection. Questions were similar for both patient and carer. Interviews were audio recorded and transcribed verbatim. For one interview, audio recording was not feasible due to the noisy environment so extensive field notes were taken and transcribed. For all interviews the researcher made field notes to assist interpretation of the interview data.

### *Analysis*

Interview transcripts were checked, anonymised and uploaded into Nvivo software ~~(+6)~~(16). Initial analysis involved data immersion, reading and re-reading each transcript, and discussion of the interview transcripts by the research team. All team members read at least five transcripts. ~~The key issues crystallised from this process so all transcripts were read by at least two team members.~~ From the data we identified and crystallised what was important for participants that was specific to hip fracture recovery (+7)-(17). We found that the interviews at four weeks and four months covered very similar issues, although, as would be expected, what the participants reported about each issue four weeks and at four months ~~reporting of fracture specific~~ was different, as recovery was more advanced. ~~For~~ at four months. As our analysis aimed to identify what patients consider important when evaluating their recovery rather than the detail of recovery itself, we therefore treated all the interviews related to one participant as one set of data. During data interpretation we took account of the timing of the interview, whether the interview data was from a patient or carer or patient/carer dyad, and field notes. Two different approaches to analysis were then undertaken in response to our research questions.

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8 To answer our first research question, we searched the transcripts for any mention by the  
9 participants of what was important to them during recovery from hip fracture ~~and~~. These  
10 were discussed at team analysis meetings. Transcripts were then coded ~~this text~~ in NVivo. As  
11 coding proceeded, we reviewed these codes at our team analysis meetings and combined  
12 them into themes. After ~~coding~~ we had read, discussed and then coded ten transcripts we  
13 found no additional themes were identified in the remaining data. Double coding was  
14 undertaken for one in four transcripts and coding compared and discussed to check  
15 consistency of final coding. During analysis we became aware that although the data from  
16 different participants could be coded under the same theme such as mobility, there was  
17 variation in the experience of recovery. This led us to our second research question and  
18 analysis approach.  
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25 To answer our second research question, from close reading of the first five interview  
26 transcripts, we developed ~~and refined, from the data,~~ a template for summarising the key  
27 issues of relevance to recovery from the experience of hip fracture recovery for each patient  
28 carer dyad. This involved considering each set of interviews as a whole, reading and  
29 rereading the text and writing a summary of the patient/carer journey and all that influenced  
30 it. We reviewed the summaries at our data analysis meetings and from these initial summaries  
31 we developed a draft template. We refined the template as we summarised and discussed  
32 further transcripts. The template included: current and recent past living arrangements and  
33 environment, day-to-day life now and in the recent past, the impact of the hip fracture and its  
34 management, what was changing in day-to-day life as they recovered, the extent to which the  
35 patient referred specifically to the fracture and their ability to engage in the interview. The  
36 data from each patient or patient/carer dyad was summarised with a second research team  
37 member reviewing each summary against the data. ~~The summaries were then compared.~~ To  
38 qualitatively understand the variation in the experience of what was considered important for  
39 recovery, we compared these summaries.  
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## 48 Results

49 Twenty one patients were interviewed on one occasion and 10 were interviewed twice giving  
50 a total of 31 patient participants and 41 interviews. Of the 31 patient participants, 20 (64.5%)  
51 were female, the mean age was 81.5 years (SD 9.2, range 61-96) and 12 (39%) scored less  
52 than eight on the AMTS. Of the 41 interviews, 24 were conducted three to nine weeks, and  
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7 17 were conducted 14 to 23 weeks after the hip fracture. Nineteen interviews were with the  
8 patient only, 14 with carer only, and eight with patient/carer dyads. Interviews lasted between  
9 20 and 90 minutes. Despite framing the interview for interviewees as exploring the  
10 experience of hip fracture, many interviewees talked about general health issues. Although  
11 we prompted to clarify what was related to their fracture, in many interviews it was difficult  
12 to disentangle the impact of the fracture from the impact of other health problems. Some  
13 interviews contained almost no data that was clearly related to the fracture. From the  
14 perspective of the patient, all their health problems were part of one experience. The absence  
15 of data clearly related to the fracture was more marked in the four month compared to ~~two~~  
16 monthfour week interviews. We therefore decided not to attempt interviews at 12 months  
17 post fracture as originally planned (~~8~~8). The following sections report our analysis.  
18 Illustrative quotations from data are labelled with the age and gender of the patient, time  
19 since hip fracture and whether the quotation was from the patient or carer.  
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#### 27 What is important to patients when evaluating their recovery?

28 From our systematic search of the interviews for data related to recovery from the hip  
29 fracture we identified the following themes: mobility, valued day-to-day activities, self-care,  
30 pain, mental wellbeing, fear of falling and leg shortening. When talking about mobility, day-  
31 to-day activities or self-care participants also talked about their level of independence.  
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#### 35 *Mobility*

36 This was the most prominent theme, although when talking about mobility the interviewees  
37 often mentioned other themes. Mobile participants reported limited mobility in the weeks  
38 post operation and valued any improvement.  
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42 I'm walking with a walking stick at the moment. I've been down the park and back...I  
43 can usually get around [the house] without the walking stick, and I can get up and  
44 down stairs no problem. I get upstairs with my good leg and downstairs with my bad  
45 leg. (Participant 6, male, age 78, 5 weeks post operation)  
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47 By four months, for many participants mobility had improved, and they were happy that they  
48 were returning to normal mobility.  
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50 I can't rush round like I did, but eventually that will come...I mean it's pretty normal  
51 now, but I think it's going to be a while before I can actually walk as I did and I  
52 probably won't walk as I did... when I came home [from hospital] I was still  
53 hobbling... but now I'm more or less...walking normal, especially with the stick  
54 (Participant 10, female, age 83, 18 weeks post operation)  
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8 For those with limited mobility before hip fracture any unaided improvement was limited to  
9 the pre-fracture level but also valued.

10 The operation was successful and got him back to normal right from the start, right  
11 from the very first day that he had it done. He was able to then walk pain free with a  
12 Zimmer frame to the toilet. The staff were all saying it was amazing how well he was  
13 walking and he would soon be back to normal, but what they didn't realise was that  
14 he was walking normally. (Carer of participant 1, male, age 84, 16 weeks post  
15 operation)  
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17 Other participants were using mobility aids that they had not been using regularly before the  
18 fracture. For some, the addition of mobility aids enabled greater security of mobility than  
19 prior to their fracture.  
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21 Her mobility's getting better. I think she'll cope with the frame. She's had a couple of  
22 falls in the home, earlier when she was forgetting that she had to use the frame. She'd  
23 get out of bed and not use the frame and consequently fall. But she's got in the habit  
24 of using it now... she's not falling, which is a bonus. (Carer of participant 13, female,  
25 age 87, 14 weeks post operation)  
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#### 27 *Valued day-to-day activities*

28 Those who were active prior to their fracture talked about the frustration of the restriction in  
29 their activities particularly in the weeks following the fracture.  
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31 I'm back on what I call domestic duties – washing up! But the thing that is frustrating  
32 is that I can't get outside and do any gardening. (Participant 12, male, age 78, 6 weeks  
33 post operation)  
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35 I just miss getting up and getting out. I never stayed in. I'd go out in the morning and  
36 come back and then I'd go out again, I just used to go out looking round the shops. I  
37 just get these crossword books and I do those. (Participant 20, female, age 92, 5  
38 weeks post operation)  
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40 Participants who were active before their fracture were usually able to resume valued  
41 activities but had some limitations which remained a frustration.  
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43 I can do little (gardening) jobs but because I haven't got as much movement in the  
44 hip joints, I find it difficult to go down on my hands and knees... If I go down on one  
45 knee it's difficult to get up again so that's not possible but I can do things that are  
46 higher up, I can trim. (Participant 15, female, age 61, 15 weeks post operation)  
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48 I'm tackling a little bit of cooking now. I started to cook myself some nice lunches  
49 and I haven't got round to the... scones ... I made one lot when I came home and I  
50 thought, I can't be bothered anymore. (Participant 10, female, age 83, 18 weeks post  
51 operation)  
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7 Some participants returned to valued activities through adapting how they did them, this  
8 participant using a wheelchair for the first time.

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10 Over the last three weeks, when we go out shopping now, I can't go down the aisles,  
11 so [daughter] gets me a (wheel)chair and I can sit in the chair and then say what  
12 shopping I need, that is very good. (Participant 9, female, age 92, 18 weeks post  
13 operation)

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15 Participants who no longer undertook valued activities that involved significant mobility  
16 were content to continue as they were, for example, occupying themselves with visits from  
17 family and reading.  
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#### 19 20 21 *Personal care*

22 Washing, dressing and getting to the toilet was talked about in interviews, but in many cases  
23 it was not clear whether difficulties with personal care were specifically due to the fracture. A  
24 few interviewees talked about problems with incontinence but again it was unclear whether  
25 this was specific to the fracture. Most patients had a commode or had arranged to sleep near  
26 the bathroom in the weeks immediately after the fracture. Some participants were able to  
27 describe problems with self-care specific to the hip fracture.  
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31 I'm ...not able to put a sock or anything on my injured leg. I can manage now with  
32 my trouser leg and throw these jogging trousers and hook my leg into them but I have  
33 to ask my husband if I need to put a sock or a shoe, or my slipper on that foot.  
34 (Participant 15, female, age 61, 6 weeks post operation)  
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36 At the second interview this participant was pleased to report that she now needed very little  
37 help with self-care, at least in part through wearing alternative footwear.  
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39 I still have to throw my clothes and hook them onto the foot to get dressed. I couldn't  
40 wear lace-up shoes or anything like that because I couldn't tie them up, but things like  
41 slip-ons and sandals I can get on quite easily, so I'm fairly independent – I am  
42 independent really, I just need help with cutting my toenails and that – those on the  
43 right foot that's all. (Participant 15, female, age 61, 15 weeks post operation)  
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#### 45 46 *Pain*

47 Although pain was talked about by some interviewees it was not considered a major problem.

48 So here I am, four or five weeks [post operation], I get a little bit of pain, not a lot.  
49 (Participant 7, female, age 70, 5 weeks post operation)  
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51 The pain was so bad before I had it done, and I just couldn't believe the relief after the  
52 operation when I was walking in the hospital and I had one of those pushers you  
53 know. And there was no pain. And I kept thinking, I can't believe this, and that's how  
54 it's been. I've never had any pain, not at all.  
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(Participant 10, female, age 83, 18 weeks post operation)

There's several times, like when I have got to get up those steps. I put my right foot first and bring my left foot up, and once or twice... you step on your left, and it's still there, lets you know it's still tender. (Participant 12, male, age 78, 16 weeks post operation)

### *Mental wellbeing*

Low mood or depression associated with the reduced mobility due to the fracture was reported by a few interviewees, emphasising the great value placed by interviewees on being independently mobile.

He can't walk and that, to him he'd rather die. I'll be honest with you he's said it once or twice, "Let me go". And I said, "No you're not going no-where". And then the other day for the first time, but he hasn't said it since, "I'm going to commit suicide", I said, "No you're not, you're not". (Carer of participant 31, male, age 84, 5 week post operation)

For me it was a massive problem and caused me depression. To me is the most important thing, the mental aspect of taking away somebody's freedom to be able to move around and go to the shops and do all that sort of thing. (Participant 7, female, age 70, 23 weeks post operation)

### *Fear of falling*

The experience of the fracture left a few participants with a fear of falling and sustaining a further fracture.

I think it frightened him more than anything else. He's frightened he'll fall over again and do it again, that bothers him more than anything else. Because now when he stands up at all to try and walk he's frightened he's going to fall over and the same thing will happen all over again. (Carer of participant 11, male, age 84, 7 weeks post operation)

I've got to watch what I'm doing. If I catch my foot on [paving stone], I can go over again. (Participant 12, male, age 78, 16 weeks post operation)

The fear of falling was sometimes expressed by a family member. When talking about his frustration at not being able to work in the garden, participant 6 added

All the rain has made it very slippery, and [wife] says, "No way do you go out there." (Participant 12, male, age 78, 6 weeks post operation)

This emphasises the value given to ~~stable~~ mobility without falls or fear of falls by interviewees.

### *Leg shortening*

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7 This is a problem that is common following extra-capsular fracture of the proximal femur.

8 One interviewee described her concerns about this.

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10 One leg is now shorter than the other so that makes walking a bit difficult because it  
11 gives me back pain. (Participant 15, female, age 61, 15 weeks post operation)

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13 VariationIs there variation within this population of the experience of what is considered  
14 important in ~~how patients talk about~~ recovery from a hip fracture?

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16 Our sample included patients from across a spectrum that extended from those who were  
17 physically and mentally active prior to their fracture through to those who, pre-fracture, had  
18 been immobile due to conditions such as multiple sclerosis, chronic obstructive airways  
19 disease and arthritis, and those with severe cognitive impairment. Although when talking  
20 about what was important to them when evaluating their recovery from hip fracture, patients  
21 from across this spectrum talked about similar themes, their experiences of what was  
22 important varied. In Box 1 we present condensed versions of the interview summaries  
23 developed during our second analysis approach. for participants chosen to represent the  
24 whole spectrum of patients. We indicate whether the data was provided by patient, carer or  
25 both.  
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### 31 *Recovery as a return to pre-fracture state or as part of aging and decline*

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33 Every patient interviewed had experienced a hip fracture and surgery, so in physical terms all  
34 of them had, for a period of time, been somewhat impaired compared to their pre-fracture  
35 state. Four weeks post-operation, those who were active pre-fracture talked in terms of  
36 regaining a recovered state that was similar to their pre-fracture state although with some  
37 minor adaptations (participants 15 and 20 in box 1). Whilst these participants expressed  
38 worry about how well they might function in the future, there was, nevertheless,  
39 determination to progress to as full a recovery as possible. Four months post-operation many  
40 of these participants had all but regained their pre-fracture level of activity. Among  
41 participants with severely limited mobility pre-fracture, some were able to identify specific  
42 activities which were more difficult post-fracture than pre-fracture, such as putting on socks  
43 and getting in and out of bed. Some were also able to identify specific improvements in  
44 mobility post operation (see participants 9 and 15 in box 1). These participants described a  
45 process of recovery although it was very limited.  
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7 In contrast, for other participants, the fracture was just one part of a process of aging and  
8 decline. For example, participant 11 (see box 1) had been very limited in his activities before  
9 the fracture. Post fracture he needed adaptations to his home and increased care support post  
10 fracture to enable him to continue to manage at home. The mobility of participant 18 had  
11 declined and she had started using a wheelchair instead of her mobility scooter to get out of  
12 the house. However, it was unclear whether the decline was due to the concurrent heart  
13 failure or the fracture. Those who were the most physically or cognitively impaired pre-  
14 fracture did not talk about regaining a recovered state but about a state of no change. They  
15 continued with their limited activities as before (for example: participants 23 and 26 in box  
16 1). For one participant, the only change was her move to a new nursing home (participant 5 in  
17 box 1). Participants with cognitive impairment were often unaware of having experienced a  
18 fracture (Participant 1 box 1).  
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#### 25 *Recovery through adaptation*

26 In the face of their physical limitations, most participants made adaptations that mitigated the  
27 effect of the fracture; for example employing a cleaner, moving to a nursing home or using a  
28 walking aid or other assistive device. For those who were active pre-fracture, adaptation was  
29 mostly considered temporary, although at 4 months there was some evidence that active  
30 patients had adapted to some limitations such as being unable to kneel for gardening or  
31 limiting time spent shopping to avoid exhaustion. For some participants who had been  
32 experiencing decline in their mobility pre-fracture, the fracture precipitated adaptations that  
33 they had not previously considered but made their life easier. These included using a  
34 wheelchair for shopping, having a new ramp built for getting in and out of the house in a  
35 wheelchair, using a walking aid or employing professional carers to assist with personal care.  
36 For some, their own or their carer's fear of further falls limited their mobility or at least  
37 limited how far they tested their ability to walk. Poor weather conditions exacerbated this  
38 fear, but adaptations to the environment such as walking aids or handrails lessened the fear.  
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#### 47 **Discussion**

48 Following hip fracture, for those who had some pre-fracture mobility and able to articulate  
49 what they value during recovery, stable mobility, that is, mobility without the experience of  
50 or fear of falling, and mobility that that allows people to undertake valued activities are most  
51 valued. The ability to walk is important but so too are other leg movements needed for  
52 activities such as gardening or using transport. For some participants, maintaining mobility,  
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7 however limited, was achieved by using assistive devices or working out new ways of doing  
8 an activity. Some participants adapted to their limitations, for example wearing different  
9 footwear or adjusting their expectations of what they could achieve. Others maintained their  
10 previous limited function through increased care provision.  
11

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14 Patients also consistently valued certain basic domains of health, such as pain (or lack of it),  
15 day-to-day activities, personal care and mental well-being. However, many participants in  
16 this study were unable to articulate what was important to them in terms of recovery from hip  
17 fracture. The hip fracture was just one part of their decline with age and its impact could not  
18 be disentangled from the impact of other health issues. The level of recovery perceived by a  
19 participant was influenced by their pre-fracture state and their ability to make adaptations  
20 during recovery.  
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#### 24 25 *Strengths and weaknesses of the study*

26  
27 When the mortality rate post operation is taken into account, including the higher mortality  
28 amongst older females, the study sample was broadly representative of the age profile and  
29 gender balance of the population of England, Wales and Northern Ireland experiencing hip  
30 fractures (2). We used a higher cut off for assessment of cognitive impairment (score of 8 on  
31 AMTS) compared to the NHFD (score of 6 on AMTS). This is likely to explain our higher  
32 proportion of participants with cognitive impairment compared to the average in the NHFD.  
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36  
37 More research time was spent on recruitment than any other aspect of the study as it proved  
38 difficult. When contacted about the interview study, potential participants talked about other  
39 priorities or concerns that prevented them agreeing to interview, or they simply did not wish  
40 to be interviewed. It is possible that those not interviewed were struggling most with  
41 recovery. ~~Our data is also limited by the difficulty some frail older adults have in giving a~~  
42 ~~detailed account of their health experience (18).~~ ~~Our data is also limited by the difficulty some~~  
43 ~~frail older adults have in giving a detailed account of their health experience (18).~~ Interview  
44 data is jointly constructed by interviewer and interviewee (19)(19) and our interviewer had no  
45 clinical knowledge of hip fractures. This reduced the likelihood of the interviewer influencing  
46 the data. A clinician undertaking the interviews would have the knowledge to help the patient  
47 tease out whether health problems were fracture related or not. However, this would have  
48 obscured the important finding, that participants often experienced their fracture as part of,  
49 rather than separate to, their other existing health problems. ~~For~~ ~~We relied on carer's accounts~~  
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7 for some participants. We found they talked about the same themes as the participants.  
8 However, for those with cognitive impairment, some carers were unable to give a provide  
9 detailed account of recovery due to data as they had limited day-to-day contact with the  
10 participant.  
11

#### 12 13 *Comparison with other studies*

14  
15 There are similarities between our findings and other qualitative studies of similar  
16 populations. A Swedish team that explored engagement with rehabilitation post hip fracture  
17 found a similar spectrum of participants ~~(20)~~(20). They classified their participants as: those  
18 who were frail and in need of support but did not request it; those who were dependent and  
19 took no active part in rehabilitation and those who were self-sufficient. Another Swedish  
20 study, undertaken with people 12 months after their hip fracture found that mobility and a  
21 return to normal activities were key outcomes for patients ~~(21)~~(21). An Australian study of  
22 mobility post-fracture found that reduced level of mobility was associated with fear of  
23 falling, physical limitations from other illness and social/environmental factors ~~(22)~~(22). Our  
24 results also echo findings from across the research literature on the experience of health and  
25 illness. For example, the difficulty disentangling the impact of one health condition from  
26 other co-morbidities has been found for mental health conditions ~~(23)~~(23). The acceptance of  
27 an acute health problem as being part of the aging process has been found for conditions such  
28 as stroke (24). Recalibration to altered circumstances in response to a sudden injury has also  
29 been described ~~(25)~~(25), as have the adaptations- both physical and psychological- that  
30 people make in order to maintain their quality of life ~~(26)~~(26). Reduced expectations of  
31 health and acceptance of limited function have been described among elderly women  
32 ~~(27)~~(27). Fear of falling is common among older people generally ~~(28)~~(28). The consistency  
33 between our findings and other studies suggests that ~~we there is now have~~ sufficient  
34 qualitative evidence to inform policy decisions about the choice of appropriate PROMS for  
35 assessing recovery from hip fracture.  
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#### 46 47 *Implications for clinicians and policymakers*

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49 This study was undertaken in response to a potential policy change involving the use of a  
50 PROM to assess patient recovery from hip fracture, the results of which would form part of  
51 the evaluation of the quality of care provided for hip fracture. For the population  
52 experiencing fragility hip fractures, it is unlikely that a single PROM specific to hip fracture  
53 could be developed which is relevant to the whole spectrum of patients. Several of the themes  
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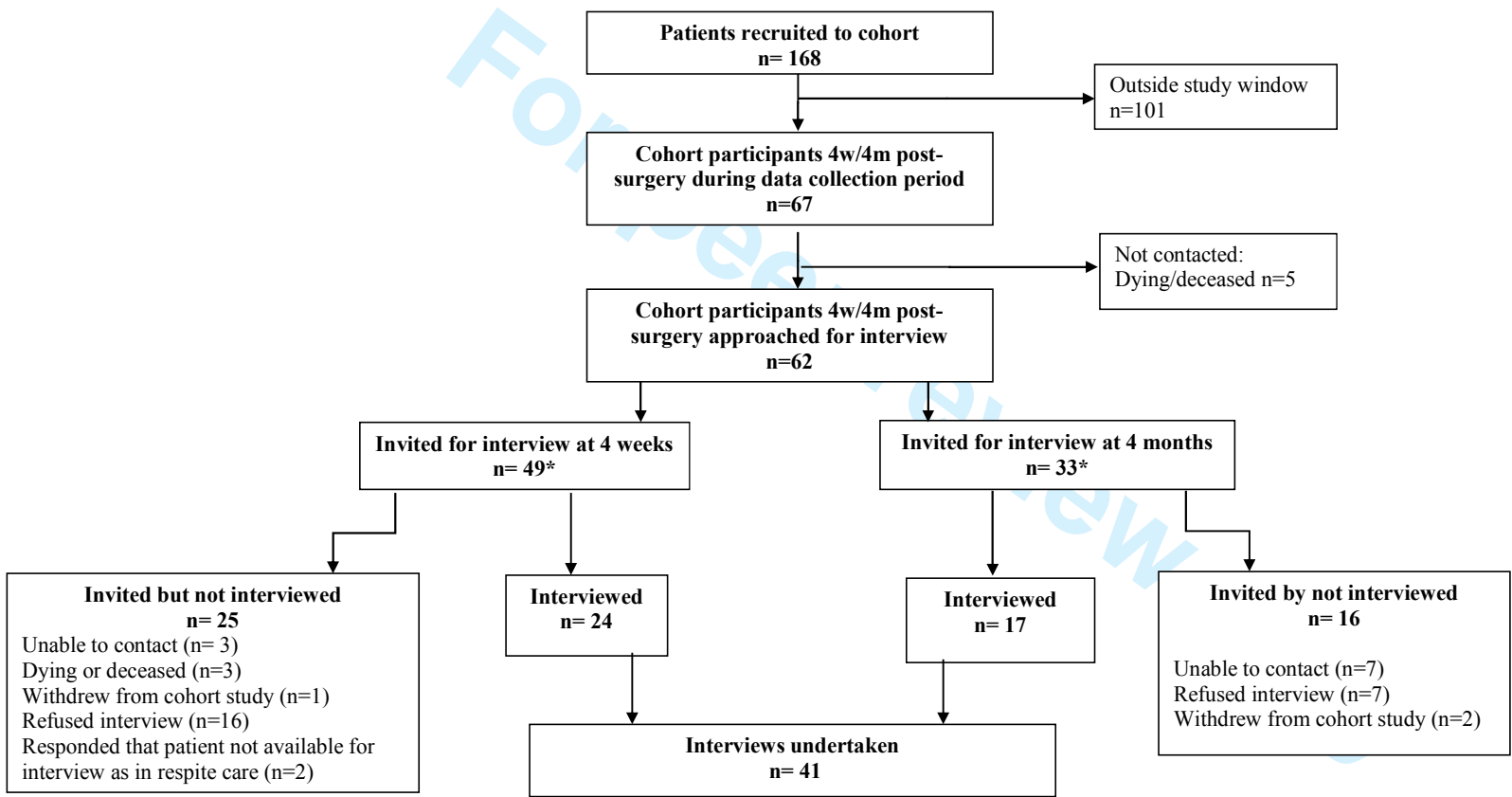


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7 described by ~~our more active~~ interviewees - mobility, day-to-day activities, self-care, pain  
8 and mental wellbeing, are similar to the domains included in currently available generic  
9 measures including the EuroQoL EQ-5D ~~(13)(13)~~, the Short Form 36-item Health Survey  
10 (SF-36) ~~(29)(29)~~ and the WHOQoL-BREF ~~(30)(30)~~. Both the EQ-5D (3L) and the SF-36  
11 (version 1) have been widely used in trials of people sustaining hip fractures, but for both  
12 measures evidence of essential measurement and practical properties is limited ~~(7)(7)~~. In the  
13 context of a clinical trial where patients are randomised to an intervention and control arm,  
14 these generic measures may be appropriate but they may need to be supplemented by specific  
15 tools for selected groups, ~~especially those such as~~ patients with high-levels of pre-injury  
16 function.<sup>52</sup>

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21 In the context of assessing quality of care for a patient population as diverse as those  
22 experiencing hip fracture, it may be impossible to devise a single PROM that will be  
23 appropriate for all patients. Although quality of care may be one factor that will influence  
24 recovery as perceived by a patient, their pre-fracture state, adaptations that they or their carers  
25 make to their reduced mobility, and their perception of whether or not they are at the stage in  
26 life where decline is inevitable will all influence how they answer questions contained within  
27 a PROM.  
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Figure 1 Flow chart of study recruitment



Notes: \* 20 participants were invited for interview at both 4 weeks and 4 months post operation

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61 year old female social worker who lives with her husband. Before her fracture she was working full time and, for recreation, taking country walks, undertaking all types of gardening activities and playing with her grandchildren. Post fracture fixation (6 weeks) she described using crutches to get around the garden and shops, needing help with putting on socks and cutting toe nails, and was unable to climb stairs. She talked in terms of improvement and expectation of returning to work and full activity including cleaning and gardening. By the second interview she was frustrated that recovery was so slow but she could identify the ways in which she had continued to recover. (Participant 15, interviewed 6 weeks and 15 weeks post operation)

92 year old female who lives alone in her own flat within a sheltered housing complex. Prior to the hip fracture she looked after herself and did her own washing, but had a cleaner to undertake heavy household chores. She spent most of each day out and about at the shops, engaging in social activities, bingo and on outings. She had no other illnesses. Post-fracture fixation she talked about having some initial pain and problems lifting her leg after the operation but was now mobile about her home with a walking frame. The housing complex has a lift which she now used. She was intending to return to getting out and about as she was before her fracture. (Participant 20, interviewed 5 weeks post operation)

92 year old female lives alone with husband. Daughter visits several times a week to help. Poor hearing. Difficult to disentangle what was before and after fracture. Seems to have been able to walk around house, undertake self-care and microwave own meals pre-fracture. Post fixation of the hip fracture, patient slowly improved walking. Life seems very similar to before fracture except need for walking aid, inability to put on socks and husband now microwaves the meals. (Participant 9, interviewed 9 weeks post operation)

70 year old male retired painter and decorator who lives with his wife and enjoys almost daily visits from his grandchildren. Mobility restricted to 5-6 metres for more than two years prior to fracture due to knee pain and chronic obstructive pulmonary disease. When interviewed he describes struggling to get up the stairs, get in and out of bed, put his shoes and socks on, and bend down. Although his mobility was severely restricted prior to his fracture, he described being unable get around as much as he had done before the fracture. He noted some improvement over recent weeks, as he no longer needed two sticks for walking, only one. (Participant 3, interviewed 15 weeks post operation)

84 year old male with dementia, who has some lucid moments and some recall of falling and hurting himself. He lives with his wife who looks after him and they have a cleaner to do heavy housework. Wife provided interview, involving the patient in the latter half when he woke up. Patient's walking was gradually slowing and he had a number of falls before his fracture. Fracture occurred while walking in shopping area with his wife. Since fixation of the fracture patient has required assistance with personal care, has professional carers four times a day, and the bathroom has been adapted for his limited mobility. The interviewee had difficulty distinguishing decline due to old age and change due to the fracture. The patient complained of some pain but it was unclear whether this was from the fracture or previously established osteoarthritis. Before the fracture both patient and wife had ceased all non-essential activities except for a weekly trip to the shops so daily life had changed little except for more care provision. (Participant 11, interviewed 7 weeks post operation)

74 year old female who lives with husband. Patient lived with severe rheumatoid arthritis for

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7 30 years. Developed heart failure and admitted to hospital with shortness of breath and  
8 confusion. Fell while in hospital and fractured her hip. Mobility before hip fracture very  
9 limited – able to walk slowly in house and garden, undertake light chores, and use scooter to  
10 go shopping. Became worse with breathing difficulty. Mobility remained reduced after  
11 hospital admission. Able to take step slowly in house with support. Uses wheelchair to go out  
12 of house – a new ramp improved this by second interview. Unclear how much mobility  
13 change was due to the fracture and how much due to heart failure. (Participant 18,  
14 interviewed 6 weeks and 18 weeks post operation)

15  
16 88 year old female retired teacher, who lives with her son and has a diagnosis of multiple  
17 sclerosis. The patient wove together pre and post injury experience in her account, making it  
18 difficult to disentangle. She said her son does the cooking and cleaning and her daughter  
19 assists with self-care. She has a close family, feels well supported and has lots of visitors –  
20 friends, grandchildren and great grandchildren. Her main interest beyond seeing friends and  
21 family is reading. She described being content with life. Prior to her fracture she was unwell  
22 with an infection and recounts using a frame for mobility which she still uses. (Participant  
23 23, interviewed 5 weeks post operation)

24  
25 85 year old female living in a nursing home. Her daughter visits alternate days. Her daughter  
26 provided the interview data. The patient has dementia but otherwise had been well before the  
27 fracture. Patient gets up and walks about herself, and takes herself to the toilet. She enjoys  
28 sitting and chatting. The patient does not remember the injury. Her life has not changed from  
29 how it was pre injury. The daughter did not mention any fracture-specific issues related to  
30 recovery. (Participant 26, interviewed 6 weeks post operation)

31  
32 84 year old female with limited English language. Pre-injury she had carers to assist her with  
33 all her personal needs. The injury had occurred whilst being hoisted. Post injury her main  
34 concern was that at discharge from hospital, after a three month stay, she was sent to a  
35 nursing home where she knew no-one. The patient repeatedly expressed distress about being  
36 in the nursing home but did not talk about the fracture.  
(Participant 5, interviewed 18 weeks post operation)

37  
38 84 year old male who has dementia. He lives alone but received visits three times a day from  
39 his son who provides meals. Son was interviewed. Arthritis of knee limited mobility before  
40 the fracture. Spent most of the day sitting. At weekends prior to fracture patient went to  
41 neighbour's house for evening meal. Patient fell and sustained fracture while walking to  
42 neighbour's house. Patient does not recall fracture. At time of interview, the patient was as  
43 mobile as pre operation limited by pain and stiffness from arthritis. Not yet visiting neighbour  
44 but this was because family was discouraging this in case he falls again rather than due to  
45 mobility. (Participant 1, interviewed 16 weeks post operation)

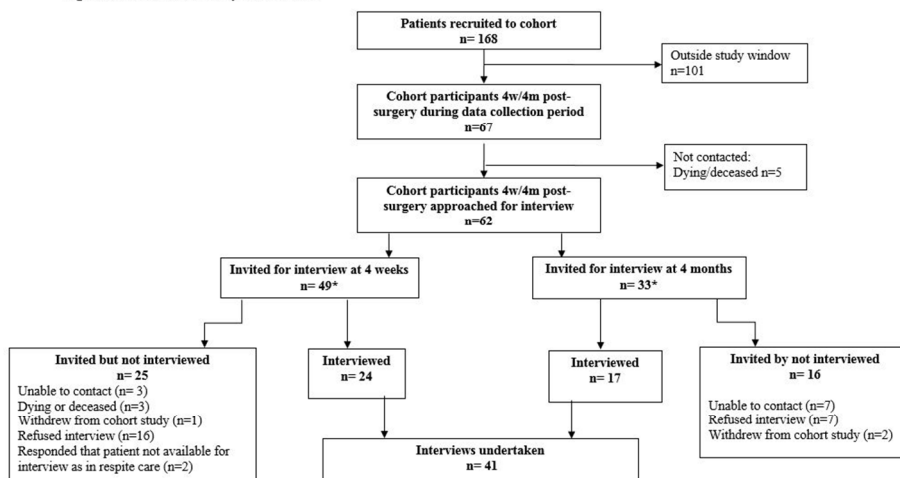
46  
47 **Box 1 Summaries of the data about individual patients and their recovery from a hip**  
48 **fracture**  
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Figure 1 Flow chart of study recruitment



Notes: \* 20 participants were invited for interview at both 4 weeks and 4 months post operation

93x63mm (300 x 300 DPI)

view only



**Evaluating recovery following hip fracture: a qualitative interview study of what is important to patients**

No	Item	Guide questions/description	Included in manuscript?
<b>Domain 1: Research team and reflexivity</b>			
Personal Characteristics			
1.	Interviewer/facilitator	Which author/s conducted the interview or focus group?	yes
2.	Credentials	What were the researcher's credentials? <i>E.g. PhD, MD</i>	No place to provide this in submission process
3.	Occupation	What was their occupation at the time of the study?	yes
4.	Gender	Was the researcher male or female?	Names are ones that are usually gender specific
5.	Experience and training	What experience or training did the researcher have?	Job title provided
Relationship with participants			
6.	Relationship established	Was a relationship established prior to study commencement?	Yes
7.	Participant knowledge of the interviewer	What did the participants know about the researcher? <i>e.g. personal goals, reasons for doing the research</i>	The participant information sheet followed standard UK ethics guidelines and was approved by an ethics committee (details in submission form)
8.	Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? <i>e.g. Bias, assumptions, reasons</i>	Job titles provided

No	Item	Guide questions/description <i>and interests in the research topic</i>	Included in manuscript?
	<b>Domain 2: study design</b>		
	Theoretical framework		The description of our analysis process makes it clear that we were using a modified grounded theory approach. We describe the approach in detail rather than giving a label which could mislead.
9.	Methodological orientation and Theory	What methodological orientation was stated to underpin the study? <i>e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis</i>	
	Participant selection		
10.	Sampling	How were participants selected? <i>e.g. purposive, convenience, consecutive, snowball</i>	Yes
11.	Method of approach	How were participants approached? <i>e.g. face-to-face, telephone, mail, email</i>	Yes
12.	Sample size	How many participants were in the study?	Yes
13.	Non-participation	How many people refused to participate or dropped out? Reasons?	Yes
	Setting		
14.	Setting of data collection	Where was the data collected? <i>e.g. home, clinic, workplace</i>	Yes
15.	Presence of non-participants	Was anyone else present besides the participants and researchers?	Yes
16.	Description of sample	What are the important	Yes

	No	Item	Guide questions/description	Included in manuscript?
1				
2				
3			characteristics of the sample?	
4			<i>e.g. demographic data, date</i>	
5		Data collection		
6				
7			Were questions, prompts,	Yes
8	17.	Interview guide	guides provided by the authors? Was it pilot tested?	
9				
10	18.	Repeat interviews	Were repeat interviews carried out? If yes, how many?	Yes
11				
12			Did the research use audio or	Yes
13	19.	Audio/visual recording	visual recording to collect the data?	
14				
15			Were field notes made during	Yes
16			and/or after the interview or	
17	20.	Field notes	focus group?	
18				
19			What was the duration of the	Yes
20	21.	Duration	interviews or focus group?	
21				
22	22.	Data saturation	Was data saturation discussed?	Yes
23				Not
24			Were transcripts returned to	mentioned
25			participants for comment	as not done
26	23.	Transcripts returned	and/or correction?	with this
27				population
28				
29				
30		<b>Domain 3:</b>		
31		<b>analysis and</b>		
32		<b>findings</b>		
33		Data analysis		
34				
35	24.	Number of data coders	How many data coders coded the data?	yes
36				
37				First
38				analysis
39				approach
40				involved
41	25.	Description of the coding tree	Did authors provide a description of the coding tree?	thematic coding. No
42				sub codes were used.
43				Yes
44				
45			Were themes identified in	Yes
46			advance or derived from the	
47	26.	Derivation of themes	data?	
48				
49			What software, if applicable,	Yes
50	27.	Software	was used to manage the data?	
51				
52				Not
53				mentioned
54			Did participants provide	as not done
55	28.	Participant checking	feedback on the findings?	with this
56				population
57				
58				
59		Reporting		
60	29.	Quotations presented	Were participant quotations	Yes

No	Item	Guide questions/description	Included in manuscript?
30.	Data and findings consistent	presented to illustrate the themes / findings? Was each quotation identified? e.g. <i>participant number</i> Was there consistency between the data presented and the findings?	Yes
31.	Clarity of major themes	Were major themes clearly presented in the findings?	Yes
32.	Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	Yes

# BMJ Open

## Evaluating recovery following hip fracture: a qualitative interview study of what is important to patients

Journal:	<i>BMJ Open</i>
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Article Type:	Research
Date Submitted by the Author:	17-Oct-2014
Complete List of Authors:	Griffiths, Frances; University of Warwick, Warwick Medical School Mason, Victoria; University of Warwick, Warwick Medical School Boardman, Felicity; University of Warwick, Warwick Medical School Dennick, Katherine; Kings College, London, Florence Nightingale School of Nursing and Midwifery Haywood, Kirstie; University of Warwick, Warwick Medical School Achten, Juul; University of Warwick, Warwick Medical School Parsons, Nicholas; University of Warwick, Warwick Medical School Griffin, Xavier; University of Warwick, Warwick Medical School Costa, Matthew; University of Warwick, Warwick Medical School
<b>Primary Subject Heading</b>:	Health services research
Secondary Subject Heading:	Qualitative research, Surgery
Keywords:	Hip < ORTHOPAEDIC & TRAUMA SURGERY, Quality in health care < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, QUALITATIVE RESEARCH

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3 **Evaluating recovery following hip fracture: a qualitative interview study of what is**  
4 **important to patients**  
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**Ethical approval**

Ethical approval was granted by NHS REC London - Camberwell and St Giles (11/LO/0927) on the 18<sup>th</sup> August 2011. Further approval was obtained from the research and development department of the University Hospitals Coventry and Warwickshire NHS Trust. This research complies with the Helsinki Declaration.

**Access to study data**

All authors had full access to all of the data in the study and can take responsibility for the integrity of the data and the accuracy of the data analysis



## Abstract

### Objective

To explore what patients consider important when evaluating their recovery from hip fracture and to consider how these priorities could be used in the evaluation of the quality of hip fracture services.

### Design

Semi-structured interviews exploring the experience of recovery from hip fracture at two time points - four weeks and four months post-operative hip fixation. Two approaches to analysis: thematic analysis of data specifically related to recovery from hip fracture; summarising the participant's experience overall.

### Participants

31 participants recruited, of whom 20 were female and 12 were cognitively impaired. Mean age 81.5 years. Interviews provided by 19 patients, 14 carers, and 8 patient/carer dyad; 10 participants were interviewed twice.

### Setting

Single major trauma centre in the West Midlands of the UK.

### Results

Stable mobility (without falls or fear of falls), for valued activities was considered most important by participants who had some pre-fracture mobility and were able to articulate what they valued during recovery. Mobility was important for managing personal care, for day-to-day activities such as shopping and gardening, and maintenance of mental well-being. Some participants used assistive mobility devices or adapted to their limitations. Others maintained their previous limited function through increased care provision. Many participants were unable to articulate what they valued as hip fracture was perceived as part of their decline with age. The fracture and problems from other health conditions were an inseparable part of one health experience.

### Conclusion

Pre-fracture mobility, adaptations to reduced mobility before or after fracture, and whether or not patients' perceive themselves to be declining with age, influence what patients consider important during recovery from hip fracture. No one patient reported outcome measure (PROM) could evaluate quality of care for all patients following hip fracture. General health-related quality of life tools may provide useful information within clinical trials.

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5 **Key words:** Hip fractures, Outcome assessment (Health Care), Interview, Frail older adults  
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## 8 **Article summary**

### 9 *Article focus*

- 10 • The UK NHS has identified the need to evaluate service provision for patients with a  
11 hip fracture
- 12 • There is increasing expectation that patient-reported outcome measures (PROM) are  
13 used within health service evaluation
- 14 • We asked the question: what do patients who have recently experienced a hip fracture  
15 consider important when evaluating their recovery?  
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### 18 *Key messages*

- 19 • Patients active before their fracture value mobility without falls or fear of falls, to  
20 undertake valued activities
- 21 • Many patients consider fracture to be part of their decline with age and adapt to  
22 reduced mobility or had already adapted pre-fracture
- 23 • No one patient reported outcome measure (PROM) could evaluate quality of care for  
24 all patients following hip fracture  
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### 30 *Strengths and limitations*

- 31 • The study sample was representative of the age profile, gender balance and dementia  
32 levels of NHS patients experiencing hip fractures
- 33 • It is possible that those not agreeing to be interviewed were struggling most with  
34 recovery.
- 35 • The data is limited by the difficulty the more physically and cognitively impaired  
36 patients had in giving a detailed account of their health experience.  
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## Introduction

Fragility fracture of the proximal femur (hip fracture) is one of the greatest challenges facing the healthcare community. In 1990, a global incidence of 1.31 million was reported and was associated with 740,000 deaths (1). Hip fractures constitute a heavy socioeconomic burden worldwide. The cost of this clinical problem is estimated at 1.75 million disability adjusted life years lost; 1.4% of the total healthcare burden in established market economies (1).

Among those experiencing fragility hip fracture in England, Wales and Northern Ireland, 70% are aged 80 years or older, 73% are female and 34% are cognitively impaired pre-operation. The mortality rate within 30 days of operation was 8.2% in 2013 (2).

The NHS has identified the need to evaluate the quality of service provision for patients with a hip fracture; this evaluation is conducted through the National Hip Fracture Audit Database (NHFD)(2). Currently, aspects of care such as time to surgery, length of patient stay and patient mortality in hospital and 30 day and 120 day follow up are recorded in the NHFD. These data are now used to guide payments to healthcare providers; the payment being increased if the provider supplies 'best practice' care (3). However, while important, there is interest from policy makers in the potential to enhance these currently reported data fields by including and an assessment of outcome as reported by patients. It is increasingly expected that healthcare evaluations should include domains of health that are important to patients (4), captured by well-developed patient-reported outcome measures (PROMs) which aim to assess how patients function and feel in relation to a health condition or associated treatment (5). PROMS capture information that cannot be obtained by other means (5, 6) complementing more traditional performance or process-based measures.

Our aim was to establish whether or not one PROM could be used with all patients who experience a fragility hip fracture as part of the evaluation of the quality of health care for hip fracture delivered by the NHS. For this patient group we were unable to identify a PROM specific to the assessment of hip fracture, and robust evidence of the quality and acceptability of non-hip fracture specific PROMs following completion by patients sustaining a hip fracture is limited (7). Moreover, clarity with regards to the outcomes of healthcare that these patients considers relevant and important does not exist. Appropriate and relevant PROM-based assessment should be underpinned by an understanding of what is important to patients in terms of the outcomes of healthcare. Further, we were concerned to understand whether,

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3 for people with different pre-fracture health and social context, what was important to them  
4 during recovery was different. For example, we hypothesised that what is important to a  
5 younger, otherwise healthy person experiencing hip fracture may be different from what is  
6 important to a person who perceives themselves as nearing the end of life. Good quality care  
7 would, as far as possible, enable each patient to achieve what is important to them in terms of  
8 recovery. If a PROM is to be used to assess quality of care the measure needs to capture this.  
9 We therefore designed an interview study to explore with patients and, where appropriate,  
10 their carers, what they consider to be important outcomes and to explore variation across this  
11 patient group. Our research questions were:  
12

- 13 1. What do patients who have recently experienced a hip fracture consider important when  
14 evaluating their recovery?
- 15 2. Is there variation between people within this population of the experience of what is  
16 considered important in recovery from hip fracture and why?

17 These research questions are framed by the desire of policy makers to evaluate the quality of  
18 care for hip fracture through assessment of recovery from the perspective of the patient.  
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## 29 **Method**

### 30 *Study Design*

31 We conducted semi-structured interviews with patients and, where appropriate, their carers at  
32 two time points, at approximately four weeks and then again at four months after they had  
33 sustained a fragility hip fracture.  
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### 41 *Identification of patients with a hip fracture*

42 We recruited participants from an existing cohort study, the Warwick Hip Trauma Evaluation  
43 (8), that commenced January 2012. This is a cohort of all patients admitted with a hip fracture  
44 to a single major trauma centre in the West Midlands of the United Kingdom. As part of their  
45 pre-operative assessment, patients were assessed for their capacity to consent using clinical  
46 assessment and the Abbreviated Mental Test Score (AMTS) (9). The AMTS is a 10-item  
47 measure used to rapidly assess the possibility of cognitive impairment in elderly people. A  
48 score below 8 suggests cognitive impairment (10). Scores less than 8 were taken to indicate  
49 that a patient was unlikely to be able to consent for themselves. Those deemed to have  
50 capacity for consenting to surgery, based on clinical assessment and AMTS, were considered  
51 able to consent for this study. Following the emergency surgery for their fracture, those with  
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3 capacity gave written consent to be approached for interview. For those deemed not to have  
4 capacity due to cognitive impairment, verbal consent was obtained from their consultee (11).  
5 Ethical approval was granted by NHS REC London - Camberwell and St Giles (11/LO/0927)  
6 on the 18<sup>th</sup> August 2011.  
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### 10 11 *Sampling*

12 During the data collection period for this study, February to August 2012, we purposefully  
13 sampled cohort participants who had reached 4 weeks or 4 months following their hip  
14 fracture and had consented to be approached for interview. The time points were chosen to be  
15 the same as those used for data collection for the NHFD (12). If a PROM were to be used  
16 with this patient population to assess quality of care, patients would be asked to complete the  
17 PROM at these time points. Our sampling strategy ensured a diverse mix of patients with  
18 respect to the following factors: age, gender, AMTS (9) and EQ-5D score (13).  
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### 26 *Interview recruitment and consent process*

27 We contacted eligible patients and carers by telephone just prior to 4 weeks and/or 4 months  
28 following hip fracture first to invite them to be interviewed, then to arrange an interview. If  
29 patients declined to participate, the reasons offered were recorded. Patients with capacity to  
30 consent were contacted directly. For those patients deemed not to have capacity, we  
31 contacted their consultee. Patients able to consent for themselves signed their own consent  
32 forms. For those unable to consent the consultee signed an agreement form and we aimed to  
33 interview a carer as well as the patient (patient/carer dyad). Carers who were interviewed  
34 signed a consent form. Initial analysis commenced during recruitment phase; recruitment  
35 continued until data saturation at the first time point. The study flow diagram is at Figure 1.  
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### 45 *Interview process*

46 We interviewed participants at their current residence (own home, residential or nursing  
47 home) or in hospital. The interviewer was trained in interviewing but did not have clinical  
48 knowledge of hip fracture, its treatment or prognosis. Where possible, patients and carers  
49 were interviewed alone, however where the carer and patient requested a joint interview  
50 (whether or not the patient had cognitive impairment), they were interviewed together. The  
51 aim of the interviews was to understand each participant's lived experience of hip fracture  
52 (14) and the influence of their social context and pre-fracture health. We use the following  
53 questions:  
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- 57 • What is a normal day like for you now?  
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- How bothersome are you finding your hip?
- What is different about your life now compared to just before your injury?
- Compared to just before your injury what has stayed the same?
- Which of these make the most difference to your life?

The interviewer encouraged participants to talk about the experience in whatever order they chose and using terms meaningful to them. Later in the interview we prompted, where necessary, for clarification about what in the patient experience was related to the hip fracture. Towards the end of the interview we directly asked what was important to them in terms of recovery if this had not already been talked about by the participant, using the following questions:

- What is important to you in terms of your recovery?
- Where would you like to see yourself in the future in relation to your recovery (i.e. the next few weeks and months)?
- If a friend or neighbour were asking you now about how well you are recovering – what has been important to you that you would tell them about?
- If a doctor or nurse was asking you now about how well you are recovering – what would be important for the doctor or nurse to ask about?

Consideration was given to the potential challenges associated with interviewing older adults, for example by giving potential participants sufficient time to decide whether or not to participate and minimising burden and fatigue through streamlining questions (15). The interview process, questions and prompts were refined by the study team during the initial stage of data collection, particularly adding questions and prompts to focus the participant on recovery from their hip fracture. Questions were similar for both patient and carer. Interviews were audio-recorded. For one interview, audio recording was not feasible due to the noisy environment so extensive field notes were taken. For all interviews the researcher made reflective field notes to assist interpretation of the interview data.

### *Analysis*

Interviews and field notes were transcribed and transcripts checked, anonymised and uploaded into Nvivo software (16). Initial analysis involved data immersion, reading and re-reading each transcript and discussion of the interview transcripts by the research team. Our research team was multi-disciplinary: social science, behavioural science, health science, orthopaedic surgery and statistics. All team members read at least five transcripts so all transcripts were read by at least two team members. From the data we identified and crystallised what was important for participants that was specific to hip fracture recovery (17). We found that the interviews at four weeks and four months covered very similar issues,

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3 although, as would be expected, what the participants reported about each issue four weeks  
4 and at four months was different, as recovery was more advanced at four months. As our  
5 analysis aimed to identify what patients consider important when evaluating their recovery  
6 rather than the detail of recovery itself, we treated all the interviews related to one participant  
7 as one set of data. During data interpretation we took account of the timing of the interview,  
8 whether the interview data was from a patient or carer or patient/carer dyad, and field notes.  
9 (17). For data collection and analysis we took a phenomenological approach in that we  
10 sought to understand participant's experience of hip fracture recovery and the influence of  
11 their context on this (14, 18) and concurrently we took a selective realist position (19) in that  
12 we recognised hip fracture as an event identifiable by means other than through the  
13 participant's account.  
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23 We used two different approaches to analysis to answer our research questions. For the first  
24 research question, which is concerned with the whole groups of participants, we used  
25 thematic analysis (20). We searched the transcripts for any mention by the participants of  
26 what was important to them during recovery from hip fracture. These were discussed at team  
27 analysis meetings. Transcripts were then coded in NVivo. As coding proceeded, we reviewed  
28 these codes at our team analysis meetings and combined them into themes. After we had  
29 read, discussed and then coded ten transcripts we found no additional themes in the  
30 remaining data. Double coding was undertaken for one in four transcripts and coding  
31 compared and discussed to check consistency of final coding. During analysis we became  
32 aware that although the data from different participants could be coded under the same theme  
33 such as mobility, the experience of recovery was very different for different people. This led  
34 us to our second research question and analysis approach.  
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45 To answer our second research question we used cross case analysis (21). We considered  
46 each participant as an individual 'case' living within their particular context (22, 23) and  
47 through comparison of cases sought to understand how they varied. To develop our matrix  
48 for the cross case analysis (21), we closely read five participant data sets then developed,  
49 from the data, a template for summarising the experience of hip fracture recovery for each  
50 patient carer dyad. This involved considering each set of interviews as a whole, reading and  
51 rereading the text and writing a summary of the patient/carer journey and all that influenced  
52 it. We reviewed the summaries at our data analysis meetings and from these initial summaries  
53 we developed a draft template. We refined the template based on the data as we summarised  
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3 and discussed further transcripts. The template included: current and recent past living  
4 arrangements and environment, day-to-day life now and in the recent past, the impact of the  
5 hip fracture and its management, what was changing in day-to-day life as they recovered, the  
6 extent to which the patient referred specifically to the fracture and their ability to engage in  
7 the interview. Each of these formed a data row in our matrix with a column for each  
8 participant. The data about each patient was summarised into the template with a second  
9 research team member reviewing each summary against the data. To qualitatively understand  
10 the variation in the experience of what was considered important for recovery, we compared  
11 these summaries.  
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## 20 **Results**

21 Twenty one patients were interviewed on one occasion and 10 were interviewed twice giving  
22 a total of 31 patient participants and 41 interviews. Of the 31 patient participants, 20 (64.5%)  
23 were female, the mean age was 81.5 years (SD 9.2, range 61-96) and 12 (39%) scored less  
24 than eight on the AMTS. Of the 41 interviews, 24 were conducted three to nine weeks, and  
25 17 were conducted 14 to 23 weeks after the hip fracture. Nineteen interviews were with the  
26 patient only, 14 with carer only, and eight with patient/carer dyads. Interviews lasted between  
27 20 and 90 minutes. Despite framing the interview for interviewees as exploring the  
28 experience of hip fracture, many interviewees talked about general health issues. Although  
29 we prompted to clarify what was related to their fracture, in many interviews it was difficult  
30 to disentangle the impact of the fracture from the impact of other health problems. Some  
31 interviews contained almost no data that was clearly related to the fracture. From the  
32 perspective of the patient, all their health problems were part of one experience. The absence  
33 of data clearly related to the fracture was more marked in the four month compared to four  
34 week interviews. We therefore decided not to attempt interviews at 12 months post fracture  
35 as originally planned (8). The following sections report our analysis. Illustrative quotations  
36 from data are labelled with the age and gender of the patient, time since hip fracture and  
37 whether the quotation was from the patient or carer.  
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### 51 What is important to patients when evaluating their recovery?

52 From our systematic search of the interviews for data related to recovery from the hip  
53 fracture we identified the following themes: mobility, valued day-to-day activities, self-care,  
54 pain, mental wellbeing, fear of falling and leg shortening. When talking about mobility, day-  
55 to-day activities or self-care participants also talked about their level of independence.  
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### *Mobility*

This was the most prominent theme, although when talking about mobility the interviewees often mentioned other themes. Mobile participants reported limited mobility in the weeks post operation and valued any improvement.

I'm walking with a walking stick at the moment. I've been down the park and back...I can usually get around [the house] without the walking stick, and I can get up and down stairs no problem. I get upstairs with my good leg and downstairs with my bad leg. (Participant 6, male, age 78, 5 weeks post operation)

By four months, for many participants mobility had improved, and they were happy that they were returning to normal mobility.

I can't rush round like I did, but eventually that will come...I mean it's pretty normal now, but I think it's going to be a while before I can actually walk as I did and I probably won't walk as I did... when I came home [from hospital] I was still hobbling... but now I'm more or less...walking normal, especially with the stick (Participant 10, female, age 83, 18 weeks post operation)

For those with limited mobility before hip fracture any unaided improvement was limited to the pre-fracture level but also valued.

The operation was successful and got him back to normal right from the start, right from the very first day that he had it done. He was able to then walk pain free with a Zimmer frame to the toilet. The staff were all saying it was amazing how well he was walking and he would soon be back to normal, but what they didn't realise was that he was walking normally. (Carer of participant 1, male, age 84, 16 weeks post operation)

Other participants were using mobility aids that they had not been using regularly before the fracture. For some, the addition of mobility aids enabled greater security of mobility than prior to their fracture.

Her mobility's getting better. I think she'll cope with the frame. She's had a couple of falls in the home, earlier when she was forgetting that she had to use the frame. She'd get out of bed and not use the frame and consequently fall. But she's got in the habit of using it now... she's not falling, which is a bonus. (Carer of participant 13, female, age 87, 14 weeks post operation)

### *Valued day-to-day activities*

Those who were active prior to their fracture talked about the frustration of the restriction in their activities particularly in the weeks following the fracture.

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3 I'm back on what I call domestic duties – washing up! But the thing that is frustrating  
4 is that I can't get outside and do any gardening. (Participant 12, male, age 78, 6 weeks  
5 post operation)  
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8 I just miss getting up and getting out. I never stayed in. I'd go out in the morning and  
9 come back and then I'd go out again, I just used to go out looking round the shops. I  
10 just get these crossword books and I do those. (Participant 20, female, age 92, 5  
11 weeks post operation)  
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13 Participants who were active before their fracture were usually able to resume valued  
14 activities but had some limitations which remained a frustration.  
15

16 I can do little (gardening) jobs but because I haven't got as much movement in the  
17 hip joints, I find it difficult to go down on my hands and knees...If I go down on one  
18 knee it's difficult to get up again so that's not possible but I can do things that are  
19 higher up, I can trim. (Participant 15, female, age 61, 15 weeks post operation)  
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23 I'm tackling a little bit of cooking now. I started to cook myself some nice lunches  
24 and I haven't got round to the... scones ... I made one lot when I came home and I  
25 thought, I can't be bothered anymore. (Participant 10, female, age 83, 18 weeks post  
26 operation)  
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28 Some participants returned to valued activities through adapting how they did them, this  
29 participant using a wheelchair for the first time.  
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32 Over the last three weeks, when we go out shopping now, I can't go down the aisles,  
33 so [daughter] gets me a (wheel)chair and I can sit in the chair and then say what  
34 shopping I need, that is very good. (Participant 9, female, age 92, 18 weeks post  
35 operation)  
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38 Participants who no longer undertook valued activities that involved significant mobility  
39 were content to continue as they were, for example, occupying themselves with visits from  
40 family and reading.  
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#### 43 44 45 *Personal care*

46 Washing, dressing and getting to the toilet was talked about in interviews, but in many cases  
47 it was not clear whether difficulties with personal care were specifically due to the fracture. A  
48 few interviewees talked about problems with incontinence but again it was unclear whether  
49 this was specific to the fracture. Most patients had a commode or had arranged to sleep near  
50 the bathroom in the weeks immediately after the fracture. Some participants were able to  
51 describe problems with self-care specific to the hip fracture.  
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57 I'm ...not able to put a sock or anything on my injured leg. I can manage now with  
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3 my trouser leg and throw these jogging trousers and hook my leg into them but I have  
4 to ask my husband if I need to put a sock or a shoe, or my slipper on that foot.  
5 (Participant 15, female, age 61, 6 weeks post operation)  
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7 At the second interview this participant was pleased to report that she now needed very little  
8 help with self-care, at least in part through wearing alternative footwear.  
9

10 I still have to throw my clothes and hook them onto the foot to get dressed. I couldn't  
11 wear lace-up shoes or anything like that because I couldn't tie them up, but things like  
12 slip-ons and sandals I can get on quite easily, so I'm fairly independent – I am  
13 independent really, I just need help with cutting my toenails and that – those on the  
14 right foot that's all. (Participant 15, female, age 61, 15 weeks post operation)  
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### 17 *Pain*

18 Although pain was talked about by some interviewees it was not considered a major problem.  
19

20 So here I am, four or five weeks [post operation], I get a little bit of pain, not a lot.  
21 (Participant 7, female, age 70, 5 weeks post operation)  
22  
23

24 The pain was so bad before I had it done, and I just couldn't believe the relief after the  
25 operation when I was walking in the hospital and I had one of those pushers you  
26 know. And there was no pain. And I kept thinking, I can't believe this, and that's how  
27 it's been. I've never had any pain, not at all.  
28 (Participant 10, female, age 83, 18 weeks post operation)  
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31 There's several times, like when I have got to get up those steps. I put my right foot  
32 first and bring my left foot up, and once or twice... you step on your left, and it's still  
33 there, lets you know it's still tender. (Participant 12, male, age 78, 16 weeks post  
34 operation)  
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### 37 *Mental wellbeing*

38 Low mood or depression associated with the reduced mobility due to the fracture was  
39 reported by a few interviewees, emphasising the great value placed by interviewees on being  
40 independently mobile.  
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43 He can't walk and that, to him he'd rather die. I'll be honest with you he's said it once  
44 or twice, "Let me go". And I said, "No you're not going no-where". And then the  
45 other day for the first time, but he hasn't said it since, "I'm going to commit suicide",  
46 I said, "No you're not, you're not". (Carer of participant 31, male, age 84, 5 week post  
47 operation)  
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49

50 For me it was a massive problem and caused me depression. To me is the most  
51 important thing, the mental aspect of taking away somebody's freedom to be able to  
52 move around and go to the shops and do all that sort of thing.  
53 (Participant 7, female, age 70, 23 weeks post operation)  
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### 56 *Fear of falling*

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3 The experience of the fracture left a few participants with a fear of falling and sustaining a  
4 further fracture.  
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6 I think it frightened him more than anything else. He's frightened he'll fall over again  
7 and do it again, that bothers him more than anything else. Because now when he  
8 stands up at all to try and walk he's frightened he's going to fall over and the same  
9 thing will happen all over again. (Carer of participant 11, male, age 84, 7 weeks post  
10 operation)  
11

12 I've got to watch what I'm doing. If I catch my foot on [paving stone], I can go over  
13 again. (Participant 12, male, age 78, 16 weeks post operation)  
14  
15

16 The fear of falling was sometimes expressed by a family member. When talking about his  
17 frustration at not being able to work in the garden, participant 6 added  
18

19 All the rain has made it very slippery, and [wife] says, "No way do you go out there."  
20 (Participant 12, male, age 78, 6 weeks post operation)  
21  
22

23 This emphasises the value given to mobility without falls or fear of falls by interviewees.  
24

#### 25 *Leg shortening*

26 This is a problem that is common following extra-capsular fracture of the proximal femur.  
27

28 One interviewee described her concerns about this.  
29

30 One leg is now shorter than the other so that makes walking a bit difficult because it  
31 gives me back pain. (Participant 15, female, age 61, 15 weeks post operation)  
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#### 34 Is there variation within this population of the experience of what is considered important in 35 recovery from hip fracture? 36

37 Our sample included patients from across a spectrum that extended from those who were  
38 physically and mentally active prior to their fracture through to those who, pre-fracture, had  
39 been immobile due to conditions such as multiple sclerosis, chronic obstructive airways  
40 disease and arthritis, and those with severe cognitive impairment. Although when talking  
41 about what was important to them when evaluating their recovery from hip fracture, patients  
42 from across this spectrum talked about similar themes, their experiences of what was  
43 important was different for different people. In Box 1 we present condensed versions of the  
44 interview summaries developed during our second analysis approach, for participants chosen  
45 to represent the whole spectrum of patients. We indicate whether the data was provided by  
46 patient, carer or both.  
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#### 55 *Recovery as a return to pre-fracture state or as part of aging and decline*

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3 Every patient interviewed had experienced a hip fracture and surgery, so in physical terms all  
4 of them had, for a period of time, been somewhat impaired compared to their pre-fracture  
5 state. Four weeks post-operation, those who were active pre-fracture talked in terms of  
6 regaining a recovered state that was similar to their pre-fracture state although with some  
7 minor adaptations (participants 15 and 20 in box 1). Whilst these participants expressed  
8 worry about how well they might function in the future, there was, nevertheless,  
9 determination to progress to as full a recovery as possible. Four months post-operation many  
10 of these participants had all but regained their pre-fracture level of activity. Among  
11 participants with severely limited mobility pre-fracture, some were able to identify specific  
12 activities which were more difficult post-fracture than pre-fracture, such as putting on socks  
13 and getting in and out of bed. Some were also able to identify specific improvements in  
14 mobility post operation (see participants 9 and 15 in box 1). These participants described a  
15 process of recovery although it was very limited.  
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26 In contrast, for other participants, the fracture was just one part of a process of aging and  
27 decline. For example, participant 11 (see box 1) had been very limited in his activities before  
28 the fracture. Post fracture he needed adaptations to his home and increased care support post  
29 fracture to enable him to continue to manage at home. The mobility of participant 18 had  
30 declined and she had started using a wheelchair instead of her mobility scooter to get out of  
31 the house. However, it was unclear whether the decline was due to the concurrent heart  
32 failure or the fracture. Those who were the most physically or cognitively impaired pre-  
33 fracture did not talk about regaining a recovered state but about a state of no change. They  
34 continued with their limited activities as before (for example: participants 23 and 26 in box  
35 1). For one participant, the only change was her move to a new nursing home (participant 5 in  
36 box 1). Participants with cognitive impairment were often unaware of having experienced a  
37 fracture (Participant 1 box 1).  
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#### 48 *Recovery through adaptation*

49 In the face of their physical limitations, most participants made adaptations that mitigated the  
50 effect of the fracture; for example employing a cleaner, moving to a nursing home or using a  
51 walking aid or other assistive device. For those who were active pre-fracture, adaptation was  
52 mostly considered temporary, although at 4 months there was some evidence that active  
53 patients had adapted to some limitations such as being unable to kneel for gardening or  
54 limiting time spent shopping to avoid exhaustion. For some participants who had been  
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3 experiencing decline in their mobility pre-fracture, the fracture precipitated adaptations that  
4 they had not previously considered but made their life easier. These included using a  
5 wheelchair for shopping, having a new ramp built for getting in and out of the house in a  
6 wheelchair, using a walking aid or employing professional carers to assist with personal care.  
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8 For some, their own or their carer's fear of further falls limited their mobility or at least  
9 limited how far they tested their ability to walk. Poor weather conditions exacerbated this  
10 fear, but adaptations to the environment such as walking aids or handrails lessened the fear.  
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### 15 **Discussion**

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17 Following hip fracture, for those who had some pre-fracture mobility and able to articulate  
18 what they value during recovery, stable mobility, that is, mobility without the experience of  
19 or fear of falling, and mobility that that allows people to undertake valued activities are most  
20 valued. The ability to walk is important but so too are other leg movements needed for  
21 activities such as gardening or using transport. For some participants, maintaining mobility,  
22 however limited, was achieved by using assistive devices or working out new ways of doing  
23 an activity. Some participants adapted to their limitations, for example wearing different  
24 footwear or adjusting their expectations of what they could achieve. Others maintained their  
25 previous limited function through increased care provision.  
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34 Patients also consistently valued certain basic domains of health, such as pain (or lack of it),  
35 day-to-day activities, personal care and mental well-being. However, many participants in  
36 this study were unable to articulate what was important to them in terms of recovery from hip  
37 fracture. The hip fracture was just one part of their decline with age and its impact could not  
38 be disentangled from the impact of other health issues. The level of recovery perceived by a  
39 participant was influenced by their pre-fracture state and their ability to make adaptations  
40 during recovery.  
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### 48 *Strengths and weaknesses of the study*

49 When the mortality rate post operation is taken into account, including the higher mortality  
50 amongst older females, the study sample was broadly representative of the age profile and  
51 gender balance of the population of England, Wales and Northern Ireland experiencing hip  
52 fractures (2). We used a higher cut off for assessment of cognitive impairment (score of 8 on  
53 AMTS) compared to the NHFD (score of 6 on AMTS). This is likely to explain our higher  
54 proportion of participants with cognitive impairment compared to the average in the NHFD.  
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More research time was spent on recruitment than any other aspect of the study as it proved difficult. When contacted about the interview study, potential participants talked about other priorities or concerns that prevented them agreeing to interview, or they simply did not wish to be interviewed. It is possible that those not interviewed were struggling most with recovery. Our data is also limited by the difficulty some frail older adults have in giving a detailed account of their health experience (24). Interview data is jointly constructed by interviewer and interviewee (25) and our interviewer had no clinical knowledge of hip fractures. This reduced the likelihood of the interviewer influencing the data. A clinician undertaking the interviews would have the knowledge to help the patient tease out whether health problems were fracture related or not. However, this would have obscured the important finding, that participants often experienced their fracture as part of, rather than separate to, their other existing health problems. We relied on carer's accounts for some participants. We found they talked about the same themes as the participants. However, for those with cognitive impairment, some carers were unable to provide detailed data as they had limited day-to-day contact with the participant. We did not attempt to check with participants about our interpretation of the data to avoid further burden for them.

### *Comparison with other studies*

There are similarities between our findings and other qualitative studies of similar populations. A Swedish team that explored engagement with rehabilitation post hip fracture found a similar spectrum of participants (26). They classified their participants as: those who were frail and in need of support but did not request it; those who were dependent and took no active part in rehabilitation and those who were self-sufficient. Another Swedish study, undertaken with people 12 months after their hip fracture found that mobility and a return to normal activities were key outcomes for patients (27). An Australian study of mobility post-fracture found that reduced level of mobility was associated with fear of falling, physical limitations from other illness and social/environmental factors (28). Our results also echo findings from across the research literature on the experience of health and illness. For example, the difficulty disentangling the impact of one health condition from other co-morbidities has been found for mental health conditions (29). The acceptance of an acute health problem as being part of the aging process has been found for conditions such as stroke (30). Recalibration to altered circumstances in response to a sudden injury has also been described (31), as have the adaptations- both physical and psychological- that people



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3 make in order to maintain their quality of life (32). Reduced expectations of health and  
4 acceptance of limited function have been described among elderly women (33). Fear of  
5 falling is common among older people generally (34). The consistency between our findings  
6 and other studies suggests that there is now sufficient qualitative evidence to inform policy  
7 decisions about the choice of appropriate PROMS for assessing recovery from hip fracture.  
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### 11 12 13 *Implications for clinicians and policymakers*

14 This study was undertaken in response to a potential policy change involving the use of a  
15 PROM to assess patient recovery from hip fracture, the results of which would form part of  
16 the evaluation of the quality of care provided for hip fracture. We conclude that for the  
17 population experiencing fragility hip fractures, it is unlikely that a single PROM specific to  
18 hip fracture could be developed which is relevant to the whole spectrum of patients. An  
19 assessment that focuses on mobility of the hip would be relevant for many patients, and  
20 mobility impacts on other health domains. However, with any form of assessment of  
21 mobility, pre-fracture status would have to be taken into account. Some patients had limited  
22 pre-fracture mobility at the hip so a lack of mobility during recovery may not reflect the  
23 quality of care. In addition there are other factors that influence the perception of recovery by  
24 patients. These include adaptations that they or their carers make to compensate for their  
25 reduced mobility, and patient perception of whether or not they are at the stage in life where  
26 decline is inevitable. Quality of care is only one of a number of interrelated factors that  
27 influence the patient's perception of recovery from hip fracture.  
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38 Several of the themes described by interviewees - mobility, day-to-day activities, self-care,  
39 pain and mental wellbeing, are similar to the domains included in currently available generic  
40 measures including the EuroQoL EQ-5D (13), the Short Form 36-item Health Survey (SF-36)  
41 (35) and the WHOQoL-BREF (36). Both the EQ-5D (3L) and the SF-36 (version 1) have  
42 been widely used in trials of people sustaining hip fractures, but for both measures evidence  
43 of essential measurement and practical properties is limited (7). In the context of a clinical  
44 trial where patients are randomised to an intervention and control arm, these generic  
45 measures may be appropriate but they may need to be supplemented by specific tools for  
46 selected groups, such as patients with high-levels of pre-injury function.  
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4 61 year old female social worker who lives with her husband. Before her fracture she was  
5 working full time and, for recreation, taking country walks, undertaking all types of  
6 gardening activities and playing with her grandchildren. Post fracture fixation (6 weeks)  
7 she described using crutches to get around the garden and shops, needing help with putting  
8 on socks and cutting toe nails, and was unable to climb stairs. She talked in terms of  
9 improvement and expectation of returning to work and full activity including cleaning and  
10 gardening. By the second interview she was frustrated that recovery was so slow but she  
11 could identify the ways in which she had continued to recover. (Participant 15, interviewed  
12 6 weeks and 15 weeks post operation)  
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15 92 year old female who lives alone in her own flat within a sheltered housing complex.  
16 Prior to the hip fracture she looked after herself and did her own washing, but had a cleaner  
17 to undertake heavy household chores. She spent most of each day out and about at the  
18 shops, engaging in social activities, bingo and on outings. She had no other illnesses. Post-  
19 fracture fixation she talked about having some initial pain and problems lifting her leg after  
20 the operation but was now mobile about her home with a walking frame. The housing  
21 complex has a lift which she now used. She was intending to return to getting out and  
22 about as she was before her fracture. (Participant 20, interviewed 5 weeks post operation)  
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25 92 year old female lives alone with husband. Daughter visits several times a week to help.  
26 Poor hearing. Difficult to disentangle what was before and after fracture. Seems to have  
27 been able to walk around house, undertake self-care and microwave own meals pre-  
28 fracture. Post fixation of the hip fracture, patient slowly improved walking. Life seems  
29 very similar to before fracture except need for walking aid, inability to put on socks and  
30 husband now microwaves the meals. (Participant 9, interviewed 9 weeks post operation)  
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33 70 year old male retired painter and decorator who lives with his wife and enjoys almost  
34 daily visits from his grandchildren. Mobility restricted to 5-6 metres for more than two  
35 years prior to fracture due to knee pain and chronic obstructive pulmonary disease. When  
36 interviewed he describes struggling to get up the stairs, get in and out of bed, put his shoes  
37 and socks on, and bend down. Although his mobility was severely restricted prior to his  
38 fracture, he described being unable get around as much as he had done before the fracture.  
39 He noted some improvement over recent weeks, as he no longer needed two sticks for  
40 walking, only one.  
41 (Participant 3, interviewed 15 weeks post operation)  
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44 84 year old male with dementia, who has some lucid moments and some recall of falling  
45 and hurting himself. He lives with his wife who looks after him and they have a cleaner to  
46 do heavy housework. Wife provided interview, involving the patient in the latter half when  
47 he woke up. Patient's walking was gradually slowing and he had a number of falls before  
48 his fracture. Fracture occurred while walking in shopping area with his wife. Since fixation  
49 of the fracture patient has required assistance with personal care, has professional carers  
50 four times a day, and the bathroom has been adapted for his limited mobility. The  
51 interviewee had difficulty distinguishing decline due to old age and change due to the  
52 fracture. The patient complained of some pain but it was unclear whether this was from the  
53 fracture or previously established osteoarthritis. Before the fracture both patient and wife  
54 had ceased all non-essential activities except for a weekly trip to the shops so daily life had  
55 changed little except for more care provision. (Participant 11, interviewed 7 weeks post  
56 operation)  
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4 74 year old female who lives with husband. Patient lived with severe rheumatoid arthritis  
5 for 30 years. Developed heart failure and admitted to hospital with shortness of breath and  
6 confusion. Fell while in hospital and fractured her hip. Mobility before hip fracture very  
7 limited – able to walk slowly in house and garden, undertake light chores, and use scooter  
8 to go shopping. Became worse with breathing difficulty. Mobility remained reduced after  
9 hospital admission. Able to take step slowly in house with support. Uses wheelchair to go  
10 out of house – a new ramp improved this by second interview. Unclear how much mobility  
11 change was due to the fracture and how much due to heart failure. (Participant 18,  
12 interviewed 6 weeks and 18 weeks post operation)  
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15 88 year old female retired teacher, who lives with her son and has a diagnosis of multiple  
16 sclerosis. The patient wove together pre and post injury experience in her account, making  
17 it difficult to disentangle. She said her son does the cooking and cleaning and her daughter  
18 assists with self-care. She has a close family, feels well supported and has lots of visitors –  
19 friends, grandchildren and great grandchildren. Her main interest beyond seeing friends  
20 and family is reading. She described being content with life. Prior to her fracture she was  
21 unwell with an infection and recounts using a frame for mobility which she still uses.  
22 (Participant 23, interviewed 5 weeks post operation)  
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25 85 year old female living in a nursing home. Her daughter visits alternate days. Her  
26 daughter provided the interview data. The patient has dementia but otherwise had been  
27 well before the fracture. Patient gets up and walks about herself, and takes herself to the  
28 toilet. She enjoys sitting and chatting. The patient does not remember the injury. Her life  
29 has not changed from how it was pre injury. The daughter did not mention any fracture-  
30 specific issues related to recovery. (Participant 26, interviewed 6 weeks post operation)  
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33 84 year old female with limited English language. Pre-injury she had carers to assist her  
34 with all her personal needs. The injury had occurred whilst being hoisted. Post injury her  
35 main concern was that at discharge from hospital, after a three month stay, she was sent to  
36 a nursing home where she knew no-one. The patient repeatedly expressed distress about  
37 being in the nursing home but did not talk about the fracture.  
38 (Participant 5, interviewed 18 weeks post operation)  
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41 84 year old male who has dementia. He lives alone but received visits three times a day  
42 from his son who provides meals. Son was interviewed. Arthritis of knee limited mobility  
43 before the fracture. Spent most of the day sitting. At weekends prior to fracture patient  
44 went to neighbour's house for evening meal. Patient fell and sustained fracture while  
45 walking to neighbour's house. Patient does not recall fracture. At time of interview, the  
46 patient was as mobile as pre operation limited by pain and stiffness from arthritis. Not yet  
47 visiting neighbour but this was because family was discouraging this in case he falls again  
48 rather than due to mobility. (Participant 1, interviewed 16 weeks post operation)  
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52 **Box 1 Summaries of the data about individual patients and their recovery from a hip**  
53 **fracture**  
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### Competing interest statement

All authors have completed the Unified Competing Interest form at [www.icmje.org/coi\\_disclosure.pdf](http://www.icmje.org/coi_disclosure.pdf) (available on request from the corresponding author) and declare: funding from the National Institute of Health Research, University of Warwick, and University Hospitals Coventry and Warwickshire NHS trust.

### Authorship

MC, FG, JA, XG, KH and FB contributed to the conception and design of the study. FB, VM and KD conducted the interviews. All authors contributed to analysis and interpretation of data. FG, KD and VM drafted the article and all authors revised it critically for important intellectual content. All authors gave final approval of the version to be published.

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**Data sharing:** no additional data available

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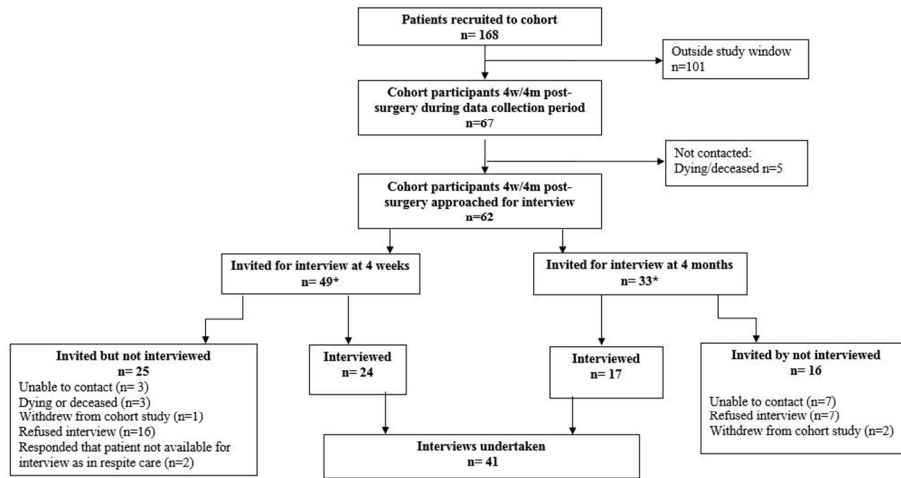
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For peer review only



Figure 1 Flow chart of study recruitment



Notes: \* 20 participants were invited for interview at both 4 weeks and 4 months post operation

93x63mm (300 x 300 DPI)

view only



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7 **Evaluating recovery following hip fracture: a qualitative interview study of what is**  
8 **important to patients**

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**Ethical approval**

Ethical approval was granted by NHS REC London - Camberwell and St Giles (11/LO/0927) on the 18<sup>th</sup> August 2011. Further approval was obtained from the research and development department of the University Hospitals Coventry and Warwickshire NHS Trust. This research complies with the Helsinki Declaration.

**Access to study data**

All authors had full access to all of the data in the study and can take responsibility for the integrity of the data and the accuracy of the data analysis

## Abstract

### Objective

To explore what patients consider important when evaluating their recovery from hip fracture and to consider how these priorities could be used in the evaluation of the quality of hip fracture services.

### Design

Semi-structured interviews exploring the experience of recovery from hip fracture at two time points - four weeks and four months post-operative hip fixation. Two approaches to analysis: thematic analysis of data specifically related to recovery from hip fracture; summarising the participant's experience overall.

### Participants

31 participants recruited, of whom 20 were female and 12 were cognitively impaired. Mean age 81.5 years. Interviews provided by 19 patients, 14 carers, and 8 patient/carer dyad; 10 participants were interviewed twice.

### Setting

Single major trauma centre in the West Midlands of the UK.

### Results

Stable mobility (without falls or fear of falls), for valued activities was considered most important by participants who had some pre-fracture mobility and were able to articulate what they valued during recovery. Mobility was important for managing personal care, for day-to-day activities such as shopping and gardening, and maintenance of mental well-being. Some participants used assistive mobility devices or adapted to their limitations. Others maintained their previous limited function through increased care provision. Many participants were unable to articulate what they valued as hip fracture was perceived as part of their decline with age. The fracture and problems from other health conditions were an inseparable part of one health experience.

### Conclusions

~~Patients consistently valued stable~~**Conclusion**

~~Pre-fracture mobility, adaptations to reduced mobility before or after fracture, and its role in other basic health domains. For evaluating service quality, nowhether or not patients' perceive themselves to be declining with age, influence what patients consider important during recovery from hip fracture. No~~ one patient-reported outcome measure (PROM) could

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consistently evaluate recovery quality of care for all patients with following hip fracture.

General health-related quality of life tools may provide useful information within clinical trials ~~but may need to be supplemented by specific tools for selected groups, especially those patients with high levels of pre-injury function.~~

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**Key words:** Hip fractures, Outcome assessment (Health Care), Interview, Frail older adults

## Article summary

### Article focus

- The UK NHS has identified the need to evaluate service provision for patients with a hip fracture
- There is increasing expectation that patient-reported outcome measures (PROM) are used within health service evaluation
- We asked the question: what do patients who have recently experienced a hip fracture consider important when evaluating their recovery?

### Key messages

- Patients active before their fracture value mobility without falls or fear of falls, to undertake valued activities ~~but many patients consider fracture to be part of their decline with age.~~
- While no Many patients consider fracture to be part of their decline with age and adapt to reduced mobility or had already adapted pre-fracture
- No one patient reported outcome measure (PROM) could evaluate all aspects quality of recovery care for all patients with following hip fracture, ~~general health related quality of life tools may provide useful information for the majority of patients.~~

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### Strengths and limitations

- The study sample was representative of the age profile, gender balance and dementia levels of NHS patients experiencing hip fractures
- It is possible that those not agreeing to be interviewed were struggling most with recovery.
- The data is limited by the difficulty the more physically and cognitively impaired patients had in giving a detailed account of their health experience.

## Introduction

Fragility fracture of the proximal femur (hip fracture) is one of the greatest challenges facing the healthcare community. In 1990, a global incidence of 1.31 million was reported and was associated with 740,000 deaths ~~(+)(1)~~. Hip fractures constitute a heavy socioeconomic burden worldwide. The cost of this clinical problem is estimated at 1.75 million disability adjusted life years lost; 1.4% of the total healthcare burden in established market economies ~~(+)(1)~~. Among those experiencing fragility hip fracture in England, Wales and Northern Ireland, 70% are aged 80 years or older, 73% are female and 34% are cognitively impaired pre-operation. The mortality rate within 30 days of operation was 8.2% in 2013 (2).

The NHS has identified the need to evaluate the quality of service provision for patients with a hip fracture; this evaluation is conducted through the National Hip Fracture Audit Database (NHFD)(2). Currently, aspects of care such as time to surgery, length of patient stay and patient mortality in hospital and 30 day and 120 day follow up are recorded in the NHFD. These data are now used to guide payments to healthcare providers; the payment being increased if the provider supplies 'best practice' care ~~(+)(3)~~. However, while important, there is interest from policy makers in the potential to enhance these currently reported data fields by including an assessment of outcome as reported by patients. It is increasingly expected that healthcare evaluations should include domains of health that are important to patients ~~(+)(4)~~, captured by well-developed patient-reported outcome measures (PROMs) which aim to assess how patients function and feel in relation to a health condition or associated treatment (5). PROMS capture information that cannot be obtained by other means (5, 6) complementing more traditional performance or process-based measures.

Our aim was to establish whether or not one PROM could be used with all patients who experience a fragility hip fracture as part of the evaluation of the quality of health care for hip fracture delivered by the NHS. For this patient group we were unable to identify a PROM specific to the assessment of hip fracture, and robust evidence of the quality and acceptability of non-hip fracture specific PROMs following completion by patients sustaining a hip fracture is limited ~~(+)(7)~~. Moreover, clarity with regards to the outcomes of healthcare that these patients considers relevant and important does not exist. Appropriate and relevant PROM-based assessment should be underpinned by an understanding of what is important to patients in terms of the outcomes of healthcare. Further, we were concerned to understand

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7 whether, for people with different pre-fracture health and social context, what was important  
8 to them during recovery was different. For example, we hypothesised that what is important  
9 to a younger, otherwise healthy person experiencing hip fracture may be different from what  
10 is important to a person who perceives themselves as nearing the end of life. Good quality  
11 care would, as far as possible, enable each patient to achieve what is important to them in  
12 terms of recovery. If a PROM is to be used to assess quality of care the measure needs to  
13 capture this. We therefore designed an interview study to explore with patients and, where  
14 appropriate, their carers, what they consider to be important outcomes and to explore  
15 variation across this patient group. Our research questions were:

- 16 1. What do patients who have recently experienced a hip fracture consider important when  
17 evaluating their recovery?
- 18 2. Is there variation between people within this population of the experience of what is  
19 considered important in recovery from hip fracture and why?

20 These research questions are framed by the desire of policy makers to evaluate the quality of  
21 care for hip fracture through assessment of recovery from the perspective of the patient.  
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## 25 **Method**

### 26 *Study Design*

27 We conducted semi-structured interviews with patients and, where appropriate, their carers at  
28 two time points, at approximately four weeks and then again at four months after they had  
29 sustained a fragility hip fracture.  
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### 32 *Identification of patients with a hip fracture*

33 We recruited participants from an existing cohort study, the Warwick Hip Trauma Evaluation  
34 ~~(8)~~(8), that commenced January 2012. This is a cohort of all patients admitted with a hip  
35 fracture to a single major trauma centre in the West Midlands of the United Kingdom. As part  
36 of their pre-operative assessment, patients were assessed for their capacity to consent using  
37 clinical assessment and the Abbreviated Mental Test Score (AMTS) ~~(9)~~(9). The AMTS is a  
38 10-item measure used to rapidly assess the possibility of cognitive impairment in elderly  
39 people. A score below 8 suggests cognitive impairment ~~(10)~~(10). Scores less than 8 were  
40 taken to indicate that a patient was unlikely to be able to consent for themselves. Those  
41 deemed to have capacity for consenting to surgery, based on clinical assessment and AMTS,  
42 were considered able to consent for this study. Following the emergency surgery for their  
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7 fracture, those with capacity gave written consent to be approached for interview. For those  
8 deemed not to have capacity due to cognitive impairment, verbal consent was obtained from  
9 their consultee ~~(11)~~(11). Ethical approval was granted by NHS REC London - Camberwell  
10 and St Giles (11/LO/0927) on the 18<sup>th</sup> August 2011.  
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### 13 *Sampling*

14  
15 During the data collection period for this study, February to August 2012, we purposefully  
16 sampled cohort participants who had reached 4 weeks or 4 months following their hip  
17 fracture and had consented to be approached for interview. The time points were chosen to be  
18 the same as those used for data collection for the NHFD ~~(12)~~(12). If a PROM were to be used  
19 with this patient population to assess quality of care, patients would be asked to complete the  
20 PROM at these time points. Our sampling strategy ensured a diverse mix of patients with  
21 respect to the following factors: age, gender, AMTS ~~(9)~~(9) and EQ-5D score (13).  
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### 25 *Interview recruitment and consent process*

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27 We contacted eligible patients and carers by telephone just prior to 4 weeks and/or 4 months  
28 following hip fracture first to invite them to be interviewed, then to arrange an interview. If  
29 patients declined to participate, the reasons offered were recorded. Patients with capacity to  
30 consent were contacted directly. For those patients deemed not to have capacity, we  
31 contacted their consultee. Patients able to consent for themselves signed their own consent  
32 forms. For those unable to consent the consultee signed an agreement form and we aimed to  
33 interview a carer as well as the patient (patient/carer dyad). Carers who were interviewed  
34 signed a consent form. ~~Recruitment~~Initial analysis commenced during recruitment phase;  
35 ~~recruitment~~ continued ~~to~~until data saturation at the first time point. The study flow diagram is  
36 at Figure 1.  
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### 44 *Interview process*

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46 We interviewed participants at their current residence (own home, residential or nursing  
47 home) or in hospital. The interviewer was trained in interviewing but did not have clinical  
48 knowledge of hip fracture, its treatment or prognosis. Where possible, patients and carers  
49 were interviewed alone, however where the carer and patient requested a joint interview  
50 (whether or not the patient had cognitive impairment), they were interviewed together. The  
51 aim of the interviews was to understand each participant's lived experience of hip fracture  
52 ~~(14)~~(14) and the influence of their social context and pre-fracture health. We use the  
53 following questions:  
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- What is a normal day like for you now?
  - How bothersome are you finding your hip?
  - What is different about your life now compared to just before your injury?
  - Compared to just before your injury what has stayed the same?
  - Which of these make the most difference to your life?

13 The interviewer encouraged participants to talk about the experience in whatever order they  
14 chose and using terms meaningful to them. Later in the interview we prompted, where  
15 necessary, for clarification about what in the patient experience was related to the hip  
16 fracture. Towards the end of the interview we directly asked what was important to them in  
17 terms of recovery if this had not already been talked about by the participant, using the  
18 following questions:  
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- What is important to you in terms of your recovery?
  - Where would you like to see yourself in the future in relation to your recovery (i.e. the next few weeks and months)?
  - If a friend or neighbour were asking you now about how well you are recovering – what has been important to you that you would tell them about?
  - If a doctor or nurse was asking you now about how well you are recovering – what would be important for the doctor or nurse to ask about?

29 Consideration was given to the potential challenges associated with interviewing older adults,  
30 for example by giving potential participants sufficient time to decide whether or not to  
31 participate and minimising burden and fatigue through streamlining questions ~~(15)~~(15). The  
32 interview process, questions and prompts were refined by the study team during the initial  
33 stage of data collection: particularly adding questions and prompts to focus the participant on  
34 recovery from their hip fracture. Questions were similar for both patient and carer. Interviews  
35 were audio-recorded ~~and transcribed verbatim~~. For one interview, audio recording was not  
36 feasible due to the noisy environment so extensive field notes were taken ~~and transcribed~~.  
37 For all interviews the researcher made reflective field notes to assist interpretation of the  
38 interview data.  
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#### 45 *Analysis*

46 ~~Interview~~Interviews and field notes were transcribed and transcripts ~~were~~ checked,  
47 anonymised and uploaded into Nvivo software ~~(16)~~(16). Initial analysis involved data  
48 immersion, reading and re-reading each transcript and discussion of the interview transcripts  
49 by the research team. Our research team was multi-disciplinary: social science, behavioural  
50 science, health science, orthopaedic surgery and statistics. All team members read at least  
51 five transcripts so all transcripts were read by at least two team members. From the data we  
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7 identified and crystallised what was important for participants that was specific to hip  
8 fracture recovery ~~(17)~~(17). We found that the interviews at four weeks and four months  
9 covered very similar issues, although, as would be expected, what the participants reported  
10 about each issue four weeks and at four months was different, as recovery was more  
11 advanced at four months. As our analysis aimed to identify what patients consider important  
12 when evaluating their recovery rather than the detail of recovery itself, we treated all the  
13 interviews related to one participant as one set of data. During data interpretation we took  
14 account of the timing of the interview, whether the interview data was from a patient or carer  
15 or patient/carer dyad, and field notes. ~~Two different approaches to analysis were then~~  
16 ~~undertaken in response to our research questions~~(17). For data collection and analysis we  
17 ~~took a phenomenological approach in that we sought to understand participant's experience~~  
18 ~~of hip fracture recovery and the influence of their context on this~~ (14, 18) and concurrently  
19 ~~we took a selective realist position~~ (19) in that we recognised hip fracture as an event  
20 ~~identifiable by means other than through the participant's account.~~

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28 ~~To answer our first research question, we~~We used two different approaches to analysis to  
29 ~~answer our research questions. For the first research question, which is concerned with the~~  
30 ~~whole groups of participants, we used thematic analysis~~ (20). We searched the transcripts for  
31 any mention by the participants of what was important to them during recovery from hip  
32 fracture. These were discussed at team analysis meetings. Transcripts were then coded in  
33 NVivo. As coding proceeded, we reviewed these codes at our team analysis meetings and  
34 combined them into themes. After we had read, discussed and then coded ten transcripts we  
35 found no additional themes in the remaining data. Double coding was undertaken for one in  
36 four transcripts and coding compared and discussed to check consistency of final coding.  
37 During analysis we became aware that although the data from different participants could be  
38 coded under the same theme such as mobility, ~~there was variation in~~ the experience of  
39 recovery ~~was very different for different people~~. This led us to our second research question  
40 and analysis approach.

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49 To answer our second research question, ~~from close reading of the first five interview~~  
50 ~~transcripts we~~ we used cross case analysis (21). We considered each participant as an  
51 individual 'case' living within their particular context (22, 23) and through comparison of  
52 cases sought to understand how they varied. To develop our matrix for the cross case analysis  
53 (21), we closely read five participant data sets then developed, from the data, a template for  
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7 summarising the experience of hip fracture recovery for each patient carer dyad. This  
8 involved considering each set of interviews as a whole, reading and rereading the text and  
9 writing a summary of the patient/carer journey and all that influenced it. We reviewed the  
10 summaries at our data analysis meetings and from these initial summaries we developed a  
11 draft template. We refined the template based on the data as we summarised and discussed  
12 further transcripts. The template included: current and recent past living arrangements and  
13 environment, day-to-day life now and in the recent past, the impact of the hip fracture and its  
14 management, what was changing in day-to-day life as they recovered, the extent to which the  
15 patient referred specifically to the fracture and their ability to engage in the interview. Each  
16 of these formed a data row in our matrix with a column for each participant. The data  
17 from about each patient ~~or patient/carer dyad~~ was summarised into the template with a second  
18 research team member reviewing each summary against the data. To qualitatively understand  
19 the variation in the experience of what was considered important for recovery, we compared  
20 these summaries.  
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## 28 Results

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30 Twenty one patients were interviewed on one occasion and 10 were interviewed twice giving  
31 a total of 31 patient participants and 41 interviews. Of the 31 patient participants, 20 (64.5%)  
32 were female, the mean age was 81.5 years (SD 9.2, range 61-96) and 12 (39%) scored less  
33 than eight on the AMTS. Of the 41 interviews, 24 were conducted three to nine weeks, and  
34 17 were conducted 14 to 23 weeks after the hip fracture. Nineteen interviews were with the  
35 patient only, 14 with carer only, and eight with patient/carer dyads. Interviews lasted between  
36 20 and 90 minutes. Despite framing the interview for interviewees as exploring the  
37 experience of hip fracture, many interviewees talked about general health issues. Although  
38 we prompted to clarify what was related to their fracture, in many interviews it was difficult  
39 to disentangle the impact of the fracture from the impact of other health problems. Some  
40 interviews contained almost no data that was clearly related to the fracture. From the  
41 perspective of the patient, all their health problems were part of one experience. The absence  
42 of data clearly related to the fracture was more marked in the four month compared to four  
43 week interviews. ~~We therefore decided not to attempt interviews at 12 months post fracture~~  
44 ~~as originally planned (8)~~ We therefore decided not to attempt interviews at 12 months post  
45 fracture as originally planned (8). The following sections report our analysis. Illustrative  
46 quotations from data are labelled with the age and gender of the patient, time since hip  
47 fracture and whether the quotation was from the patient or carer.  
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8 What is important to patients when evaluating their recovery?

9 From our systematic search of the interviews for data related to recovery from the hip  
10 fracture we identified the following themes: mobility, valued day-to-day activities, self-care,  
11 pain, mental wellbeing, fear of falling and leg shortening. When talking about mobility, day-  
12 to-day activities or self-care participants also talked about their level of independence.  
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17 *Mobility*

18 This was the most prominent theme, although when talking about mobility the interviewees  
19 often mentioned other themes. Mobile participants reported limited mobility in the weeks  
20 post operation and valued any improvement.  
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24 I'm walking with a walking stick at the moment. I've been down the park and back...I  
25 can usually get around [the house] without the walking stick, and I can get up and  
26 down stairs no problem. I get upstairs with my good leg and downstairs with my bad  
27 leg. (Participant 6, male, age 78, 5 weeks post operation)  
28

29 By four months, for many participants mobility had improved, and they were happy that they  
30 were returning to normal mobility.  
31

32 I can't rush round like I did, but eventually that will come...I mean it's pretty normal  
33 now, but I think it's going to be a while before I can actually walk as I did and I  
34 probably won't walk as I did... when I came home [from hospital] I was still  
35 hobbling... but now I'm more or less...walking normal, especially with the stick  
36 (Participant 10, female, age 83, 18 weeks post operation)  
37

38 For those with limited mobility before hip fracture any unaided improvement was limited to  
39 the pre-fracture level but also valued.  
40

41 The operation was successful and got him back to normal right from the start, right  
42 from the very first day that he had it done. He was able to then walk pain free with a  
43 Zimmer frame to the toilet. The staff were all saying it was amazing how well he was  
44 walking and he would soon be back to normal, but what they didn't realise was that  
45 he was walking normally. (Carer of participant 1, male, age 84, 16 weeks post  
46 operation)

47 Other participants were using mobility aids that they had not been using regularly before the  
48 fracture. For some, the addition of mobility aids enabled greater security of mobility than  
49 prior to their fracture.  
50

51 Her mobility's getting better. I think she'll cope with the frame. She's had a couple of  
52 falls in the home, earlier when she was forgetting that she had to use the frame. She'd  
53 get out of bed and not use the frame and consequently fall. But she's got in the habit  
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7 of using it now... she's not falling, which is a bonus. (Carer of participant 13, female,  
8 age 87, 14 weeks post operation)  
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#### 10 *Valued day-to-day activities*

11 Those who were active prior to their fracture talked about the frustration of the restriction in  
12 their activities particularly in the weeks following the fracture.  
13

14 I'm back on what I call domestic duties – washing up! But the thing that is frustrating  
15 is that I can't get outside and do any gardening. (Participant 12, male, age 78, 6 weeks  
16 post operation)  
17

18 I just miss getting up and getting out. I never stayed in. I'd go out in the morning and  
19 come back and then I'd go out again, I just used to go out looking round the shops. I  
20 just get these crossword books and I do those. (Participant 20, female, age 92, 5  
21 weeks post operation)  
22

23 Participants who were active before their fracture were usually able to resume valued  
24 activities but had some limitations which remained a frustration.  
25

26 I can do little (gardening) jobs but because I haven't got as much movement in the  
27 hip joints, I find it difficult to go down on my hands and knees... If I go down on one  
28 knee it's difficult to get up again so that's not possible but I can do things that are  
29 higher up, I can trim. (Participant 15, female, age 61, 15 weeks post operation)  
30

31 I'm tackling a little bit of cooking now. I started to cook myself some nice lunches  
32 and I haven't got round to the... scones ... I made one lot when I came home and I  
33 thought, I can't be bothered anymore. (Participant 10, female, age 83, 18 weeks post  
34 operation)  
35

36 Some participants returned to valued activities through adapting how they did them, this  
37 participant using a wheelchair for the first time.  
38

39 Over the last three weeks, when we go out shopping now, I can't go down the aisles,  
40 so [daughter] gets me a (wheel)chair and I can sit in the chair and then say what  
41 shopping I need, that is very good. (Participant 9, female, age 92, 18 weeks post  
42 operation)  
43

44 Participants who no longer undertook valued activities that involved significant mobility  
45 were content to continue as they were, for example, occupying themselves with visits from  
46 family and reading.  
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#### 49 *Personal care*

50 Washing, dressing and getting to the toilet was talked about in interviews, but in many cases  
51 it was not clear whether difficulties with personal care were specifically due to the fracture. A  
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7 few interviewees talked about problems with incontinence but again it was unclear whether  
8 this was specific to the fracture. Most patients had a commode or had arranged to sleep near  
9 the bathroom in the weeks immediately after the fracture. Some participants were able to  
10 describe problems with self-care specific to the hip fracture.  
11

12  
13 I'm ...not able to put a sock or anything on my injured leg. I can manage now with  
14 my trouser leg and throw these jogging trousers and hook my leg into them but I have  
15 to ask my husband if I need to put a sock or a shoe, or my slipper on that foot.  
16 (Participant 15, female, age 61, 6 weeks post operation)  
17

18 At the second interview this participant was pleased to report that she now needed very little  
19 help with self-care, at least in part through wearing alternative footwear.  
20

21 I still have to throw my clothes and hook them onto the foot to get dressed. I couldn't  
22 wear lace-up shoes or anything like that because I couldn't tie them up, but things like  
23 slip-ons and sandals I can get on quite easily, so I'm fairly independent – I am  
24 independent really, I just need help with cutting my toenails and that – those on the  
25 right foot that's all. (Participant 15, female, age 61, 15 weeks post operation)  
26

### 27 *Pain*

28 Although pain was talked about by some interviewees it was not considered a major problem.  
29

30 So here I am, four or five weeks [post operation], I get a little bit of pain, not a lot.  
31 (Participant 7, female, age 70, 5 weeks post operation)  
32

33 The pain was so bad before I had it done, and I just couldn't believe the relief after the  
34 operation when I was walking in the hospital and I had one of those pushers you  
35 know. And there was no pain. And I kept thinking, I can't believe this, and that's how  
36 it's been. I've never had any pain, not at all.  
37 (Participant 10, female, age 83, 18 weeks post operation)  
38

39 There's several times, like when I have got to get up those steps. I put my right foot  
40 first and bring my left foot up, and once or twice... you step on your left, and it's still  
41 there, lets you know it's still tender. (Participant 12, male, age 78, 16 weeks post  
42 operation)  
43

### 44 *Mental wellbeing*

45 Low mood or depression associated with the reduced mobility due to the fracture was  
46 reported by a few interviewees, emphasising the great value placed by interviewees on being  
47 independently mobile.  
48

49 He can't walk and that, to him he'd rather die. I'll be honest with you he's said it once  
50 or twice, "Let me go". And I said, "No you're not going no-where". And then the  
51 other day for the first time, but he hasn't said it since, "I'm going to commit suicide",  
52 I said, "No you're not, you're not". (Carer of participant 31, male, age 84, 5 week post  
53 operation)  
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7 For me it was a massive problem and caused me depression. To me is the most  
8 important thing, the mental aspect of taking away somebody's freedom to be able to  
9 move around and go to the shops and do all that sort of thing.

10 (Participant 7, female, age 70, 23 weeks post operation)

### 11 *Fear of falling*

12 The experience of the fracture left a few participants with a fear of falling and sustaining a  
13 further fracture.

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16 I think it frightened him more than anything else. He's frightened he'll fall over again  
17 and do it again, that bothers him more than anything else. Because now when he  
18 stands up at all to try and walk he's frightened he's going to fall over and the same  
19 thing will happen all over again. (Carer of participant 11, male, age 84, 7 weeks post  
20 operation)

21  
22 I've got to watch what I'm doing. If I catch my foot on [paving stone], I can go over  
23 again. (Participant 12, male, age 78, 16 weeks post operation)

24  
25 The fear of falling was sometimes expressed by a family member. When talking about his  
26 frustration at not being able to work in the garden, participant 6 added

27  
28 All the rain has made it very slippery, and [wife] says, "No way do you go out there."  
29 (Participant 12, male, age 78, 6 weeks post operation)

30  
31 This emphasises the value given to mobility without falls or fear of falls by interviewees.

### 32 *Leg shortening*

33 This is a problem that is common following extra-capsular fracture of the proximal femur.

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35 One interviewee described her concerns about this.

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37 One leg is now shorter than the other so that makes walking a bit difficult because it  
38 gives me back pain. (Participant 15, female, age 61, 15 weeks post operation)

### 39 40 Is there variation within this population of the experience of what is considered important in 41 recovery from hip fracture?

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43 Our sample included patients from across a spectrum that extended from those who were  
44 physically and mentally active prior to their fracture through to those who, pre-fracture, had  
45 been immobile due to conditions such as multiple sclerosis, chronic obstructive airways  
46 disease and arthritis, and those with severe cognitive impairment. Although when talking  
47 about what was important to them when evaluating their recovery from hip fracture, patients  
48 from across this spectrum talked about similar themes, their experiences of what was  
49 important ~~varied~~ **was different for different people**. In Box 1 we present condensed versions  
50 of the interview summaries developed during our second analysis approach, for participants  
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7 chosen to represent the whole spectrum of patients. We indicate whether the data was  
8 provided by patient, carer or both.  
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#### 10 *Recovery as a return to pre-fracture state or as part of aging and decline*

11 Every patient interviewed had experienced a hip fracture and surgery, so in physical terms all  
12 of them had, for a period of time, been somewhat impaired compared to their pre-fracture  
13 state. Four weeks post-operation, those who were active pre-fracture talked in terms of  
14 regaining a recovered state that was similar to their pre-fracture state although with some  
15 minor adaptations (participants 15 and 20 in box 1). Whilst these participants expressed  
16 worry about how well they might function in the future, there was, nevertheless,  
17 determination to progress to as full a recovery as possible. Four months post-operation many  
18 of these participants had all but regained their pre-fracture level of activity. Among  
19 participants with severely limited mobility pre-fracture, some were able to identify specific  
20 activities which were more difficult post-fracture than pre-fracture, such as putting on socks  
21 and getting in and out of bed. Some were also able to identify specific improvements in  
22 mobility post operation (see participants 9 and 15 in box 1). These participants described a  
23 process of recovery although it was very limited.  
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32 In contrast, for other participants, the fracture was just one part of a process of aging and  
33 decline. For example, participant 11 (see box 1) had been very limited in his activities before  
34 the fracture. Post fracture he needed adaptations to his home and increased care support post  
35 fracture to enable him to continue to manage at home. The mobility of participant 18 had  
36 declined and she had started using a wheelchair instead of her mobility scooter to get out of  
37 the house. However, it was unclear whether the decline was due to the concurrent heart  
38 failure or the fracture. Those who were the most physically or cognitively impaired pre-  
39 fracture did not talk about regaining a recovered state but about a state of no change. They  
40 continued with their limited activities as before (for example: participants 23 and 26 in box  
41 1). For one participant, the only change was her move to a new nursing home (participant 5 in  
42 box 1). Participants with cognitive impairment were often unaware of having experienced a  
43 fracture (Participant 1 box 1).  
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#### 51 *Recovery through adaptation*

52 In the face of their physical limitations, most participants made adaptations that mitigated the  
53 effect of the fracture; for example employing a cleaner, moving to a nursing home or using a  
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7 walking aid or other assistive device. For those who were active pre-fracture, adaptation was  
8 mostly considered temporary, although at 4 months there was some evidence that active  
9 patients had adapted to some limitations such as being unable to kneel for gardening or  
10 limiting time spent shopping to avoid exhaustion. For some participants who had been  
11 experiencing decline in their mobility pre-fracture, the fracture precipitated adaptations that  
12 they had not previously considered but made their life easier. These included using a  
13 wheelchair for shopping, having a new ramp built for getting in and out of the house in a  
14 wheelchair, using a walking aid or employing professional carers to assist with personal care.  
15 For some, their own or their carer's fear of further falls limited their mobility or at least  
16 limited how far they tested their ability to walk. Poor weather conditions exacerbated this  
17 fear, but adaptations to the environment such as walking aids or handrails lessened the fear.  
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### 23 **Discussion**

24 Following hip fracture, for those who had some pre-fracture mobility and able to articulate  
25 what they value during recovery, stable mobility, that is, mobility without the experience of  
26 or fear of falling, and mobility that that allows people to undertake valued activities are most  
27 valued. The ability to walk is important but so too are other leg movements needed for  
28 activities such as gardening or using transport. For some participants, maintaining mobility,  
29 however limited, was achieved by using assistive devices or working out new ways of doing  
30 an activity. Some participants adapted to their limitations, for example wearing different  
31 footwear or adjusting their expectations of what they could achieve. Others maintained their  
32 previous limited function through increased care provision.  
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39 Patients also consistently valued certain basic domains of health, such as pain (or lack of it),  
40 day-to-day activities, personal care and mental well-being. However, many participants in  
41 this study were unable to articulate what was important to them in terms of recovery from hip  
42 fracture. The hip fracture was just one part of their decline with age and its impact could not  
43 be disentangled from the impact of other health issues. The level of recovery perceived by a  
44 participant was influenced by their pre-fracture state and their ability to make adaptations  
45 during recovery.  
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### 50 *Strengths and weaknesses of the study*

51 When the mortality rate post operation is taken into account, including the higher mortality  
52 amongst older females, the study sample was broadly representative of the age profile and  
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7 gender balance of the population of England, Wales and Northern Ireland experiencing hip  
8 fractures (2). We used a higher cut off for assessment of cognitive impairment (score of 8 on  
9 AMTS) compared to the NHFD (score of 6 on AMTS). This is likely to explain our higher  
10 proportion of participants with cognitive impairment compared to the average in the NHFD.  
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14 More research time was spent on recruitment than any other aspect of the study as it proved  
15 difficult. When contacted about the interview study, potential participants talked about other  
16 priorities or concerns that prevented them agreeing to interview, or they simply did not wish  
17 to be interviewed. It is possible that those not interviewed were struggling most with  
18 recovery. ~~Our data is also limited by the difficulty some frail older adults have in giving a~~  
19 ~~detailed account of their health experience (18).~~~~Our data is also limited by the difficulty some~~  
20 ~~frail older adults have in giving a detailed account of their health experience (24).~~ Interview  
21 data is jointly constructed by interviewer and interviewee (19) ~~and our interviewer had no~~  
22 ~~clinical knowledge of hip fractures (25) and our interviewer had no clinical knowledge of hip~~  
23 ~~fractures.~~ This reduced the likelihood of the interviewer influencing the data. A clinician  
24 undertaking the interviews would have the knowledge to help the patient tease out whether  
25 health problems were fracture related or not. However, this would have obscured the  
26 important finding, that participants often experienced their fracture as part of, rather than  
27 separate to, their other existing health problems. We relied on carer's accounts for some  
28 participants. We found they talked about the same themes as the participants. However, for  
29 those with cognitive impairment, some carers were unable to provide detailed data as they  
30 had limited day-to-day contact with the participant. ~~We did not attempt to check with~~  
31 ~~participants about our interpretation of the data to avoid further burden for them.~~  
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#### 41 *Comparison with other studies*

42 There are similarities between our findings and other qualitative studies of similar  
43 populations. A Swedish team that explored engagement with rehabilitation post hip fracture  
44 found a similar spectrum of participants ~~(20)-(26)~~. They classified their participants as: those  
45 who were frail and in need of support but did not request it; those who were dependent and  
46 took no active part in rehabilitation and those who were self-sufficient. Another Swedish  
47 study, undertaken with people 12 months after their hip fracture found that mobility and a  
48 return to normal activities were key outcomes for patients ~~(21)-(27)~~. An Australian study of  
49 mobility post-fracture found that reduced level of mobility was associated with fear of  
50 falling, physical limitations from other illness and social/environmental factors ~~(22)-(28)~~. Our  
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7 results also echo findings from across the research literature on the experience of health and  
8 illness. For example, the difficulty disentangling the impact of one health condition from  
9 other co-morbidities has been found for mental health conditions ~~(23)~~(29). The acceptance of  
10 an acute health problem as being part of the aging process has been found for conditions such  
11 as stroke ~~(24)~~(30). Recalibration to altered circumstances in response to a sudden injury has  
12 also been described ~~(25)~~(31), as have the adaptations- both physical and psychological- that  
13 people make in order to maintain their quality of life ~~(26)~~(32). Reduced expectations of  
14 health and acceptance of limited function have been described among elderly women  
15 ~~(27)~~(33). Fear of falling is common among older people generally ~~(28)~~(34). The consistency  
16 between our findings and other studies suggests that there is now sufficient qualitative  
17 evidence to inform policy decisions about the choice of appropriate PROMS for assessing  
18 recovery from hip fracture.  
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#### 24 25 26 *Implications for clinicians and policymakers*

27 This study was undertaken in response to a potential policy change involving the use of a  
28 PROM to assess patient recovery from hip fracture, the results of which would form part of  
29 the evaluation of the quality of care provided for hip fracture. ~~For~~We conclude that for the  
30 population experiencing fragility hip fractures, it is unlikely that a single PROM specific to  
31 hip fracture could be developed which is relevant to the whole spectrum of patients. An  
32 assessment that focuses on mobility of the hip would be relevant for many patients, and  
33 mobility impacts on other health domains. However, with any form of assessment of  
34 mobility, pre-fracture status would have to be taken into account. Some patients had limited  
35 pre-fracture mobility at the hip so a lack of mobility during recovery may not reflect the  
36 quality of care. In addition there are other factors that influence the perception of recovery by  
37 patients. These include adaptations that they or their carers make to compensate for their  
38 reduced mobility, and patient perception of whether or not they are at the stage in life where  
39 decline is inevitable. Quality of care is only one of a number of interrelated factors that  
40 influence the patient's perception of recovery from hip fracture.  
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48 Several of the themes described by interviewees - mobility, day-to-day activities, self-care,  
49 pain and mental wellbeing, are similar to the domains included in currently available generic  
50 measures including the EuroQoL EQ-5D ~~(13)~~(13), the Short Form 36-item Health Survey  
51 (SF-36) ~~(29)~~(35) and the WHOQoL-BREF ~~(30)~~(36). Both the EQ-5D (3L) and the SF-36  
52 (version 1) have been widely used in trials of people sustaining hip fractures, but for both  
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7 | measures evidence of essential measurement and practical properties is limited ~~(7)(7)~~. In the  
8 | context of a clinical trial where patients are randomised to an intervention and control arm,  
9 | these generic measures may be appropriate but they may need to be supplemented by specific  
10 | tools for selected groups, such as patients with high-levels of pre-injury function.  
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13 | ~~In the context of assessing quality of care for a patient population as diverse as those~~  
14 | ~~experiencing hip fracture, it may be impossible to devise a single PROM that will be~~  
15 | ~~appropriate for all patients. Although quality of care may be one factor that will influence~~  
16 | ~~recovery as perceived by a patient, their pre fracture state, adaptations that they or their carers~~  
17 | ~~make to their reduced mobility, and their perception of whether or not they are at the stage in~~  
18 | ~~life where decline is inevitable will all influence how they answer questions contained within~~  
19 | ~~a PROM.~~  
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61 year old female social worker who lives with her husband. Before her fracture she was working full time and, for recreation, taking country walks, undertaking all types of gardening activities and playing with her grandchildren. Post fracture fixation (6 weeks) she described using crutches to get around the garden and shops, needing help with putting on socks and cutting toe nails, and was unable to climb stairs. She talked in terms of improvement and expectation of returning to work and full activity including cleaning and gardening. By the second interview she was frustrated that recovery was so slow but she could identify the ways in which she had continued to recover. (Participant 15, interviewed 6 weeks and 15 weeks post operation)

92 year old female who lives alone in her own flat within a sheltered housing complex. Prior to the hip fracture she looked after herself and did her own washing, but had a cleaner to undertake heavy household chores. She spent most of each day out and about at the shops, engaging in social activities, bingo and on outings. She had no other illnesses. Post-fracture fixation she talked about having some initial pain and problems lifting her leg after the operation but was now mobile about her home with a walking frame. The housing complex has a lift which she now used. She was intending to return to getting out and about as she was before her fracture. (Participant 20, interviewed 5 weeks post operation)

92 year old female lives alone with husband. Daughter visits several times a week to help. Poor hearing. Difficult to disentangle what was before and after fracture. Seems to have been able to walk around house, undertake self-care and microwave own meals pre-fracture. Post fixation of the hip fracture, patient slowly improved walking. Life seems very similar to before fracture except need for walking aid, inability to put on socks and husband now microwaves the meals. (Participant 9, interviewed 9 weeks post operation)

70 year old male retired painter and decorator who lives with his wife and enjoys almost daily visits from his grandchildren. Mobility restricted to 5-6 metres for more than two years prior to fracture due to knee pain and chronic obstructive pulmonary disease. When interviewed he describes struggling to get up the stairs, get in and out of bed, put his shoes and socks on, and bend down. Although his mobility was severely restricted prior to his fracture, he described being unable get around as much as he had done before the fracture. He noted some improvement over recent weeks, as he no longer needed two sticks for walking, only one. (Participant 3, interviewed 15 weeks post operation)

84 year old male with dementia, who has some lucid moments and some recall of falling and hurting himself. He lives with his wife who looks after him and they have a cleaner to do heavy housework. Wife provided interview, involving the patient in the latter half when he woke up. Patient's walking was gradually slowing and he had a number of falls before his fracture. Fracture occurred while walking in shopping area with his wife. Since fixation of the fracture patient has required assistance with personal care, has professional carers four times a day, and the bathroom has been adapted for his limited mobility. The interviewee had difficulty distinguishing decline due to old age and change due to the fracture. The patient complained of some pain but it was unclear whether this was from the fracture or previously established osteoarthritis. Before the fracture both patient and wife had ceased all non-essential activities except for a weekly trip to the shops so daily life had changed little except for more care provision. (Participant 11, interviewed 7 weeks post operation)

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8 74 year old female who lives with husband. Patient lived with severe rheumatoid arthritis  
9 for 30 years. Developed heart failure and admitted to hospital with shortness of breath and  
10 confusion. Fell while in hospital and fractured her hip. Mobility before hip fracture very  
11 limited – able to walk slowly in house and garden, undertake light chores, and use scooter  
12 to go shopping. Became worse with breathing difficulty. Mobility remained reduced after  
13 hospital admission. Able to take step slowly in house with support. Uses wheelchair to go  
14 out of house – a new ramp improved this by second interview. Unclear how much mobility  
15 change was due to the fracture and how much due to heart failure. (Participant 18,  
16 interviewed 6 weeks and 18 weeks post operation)

17  
18 88 year old female retired teacher, who lives with her son and has a diagnosis of multiple  
19 sclerosis. The patient wove together pre and post injury experience in her account, making  
20 it difficult to disentangle. She said her son does the cooking and cleaning and her daughter  
21 assists with self-care. She has a close family, feels well supported and has lots of visitors –  
22 friends, grandchildren and great grandchildren. Her main interest beyond seeing friends  
23 and family is reading. She described being content with life. Prior to her fracture she was  
24 unwell with an infection and recounts using a frame for mobility which she still uses.  
25 (Participant 23, interviewed 5 weeks post operation)

26  
27 85 year old female living in a nursing home. Her daughter visits alternate days. Her  
28 daughter provided the interview data. The patient has dementia but otherwise had been  
29 well before the fracture. Patient gets up and walks about herself, and takes herself to the  
30 toilet. She enjoys sitting and chatting. The patient does not remember the injury. Her life  
31 has not changed from how it was pre injury. The daughter did not mention any fracture-  
32 specific issues related to recovery. (Participant 26, interviewed 6 weeks post operation)

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34 84 year old female with limited English language. Pre-injury she had carers to assist her  
35 with all her personal needs. The injury had occurred whilst being hoisted. Post injury her  
36 main concern was that at discharge from hospital, after a three month stay, she was sent to  
37 a nursing home where she knew no-one. The patient repeatedly expressed distress about  
38 being in the nursing home but did not talk about the fracture.  
39 (Participant 5, interviewed 18 weeks post operation)

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41 84 year old male who has dementia. He lives alone but received visits three times a day  
42 from his son who provides meals. Son was interviewed. Arthritis of knee limited mobility  
43 before the fracture. Spent most of the day sitting. At weekends prior to fracture patient  
44 went to neighbour's house for evening meal. Patient fell and sustained fracture while  
45 walking to neighbour's house. Patient does not recall fracture. At time of interview, the  
46 patient was as mobile as pre operation limited by pain and stiffness from arthritis. Not yet  
47 visiting neighbour but this was because family was discouraging this in case he falls again  
48 rather than due to mobility. (Participant 1, interviewed 16 weeks post operation)

49 **Box 1 Summaries of the data about individual patients and their recovery from a hip**  
50 **fracture**  
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### Competing interest statement

All authors have completed the Unified Competing Interest form at [www.icmje.org/coi\\_disclosure.pdf](http://www.icmje.org/coi_disclosure.pdf) (available on request from the corresponding author) and declare: funding from the National Institute of Health Research, University of Warwick, and University Hospitals Coventry and Warwickshire NHS trust.

### Authorship

MC, FG, JA, XG, KH and FB contributed to the conception and design of the study. FB, VM and KD conducted the interviews. All authors contributed to analysis and interpretation of data. FG, KD and VM drafted the article and all authors revised it critically for important intellectual content. All authors gave final approval of the version to be published.

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**Data sharing:** no additional data available

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**Evaluating recovery following hip fracture: a qualitative interview study of what is important to patients**

No	Item	Guide questions/description	Included in manuscript?
<b>Domain 1: Research team and reflexivity</b>			
Personal Characteristics			
1.	Interviewer/facilitator	Which author/s conducted the interview or focus group?	yes
2.	Credentials	What were the researcher's credentials? <i>E.g. PhD, MD</i>	No place to provide this in submission process
3.	Occupation	What was their occupation at the time of the study?	yes
4.	Gender	Was the researcher male or female?	Names are ones that are usually gender specific
5.	Experience and training	What experience or training did the researcher have?	Job title provided
Relationship with participants			
6.	Relationship established	Was a relationship established prior to study commencement?	Yes
7.	Participant knowledge of the interviewer	What did the participants know about the researcher? <i>e.g. personal goals, reasons for doing the research</i>	The participant information sheet followed standard UK ethics guidelines and was approved by an ethics committee (details in submission form)
8.	Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? <i>e.g. Bias, assumptions, reasons</i>	Job titles provided

No	Item	Guide questions/description <i>and interests in the research topic</i>	Included in manuscript?
	<b>Domain 2: study design</b>		
	Theoretical framework		The description of our analysis process makes it clear that we were using a modified grounded theory approach. We describe the approach in detail rather than giving a label which could mislead.
9.	Methodological orientation and Theory	What methodological orientation was stated to underpin the study? <i>e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis</i>	
	Participant selection		
10.	Sampling	How were participants selected? <i>e.g. purposive, convenience, consecutive, snowball</i>	Yes
11.	Method of approach	How were participants approached? <i>e.g. face-to-face, telephone, mail, email</i>	Yes
12.	Sample size	How many participants were in the study?	Yes
13.	Non-participation	How many people refused to participate or dropped out? Reasons?	Yes
	Setting		
14.	Setting of data collection	Where was the data collected? <i>e.g. home, clinic, workplace</i>	Yes
15.	Presence of non-participants	Was anyone else present besides the participants and researchers?	Yes
16.	Description of sample	What are the important	Yes

	No	Item	Guide questions/description	Included in manuscript?
1			characteristics of the sample? <i>e.g. demographic data, date</i>	
2				
3				
4				
5		Data collection		
6				
7			Were questions, prompts, guides provided by the authors? Was it pilot tested?	Yes
8	17.	Interview guide		
9				
10			Were repeat interviews carried out? If yes, how many?	Yes
11	18.	Repeat interviews		
12			Did the research use audio or visual recording to collect the data?	Yes
13				
14	19.	Audio/visual recording		
15			Were field notes made during and/or after the interview or focus group?	Yes
16				
17	20.	Field notes		
18			What was the duration of the interviews or focus group?	Yes
19				
20	21.	Duration		
21			Was data saturation discussed?	Yes
22	22.	Data saturation		
23			Were transcripts returned to participants for comment and/or correction?	Not mentioned as not done with this population
24				
25				
26	23.	Transcripts returned		
27				
28				
29				
30		<b>Domain 3:</b>		
31		<b>analysis and</b>		
32		<b>findings</b>		
33		Data analysis		
34				
35	24.	Number of data coders	How many data coders coded the data?	yes
36				
37				First analysis approach involved thematic coding. No sub codes were used.
38				
39				
40				
41	25.	Description of the coding tree	Did authors provide a description of the coding tree?	Yes
42				
43				
44				
45				
46			Were themes identified in advance or derived from the data?	Yes
47	26.	Derivation of themes		
48				
49				
50			What software, if applicable, was used to manage the data?	Yes
51	27.	Software		
52				
53				Not mentioned as not done with this population
54				
55	28.	Participant checking	Did participants provide feedback on the findings?	
56				
57				
58				
59		Reporting		
60	29.	Quotations presented	Were participant quotations	Yes

No	Item	Guide questions/description	Included in manuscript?
30.	Data and findings consistent	presented to illustrate the themes / findings? Was each quotation identified? e.g. <i>participant number</i> Was there consistency between the data presented and the findings?	Yes
31.	Clarity of major themes	Were major themes clearly presented in the findings?	Yes
32.	Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	Yes