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Patient-reported outcomes at acute hospital stay and four months after hip fracture surgery. A register and questionnaire study

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Abstract

Introduction: The large and increasing number of hip fracture patients, in combination with the large impact that this is having on daily living activities, is emphasizing the importance of identifying factors that have a detrimental impact on post-operative outcomes. There are benefits to planning the ward in a way that prevents a steep decline in recovery after hip fracture surgery. Adding the patient's perspective into the healthcare assessment, *via* shared healthcare decision-making, allows the patient's needs and preferences to be taken fully into account. The aim of this study was to identify factors that predict how patients recover after hip fracture surgery.

Methods: A descriptive quality register/questionnaire study in acute orthopaedic wards, 2 to 5 days after surgery, with a follow-up 4 months later. The patients included were ≥ 65 years of age and had been previously healthy and living independently before the hip fracture.

Results: The participants in this study had returned to their own homes after 4 months, but only 21% reported themselves as being fully or almost fully recovered. In several domains of recovery, all 3 age groups (65-74, 75-84 and 85-97) reported different challenges both during their acute hospital stay and at the 4 months follow-up. The recovery phase is heterogeneous and requires individual care. The way that this is planned has an influence on patient outcome.

Conclusion: Patients sustaining a hip fracture are heterogeneous and different age groups experience different challenges. At 4 months follow-up, one fifth of the participants reported themselves fully or almost fully recovered and most of them had returned to their own homes. The Swedish National Hip Fracture Register and the patient-reported questionnaires employed in this study are appropriate tools to audit further development of healthcare to improve quality of life after hip fracture surgery.

Keywords

Clinical outcomes, hip fractures, needs preferences, nursing, patient perspectives, patient-reported outcomes, person-centered healthcare, quality of life, quality register, questionnaire, recovery, shared clinical decision-making, Swedish National Hip Fracture Register

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Introduction

The number of hip fracture patients will continue to increase due to demographic changes and osteoporosis [1] in combination with falls [2]. The Swedish National Hip Fracture Register (RIKSHÖFT) is designed to improve patient care and is a necessary part of quality assurance for hip fracture patients, covering approximately 95% of individuals sustaining a hip fracture in Sweden. Since the

1990s, other European countries have adopted their own hip fracture registers, facilitating the comparison of hip fracture care outcomes within and between countries [3].

Previous research on the outcomes of hip fractures often focus on surgical methods, morbidity, complications, waiting time for surgery, physical functions and mortality [4,5]. While these factors are important, they do not capture all aspects of hip fracture recovery, which consists of both physical and psychological factors [6,7]. The

patient's perspective is important in healthcare decision-making [8], yet if the evaluation of hip fracture care mainly relies purely on clinical outcomes, patients' preferences tend to be ignored [8]. The large and increasing number of hip fracture patients, in combination with the large impact that this is having on patients' daily living activities, emphasizes the importance of identifying those factors that have a detrimental effect on post-operative outcomes [9,10].

The findings of a previous study demonstrated that healthy patients with a hip fracture believed that they would recover when admitted to hospital, but on becoming used to the ward culture, a tendency to passivity was observed. This resulted in insecurity regarding their capacity to regain previous functions [11]. Healthier patients may need extra care to prevent them from suffering from a steep decline in recovery after a hip fracture [9]. Patient-reported outcome measures would increase the requirements for and support provided for value-based surgical holistic care outcomes [12] given that hip fracture may threaten healthy patients' future life situation [13].

In this study, we attempted to include the patient perspective both during the acute hospital stay and 4 months after hip fracture surgery in a cluster of previously healthy adults. The aim of this study was to identify factors that predict how patients will recover after hip fracture surgery.

Method and Materials

A descriptive quality register and questionnaire study was employed in this study. Data were collected upon admission to hospital (before and after hip fracture surgery) and at a follow-up consultation after 4 months. The study took place in 5 orthopaedic wards at 3 hospitals (one university hospital in southern Sweden and 2 hospitals in central Sweden). Patients treated in 2014 were included. This study was approved by the Ethical Board in Lund, Sweden (Dnr 2013/320).

Participants

Previously healthy patients ≥ 65 years of age admitted to the included hospitals for a hip fracture were invited to participate. The inclusion criteria were: (1) patients with a hip fracture, (2) an age of ≥ 65 , (3) a classification of I = A normal healthy patient or II = A patient with mild systemic disease according to the American Society of Anesthesiologists (ASA) [14], (4) independent living situation before the fracture, (5) the ability to speak and understand Swedish and (6) no cognitive impairment (Pfeiffer-test 8-10) [15]. At baseline, a consecutive sample of 188 patients participated; of these 160 patients participated in the 4 month follow-up.

Data collection

The patients were invited to participate in the study as soon as possible after surgery. They received oral and written information about the study from the Registered Nurse (RN) responsible for their nursing care. The patients were informed that they could withdraw at any time with no explanation and without this affecting their future care. The Swedish National Hip Fracture Register including the Euroqol (EQ-5D, 3L) was routinely completed on admission to the acute hospital before surgery, providing information on what their situation had been one week before the fracture. Demographic information such as age, gender, ASA-classification, type of hip fracture, surgical procedure, walking ability and living condition were collected from the Swedish National Hip Fracture Register [16]. Patients were also asked to answer two validated and reliability-tested questionnaires: The Swedish version of the Falls Efficacy Scale (FES(S)) [17] and the Post-operative Recovery Profile (PRP) [18].

Measurements

The Swedish National Hip Fracture Register consists of the collection of data during both the acute hospital stay and 4 months after surgery [16]. *Hip fracture primary operation form 1* contains demographical data about the living condition and mobility of patients before their hip fracture, items on medical care and nursing-sensitive quality indicators and the location of discharge. *Hip fracture 4-month follow up form 2* consists of items such as place of residence, pain and mobility (Table 1).

EQ-5D-3L is a translated, valid and reliability tested instrument [19] and is a part of The Swedish National Hip Fracture Quality Register, widely used for measuring health quality. It comprises 5 self-assessed items (mobility, self-care, usual activities, pain/discomfort and anxiety/depression) [20].

The Swedish version of the Falls Efficacy Scale (FES(S)) is a multi-item questionnaire consisting of 13 items for the self-assessment of perceived confidence in performing common everyday tasks without fear of falling [17]. The scale comprises 2 parts: 6 items measuring Personal Activities of Daily Living (PADL), 6 items covering Instrumental Activities of Daily Living (IADL). Each subscale encompasses 6 activities (with a maximum score of 60). Item number 7, walking up and down stairs, is regarded as the in-between item, with a maximum score of 10. Each item is graded on an 11-point visual analogue scale from 0 (not confident at all) to 10 (completely confident) in performing the specified activity without falling. The full summed scale gives a possible total score of 130 points [17].

The Postoperative Recovery Profile (PRP) questionnaire is a multi-item questionnaire with 5 dimensions at the individual and group level. According to Allvin *et al.* [18], it is useful for studying the progress of patient-reported post-operative recovery after surgical treatment. Patients described their self-assessed problems/difficulties, which are formulated as a statement

Table 1 Demographical data of included patients at admission and after 4 months according to the Swedish National Hip Fracture Register (RIKSHÖFT) forms

	Before admission N=188	At 4 months N=160	P-value
Gender n (%)			0.658
Women	147 (78.2)	127 (79.4)	
Men	41 (21.8)	33 (20.6)	
Age m (SD)	79.96 (8.11)	80.5 (7.6)	0.023
Age groups n (%)			
65-74	50 (26.6)	43 (26.9)	
75-84	80 (42.5)	73 (45.6)	
85-105	58 (30.8)	44 (27.5)	
Admitted from n (%)			0.001
Own home	181 (96.3)	153 (95.6)	
Sheltered housing	1 (0.5)	6 (3.8)	
Acute hospital	6 (3.2)	1 (0.6)	
Living alone n (%)			0.025
Yes	108 (57.4)	90 (56.2)	
No	80 (42.6)	70 (43.8)	
Mobility n (%)			0.001
Walked alone out of doors	175 (93.1)	112 (70)	
Walked out of doors only if accompanied	9 (4.8)	18 (11.2)	
Walked alone indoors but not out of doors	4 (2.1)	13 (8.1)	
Walked indoors only if accompanied	-	14 (8.8)	
Unable to walk	-	3 (1.9)	
Walking aids n (%)			0.012
Can walk without aids	144 (76.3)	99 (61.9)	
Two aids	2 (1.1)	3 (1.9)	
Frame/Rollator	42 (22.3)	57 (35.6)	
Wheelchair/bedbound	-	1 (0.6)	
ASA grade n (%)			0.027
ASA 1	35 (18.62)	33 (20.6)	
ASA 2	153 (81.38)	127 (79.4)	
Type of Fracture n (%)			0.062
1.Undisplaced cervical fracture	30 (16)	26 (16.2)	
2.Displaced cervical fracture	78 (41.5)	68 (42.5)	
3.Basocervical fracture	6 (3.2)	6 (3.8)	
4.Trochanteric two fragments fracture	39 (20.7)	32 (20)	
5.Trochanteric fracture multi fragments	20 (10.6)	15 (9.4)	
6.Subtrochanteric fracture	15 (8)	13 (8.1)	

on the questionnaire, for example, 'right now I am experiencing nausea'. The responses are categorized into one of 4 choices: *severe*, *moderate*, *mild* or *none*. The items in each part in the dimensions are presented below (Box 1).

Box 1 Single items included in dimensions in Post-operative Recovery Profile questionnaire

Dimensions in PRP	
Physical symptoms	Pain, nausea, fatigue, appetite changes, sleeping difficulties
Physical functions	Gastrointestinal function, bladder function, mobilization, muscle weakness, sexual function
Psychological	Anxiety and worry, feeling down, feeling lonely/abandoned, difficulties in concentration
Social	Social activities, dependence on others, interest in surroundings
Activity	Re-establish everyday life, personal hygiene

Statistical analysis

Descriptive statistics were calculated in frequencies and proportions (%), mean (standard deviation) and median (interquartile range). Comparisons between the 2 points of time were analysed using the two-sample t-test (mean-age), chi-square test for binary variables and the Kruskal-Wallis test for categorical data. In all of the tests, the level of statistical significance was set at <0.05. Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS), version 21.0 (IBM Corp, Armonk, New York).

Results

A total of 188 patients were included upon admission to hospital: 147 women (78.2%) and 41 men (21.8%). The mean age was 79.96 years (SD 8.11) (Table 1). At the 4 months follow-up, 28 patients dropped out, leaving 160 patients in the study. Of these 28 patients, 5 died and the remaining 23 did not return their questionnaires. There was

no statistically significant difference between gender and cognitive status from baseline to the 4 months follow-up. However, there was a significant difference in mean age between baseline and the follow-up because of drop outs of 28 participants who were older (mean age 83.46 (SD 10.1) (N=28). Mean age for the participants who completed the study was 79.34 (SD 7.6) (N=160) (Table 2 & Table 3). During the acute hospital stay, no patient considered themselves fully recovered 2 to 5 days after surgery. The length of patients' hospital stay varied between 2 and 27 days (mean 6.1).

Table 2 Demographical data of patients with missing data at 4 months follow-up according to the Swedish National Hip Fracture Register (RIKSHÖFT) forms

	Before admission (N=28)
Gender n (%)	
Women	20 (71.4)
Men	8 (28.6)
Age m (SD)	83.46 (10.1)
Age groups n (%)	
65-74	6 (21.4)
75-84	6 (21.4)
85-105	16 (57.2)
Admitted from n (%)	
Own home	28 (100)
Living alone n (%)	
Yes	20 (71.4)
No	8 (28.6)
Mobility n (%)	
Walked alone out of doors	25 (89.3)
Walked out of doors only if accompanied	2 (7.1)
Walked alone indoors but not out of doors	1 (3.6)
Walking aids n (%)	
Can walk without aids	17 (60.7)
Two aids	1 (3.6)
Frame/Rollator	10 (35.7)
ASA grade n (%)	
ASA 1	1 (3.6)
ASA 2	27 (96.4)
Type of Fracture n (%)	
1.Undisplaced cervical fracture	5 (17.9)
2.Displaced cervical fracture	10 (35.6)
3.Basocervical fracture	0 (0)
4.Trochanteric two fragments fracture	7 (25)
5.Trochanteric fracture multi fragments	5 (17.9)
6.Subtrochanteric fracture	1 (3.6)

The Swedish National Hip Fracture Register

The Swedish National Hip Fracture Register showed differences in mobility. At baseline, 93.1% of the patients had walked independently alone outdoors. This decreased to 70% ($p=0.011$) at the 4 month follow-up. The same pattern was detected for walking without aids. At baseline, the percentage had been 70.7 % and this decreased to 53.1% ($p=0.012$) at the 4-month follow-up (Table 1).

Table 3 Demographical data of patients who fulfilled follow-up according to the Swedish National Hip Fracture Register (RIKSHÖFT) forms

	Before admission N=160
Gender n (%)	
Women	127 (79.4)
Men	33 (20.6)
Age m (SD)	79.34 (7.6)
Age groups n (%)	
65-74	43 (26.9)
75-84	73 (45.6)
85-105	44 (27.5)
Admitted from n (%)	
Own home	153 (95.6)
Sheltered housing	1 (0.6)
Acute hospital	6 (3.8)
Living alone n (%)	
Yes	88 (55)
No	72 (45)
Mobility n (%)	
Walked alone out of doors	150 (93.8)
Walked out of doors only if accompanied	7 (4.4)
Walked alone indoors but not out of doors	3 (1.9)
Walking aids n (%)	
Can walk without aids	127 (79.4)
Two aids	1 (0.6)
Frame/Rollator	32 (20)
ASA grade n (%)	
ASA 1	34 (21.3)
ASA 2	126 (78.8)
Type of Fracture n (%)	
1.Undisplaced cervical fracture	25 (15.6)
2.Displaced cervical fracture	68 (42.5)
3.Basocervical fracture	6 (3.8)
4.Trochanteric two fragments fracture	32 (20)
5.Trochanteric fracture multi fragments	15 (9.4)
6.Subtrochanteric fracture	14 (8.8)

EQ-5D

The EQ-5D showed that, in 4 out of 5 items, there was a difference between baseline and the 4-month follow-up: *mobility* ($p<0.001$), performing *usual activities* ($p<0.001$), *pain/discomfort* ($p<0.001$) and *anxiety/depression* ($p<0.001$). At baseline, 63.4% of patients had no problems with *mobility*; this decreased to 26.1% at the 4-month follow-up ($p<0.001$). Those who had no problems with *usual activities* decreased from 71.8% to 48.9%. Those who had no *pain/discomfort* decreased from 52.1% to 39.9% and those who had no *anxiety/depression* decreased from 67.6% to 55.9%.

An analysis of the subgroups showed that patients in the 75-84 age group self-rated a significant decrease in *mobility* after 4 months ($p=0.004$). Concerning *usual activities*, there was a significant decrease for the 75-84 ($p<0.001$) and 85-97 ($p=0.007$) age groups. For *pain/discomfort*, a significant decrease could be seen in the

Table 4 Median score changes of single items and the subscales in the Falls Efficacy Scale (S), at acute hospital 2-5 days after surgery and follow-up at 4 months

Activity		Acute hospital N=186	Follow up 4 months N=160	P-value
1. Get in and out of bed	Median (Q1-Q3)	2 (0- 6)	9 (7- 10)	0.221
2. Get on and off toilet	Median (Q1-Q3)	2 (0- 6)	10 (7- 10)	0.188
3. Personal grooming	Median (Q1-Q3)	5 (2- 8)	10 (9- 10)	0.615
4. Get in/out of a chair	Median (Q1-Q3)	3 (1- 6)	9 (6- 10)	0.025
5. Get dressed/undressed	Median (Q1-Q3)	3 (1- 6)	9 (7- 10)	0.288
6. Take bath/shower	Median (Q1-Q3)	1 (1- 5)	9 (6.3- 10)	0.333
7. Go up/down stairs	Median (Q1-Q3)	0 (0- 3)	8 (3.3- 9)	0.716
8. Walk around the block	Median (Q1-Q3)	0 (0- 3)	8 (5- 10)	0.053
9. Reach into cabinets	Median (Q1-Q3)	1 (0- 4)	8 (4- 10)	0.318
10. Light housekeeping	Median (Q1-Q3)	0 (0- 3)	8 (4- 10)	0.194
11. Prepare meals	Median (Q1-Q3)	1 (0- 5)	9 (6- 10)	0.224
12. Hurry answer telephone	Median (Q1-Q3)	1 (0- 5)	7 (4- 10)	0.435
13. Simple shopping	Median (Q1-Q3)	0 (0- 3)	7 (3.5- 10)	0.052
PADL	Median (Q1-Q3)	19 (6- 36)	55.5 (40- 60)	0.054
IADL	Median (Q1-Q3)	7 (1- 21)	47 (26- 56)	0.217
SUM TOTAL	Median (Q1-Q3)	27 (9.8- 55)	61 (46.2- 77.8)	0.559

The scale is divided into 2 subscales; PADL, personal activities in daily living (items 1-6) and IADL, instrumental activities in daily living (items 8-13) (maximal possible scores= 60 for each subscale). Item 7 (walking up and down stairs) is regarded as an intermediate item. The full summed scale gives a possible total score of 130 points.

65-74 and 75-84 ($p=0.05$) age groups. Finally, concerning *anxiety/depression* a decrease could be seen in the 75-84 and 85-97 ($p=0.03$) age groups.

Falls Efficacy Scale (S)

At 4 months follow-up, the participants' confidence was highest in the following 3 items: *getting on and off the toilet* (completely confident ($n=88$ (56.1%)) and partly confident ($n=54$ (33.4%)), *personal grooming* (completely confident ($n=110$ (70.1%)) and partly confident, ($n=34$ (21.6%)) and *get dressed/undressed* (completely confident ($n=70$ (46.2%)) and partly confident ($n=65$ (41.8%)).

After 4 months, the participants' confidence was lowest in the following 3 items: *going up/down stairs* (completely confident ($n=38$ (24.4%)) and partly confident ($n=75$ (48.1%)), *light housekeeping* (completely confident ($n=47$ (30.3%)) and partly confident ($n=60$ (38.7%)) and *simple shopping* (completely confident ($n=48$ (31.4%)) and partly confident ($n=61$ (39.8%)).

The median at the full summed FES(S) scale at 4 months follow-up was 61 (46.2-77.8) with the highest values regarding activities such as *personal grooming*,

getting on and off the toilet. In general, participants reported higher confidence in PADL and lower confidence in IADL (Table 4).

The Post-Operative Recovery Profile

During the acute hospital stay, no patient considered themselves as fully recovered 2 to 5 days after surgery. Concerning their *physical symptoms* in the acute phase (2 to 5 days after surgery), the greatest problem was reported in the item *pain* (severe or moderate ($n= 137$ (73.2%)) (Table 5), with the highest level reported in the 65-74 age group.

Furthermore, the item *fatigue* was reported as being severe or moderate ($n=113$ (60.4%)) (Table 5), with the highest level reported in the 75-84 age group. For *physical functions* in the acute phase, the most problems were reported in the item *mobilisation dysfunction* (severe or moderate $n=138$ (73.8%)) (Table 5), with the highest levels reported in the 75-84 age group. *Muscle weakness* was also highly reported (severe or moderate $n=113$ (61.1%)) (Table 5). In the social part of the questionnaire, the item *dependence on help from others* was reported as (severe or

Table 5 Number and proportion (%) of participants self-reported level of problem in single items at Post-operative Recovery Profile, acute hospital 2-5 days after surgery and at follow-up at 4 months

n (%)	At hospital (2-5 days after surgery) N=188			At 4 month N=160				
	Severe	Moderate	Mild	None	Severe	Moderate	Mild	None
Physical symptoms								
Pain	64 (34.2)	73 (39)	43 (23)	7 (3.7)	5 (3.1)	29 (18.1)	74 (46.3)	52 (32.5)
Nausea	7 (3.7)	32 (17)	58 (30.9)	91 (48.4)	0 (0)	6 (3.8)	17 (10.6)	137 (85.6)
Fatigue	37 (19.8)	76 (40.6)	61 (32.6)	13 (7)	6 (3.8)	27 (16.9)	78 (48.8)	49 (30.6)
Appetite change	22 (11.8)	63 (33.9)	50 (26.9)	51 (27.4)	*	1 (0.6)	27 (17)	116 (73)
Sleeping difficulties	* 18 (9.6)	73 (39)	56 (29.9)	40 (21.4)	*	2 (1.3)	59 (37.1)	71 (44.7)
Physical Functions								
Gastrointestinal function	* 24 (13)	47 (25.4)	52 (28.1)	62 (33.5)	7 (4.4)	29 (18.1)	33 (20.6)	91 (56.9)
Bladder function	** 8 (4.4)	27 (14.8)	46 (25.1)	102 (55.7)	5 (3.1)	5 (3.1)	30 (18.8)	120 (75)
Mobilization	* 69 (36.9)	69 (36.9)	35 (18.7)	14 (7.5)	5 (3.1)	38 (23.8)	58 (36.3)	59 (36.9)
Muscle weakness	** 34 (18.4)	79 (42.7)	56 (30.3)	16 (8.5)	*	7 (4.4)	45 (28.3)	32 (20.1)
Sexual function					***	15 (11.5)	17 (13)	89 (67.9)
Psychological								
Anxiety and worry	21 (11.2)	43 (22.9)	64 (34)	60 (31.9)	1 (0.6)	31 (19.4)	49 (30.6)	79 (49.4)
Feeling down	12 (6.4)	39 (20.7)	59 (31.4)	78 (41.5)	1 (0.6)	27 (17)	58 (36.5)	73 (45.9)
Felling lonely/abandoned	12 (6.4)	26 (13.8)	43 (22.9)	107 (56.9)	2 (1.3)	21 (13.1)	33 (20.6)	104 (65)
Concentration difficulties	7 (3.8)	32 (17.3)	75 (40.5)	71 (38.4)	0 (0)	20 (12.5)	49 (30.6)	91 (56.9)
Social								
Social activities	* 31 (16.7)	56 (30.1)	59 (31.7)	40 (21.5)	5 (3.1)	40 (25)	55 (34.4)	60 (37.5)
Dependence on others	* 49 (26.8)	78 (42.6)	40 (21.9)	16 (8.7)	10 (6.3)	43 (26.9)	64 (40)	43 (26.9)
Interest in surroundings	* 23 (12.3)	36 (19.3)	42 (22.5)	86 (46)	*	7 (4.4)	20 (12.6)	131 (82.4)
Activity								
Re- establish everyday life						15 (9.4)	41 (25.6)	34 (21.3)
Personal hygiene		74 (39.4)	41 (21.8)	45 (23.9)		11 (6.9)	35 (21.9)	110 (68.8)

*Missing one participant, **Missing two participants, ***Missing 29 participants

moderate n=127 (69.4%)) (Table 5), with the highest levels reported in the 75-84 age group. For the remaining items, there were no differences between the groups during the acute phase.

The reported items that were having a restraining influence on recovery at 4 months were *mobilisation dysfunction, muscle weakness, restrictions in social activities, dependence on others* and *re-establishing everyday life*. The highest level of problems reported in the item *mobilisation dysfunction* was in the 75-84 and 85-97 age groups. In the item *muscle weakness*, most problems were reported in the 65-74 and 85-97 age groups. Most of the difficulties with *social activities* were in the 65-74 and 85-97 age groups, with most problems with *dependence on others* were reported in the 65-74 age group. Most of the problems with *re-establishing everyday life* were reported in the 65-74 and 85-97 age groups. The status of being fully or almost fully recovered at 4 months was reported by 21% of patients at the group level (Table 6). The items showing the most improvement after 4 months were *pain* (mild or none 78.8%), *nausea* (mild or none 96.2%), *fatigue* (mild or none 79.4%), *appetite change* (mild or none 90.0%) and *sleeping difficulties* (mild or none 81.8%). Further improvements were made in *interest in surroundings* (mild/none 95.0%) and *personal hygiene* (mild or none 90.7%).

Table 6 Post-operative Recovery Profile (PRP), showing the frequencies of participants n (%) and assessed total sum of items scored with "none problem" at 4 months

Global score Post-operative Recovery Profile at 4 months	Recovery profile n (%)
19 (fully recovered)	8 (5)
15-18 (almost fully recovered)	25 (16)
8-14 (partly recovered)	64 (40)
7 (slightly recovered)	7 (4)
<7 (not at all recovered)	56 (35)

Discussion

The aim of this study was to identify factors that predict how patients recover after hip fracture surgery. To gain more knowledge and a broad picture from the individuals' perspective of the difficulties of recovering after a hip fracture we used three self-reported questionnaires. The most important contribution of this study was that, for several of the items, the three age groups reported different challenges. Let us reconsider the fact that this was a sample selected from previously healthy, independently living people before the hip fracture. In practice, the surviving participants had returned to their place of residence four months after surgery. After four months, the results of this study observed declined mobility, a higher proportion of patients using walking aids and limitations in performing outdoor activities. Furthermore, patients in this

study reported impaired mobility and deterioration in performing their usual activities in comparison with their situation before the hip fracture.

The results of this study are in accordance with previous research [4,6]. Only 21% of these previously healthy patients reported themselves as being fully or almost fully recovered at four months, 40% reported partly recovered and 39% reported slightly or not recovered at all. Previous research has identified higher recovery rates back to their previous level of functions among people discharged to their own homes compared to those discharged to a nursing home [4,21]. However, a Swedish study showed that the optimal length of a hospital stay after hip fracture surgery was ≥ 10 days [22]. For each reduced day, the risk of death within 30 days increased by 13%. The risk of death increased threefold for patients discharged to a nursing home within ≤ 10 days. Patients cared for in geriatric ward hospitals had a 14% lower risk of re-admission within 30 days of discharge compared to those cared for on a regular hospital ward [22]. One interpretation of why 40% of the participants in this study reported limited recovery is that, in Sweden, there are no national clinical guidelines for the care for patients with a hip fracture following discharge. The findings of a recent interview study were that, four months after the hip fracture, the accident was still affecting the everyday lives of previously healthy participants. According to those participants, the most important factor in recovery was generating a strong inner driving force for recovering [13].

At four months follow-up our patients had the highest confidence (high fall-related self-efficacy) in performing PADL. Low confidence (low fall-related self-efficacy) was reported in performing IADL, as well as the single item "go up/down stairs". Together, all of the measurements taken indicated similar reported problems: difficulties in mobility, muscle weakness/fatigue, anxiety/discomfort, dependence on others and performing usual activities. The most frequently reported decline occurred within the 75-84 age group. The 65-74 age group reported the most difficulties with pain, muscle weakness, social activities and re-establishing everyday life. The 85-97 age groups reported the greatest difficulty with mobility, performing usual activities, re-establishing everyday life and anxiety/depression. The highest self-reported decline occurred in the two oldest age groups. Among the risk factors leading to failure to regain previous functions of everyday life, post-fall syndrome and activity avoidance is crucial [17,23]. Limited research has been conducted regarding whether domestic life and participation in community and social life changes after a hip fracture [4]. Older people are now more likely to be "wealthier and healthier" compared to previous generations [24]. Sustaining a hip fracture is a sudden, traumatic event that may affect many aspects of life [21]. Synonymous with the post-fall syndrome, the low confidence reported in performing tasks in the IADL section of this study indicates that avoiding social activities could be a sign of the onset of deteriorating functions.

This study shows that 86 (45.7%) of participants reported having control over personal hygiene two to five days after surgery during the acute phase. Pain, muscle

weakness and mobility were reported as being the most severe, even though this differed between age groups. This indicates that the participants in this study felt frail and powerless during the period immediately after surgery. Allvin *et al.* [25] stated that post-operative recovery starts directly after surgery and extends beyond discharge. The goal is to return to pre-operative levels of independence [25]. According to the results of this study, the first step in the recovery process would be taking responsibility for one's personal hygiene.

Over the past decades, the role of nursing has predominantly consisted of "delegated tasks" delivered by other members of the ward team. Registered nurses (RN) experience challenges in meeting individuals' fundamental care needs [26,27]. Emphasizing patient involvement by referring to this study highlights that recovery after a hip fracture is unique to each individual and the way that this is planned has an influence on patients' outcomes. Strengthening patients' self-efficacy at an early stage after surgery may be advantageous in their further recovery process and older adults may profit from a person-centered healthcare approach that provides healthcare in a manner consistent with the person's beliefs and values. Therefore, patients should participate in healthcare decision-making [12].

At four months, nausea, appetite changes, sleeping difficulties, personal grooming and interest in surroundings were areas reported as highly improved (80%-90%). Good health is individual and the experience of health is a balance between the individual's attitude and their ability to act with social support in the purpose of fulfilling meaningful goals. Good health is an interaction between bodily functions and contextual factors [28]. Healthcare needs and preferences from patient-reported outcomes have the potential to develop the Swedish National Hip Fracture Register. The definition of "good outcome" measured in terms of clinical outcomes and patient-reported outcomes will provide the opportunity to develop appropriate healthcare systems that will ultimately have an impact on patients' lives [12]. It should be considered that the results of our study probably underestimate the impact of hip fractures on the health-related quality of life on older adults. This is because our sample contained the healthiest and least impaired adults before their hip fracture. Furthermore, this group of older adults may have higher demands of everyday life.

Conclusion

Patients sustaining a hip fracture are heterogeneous and this heterogeneity will affect the recovery process, with different age groups experiencing different challenges in mobility. At four months follow-up, one fifth of the participants reported themselves fully or almost fully recovered and most of them had returned to their own homes. The PRP showed that participants had regained the ability to perform personal hygiene, dressing and in

nutritional intake. Declined mobility resulted in the need for walking aids, limitations in performing social outdoors activities and difficulties in re-establishing everyday life. The Swedish National Hip Fracture Register and the patient-reported questionnaires used in this study are appropriate tools to audit further development of healthcare to improve quality of life after hip fracture surgery.

Acknowledgements and Conflicts of Interest

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