The Sahlgrenska Academy

Life after hip fracture

Impact of home rehabilitation versus conventional care and patients' experiences of the recovery process in a short- and long-term perspective

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Till Björn, Sara och Alma

Molnlandskapet för dagen
ett milslångt änglahår
som blåst ut och stannat
på himlablåelsen

Dess nykrusade böljeslätt
finns till under några timmar
men raknar efterhand
och slingras ut i fjärran.
Några glänsande tofsar hänger kvar
i cirrusmolnens frostiga högland.

Harry Martinson
i "Dikter om ljus och mörker".

Abstract

Aim

In a short- and long-term perspective compare a geriatric home rehabilitation programme (HR) for patients with hip fracture with conventional care (CC), and to capture the patients experience of the consequences of the injury and their conceptions of what influences the recovery process.

Method

The thesis is based on two quantitative and two qualitative studies. The two quantitative studies were randomized and controlled, longitudinal intervention studies in which 102 community-dwelling elderly patients who had received either HR (n = 48) or CC (n = 54) were followed for one year after discharge. The HR programme, which started immediately after admission to hospital, included active participation from patients in setting goals and planning discharge. The programme was focused on encouraging the participants' self-efficacy and exercising daily activities. Assessment of balance confidence, degree of independence and frequency of daily activities, health-related quality of life, mood, perceived recovery, and basic physical performance were made one month, six months and one year after hospital discharge. In the qualitative, phenomenographic studies 18 patients were interviewed one month and one year after discharge about how they experienced the consequences of the hip fracture and their conceptions of the recovery process.

Results

The main recovery for all participants took place during the first six months after discharge. The results show that those who had participated in the HR programme recovered faster than those who hade received CC. Additionally, in a longer perspective they were more confident and independent than the CC group, although the differences between the groups had diminished at one year. Only 14 persons in the HR group and five persons in the CC group considered themselves fully recovered after one year. The results from the interviews showed that the hip fracture caused social and existential cracks in the individuals' lives. The hip fracture came unexpectedly and resulted in an experience of a changed body and a more restricted life. The interviewees experienced that they had increased difficulties to move and to manage independently. One reaction was that their pre-fracture self-view as being healthy and stable had been punctured by the injury. Although positive experiences, such as being satisfied with the recovery, were also expressed, many of the negative consequences remained or had even deepened one year after discharge. A dominating experience was that they were more cautious, afraid of further falls, and felt more sedentary and isolated than before the fracture.

Conclusions

The results show that the negative consequences of a hip fracture are substantial and long-lasting. However, the HR programme had a more significant impact than CC on the participants' functioning and confidence, which was most evident in the early phase of the recovery. An essential task for health care should be to create continued possibilities for rehabilitation after discharge from hospital also in a longer perspective, and not primarily focus on the medical and physical needs. The patients' experiences and psychological reactions that may follow a hip fracture should also be considered.

Key words

Hip fracture, recovery, home rehabilitation, RCT, longitudinal, interviews, phenomenography, balance confidence, independence, supported discharge

Svensk sammanfattning

Höftfraktur är en av de allvarligaste konsekvenserna av en fallolycka och är, vid sidan av stroke, den vanligaste orsaken till sjukhusvistelse och rehabilitering för äldre personer. Forskning har visat att endast ett fåtal av patienterna återtar de fysiska och sociala aktiviteter de hade före frakturen. Många upplever att de får svårare att ta sig utanför hemmet och det finns en ökad risk för nedstämdhet och inaktivitet. Omfattande insatser har gjorts inom sjukvården för att identifiera verksamma rehabiliteringsmodeller för denna patientgrupp och hemrehabilitering är en modell som har vunnit växande intresse under senare år. Resultaten från studier om hemrehabilitering är emellertid motstridiga. Det saknas dessutom kunskap om hur patienterna upplever återhämtningen och vad skadan inneburit för deras dagliga liv.

De övergripande syftena med avhandlingen var att jämföra ett geriatriskt sjukhusanknutet hemrehabiliteringsprogram med sedvanlig vård och att följa patienterna under ett år efter utskrivning från sjukhus samt att fånga patienternas egna erfarenheter och uppfattningar om skadans konsekvenser och om återhämtningsprocessen. Som en följd av det har vi, förutom att mäta patienterna tilltro till sin balans, grad av oberoende och frekvens av dagliga aktiviteter, basal fysisk funktionsförmåga, upplevda livskvalitet, grad av återhämtning och sinnesstämning, även intervjuat en del av deltagarna om deras erfarenheter av skadans konsekvenser, hur den påverkat deras dagliga liv, liksom deras uppfattningar av tillfrisknandet.

I avhandlingen rapporteras resultat från en studie där patienter lottades till att antingen delta i ett hemrehabiliteringsprogram (48 personer) eller i sedvanlig vård (54 personer). Hemrehabiliteringsprogrammet var inriktat mot att stödja patienternas tilltro till sin egen förmåga och balans samt att tidigt återuppta aktiviteter utanför bostaden som t ex promenader. I genomsnitt gjordes fem hembesök, främst av sjukgymnast och arbetsterapeut, hos dem som fick hemrehabilitering. Alla 102 deltagarna följdes sedan upp i hemmet en månad, sex månader och ett år efter utskrivning från sjukhus. Vid dessa tillfällen gjordes de olika mätningarna och bedömningarna. Deltagarna fick dessutom genomföra två enkla gång- och uppresningstest.

I avhandlingen redovisas också resultat från två intervjustudier, genomförda en månad och ett år efter utskrivning. I studierna har 18 av deltagarna i hemrehabiliteringsstudierna intervjuats om sina erfarenheter av höftfrakturen, vilka konsekvenser den inneburit för deras dagliga liv och vad de uppfattade påverkade läkningen.

I resultaten framkommer bl a att den största delen av återhämtningen skedde under de första sex månaderna efter utskrivning från sjukhus. En månad efter utskrivningen hade deltagarna i hemrehabiliteringsgruppen högre grad av återhämtning i såväl tilltro till egen balans, grad av oberoende och frekvens av dagliga aktiviteter som basal fysisk funktionsförmåga, än de som fått sedvanlig vård.

Sex månader och ett år efter utskrivning hade en del av skillnaderna mellan grupperna utjämnats, men vid ettårsuppföljningen hade deltagarna i hemrehabilitering fortfarande högre grad av återhämtning av oberoende i egenvård, förflyttning och gång, tilltro till balans i dagliga aktiviteter samt högre självskattad fysisk funktionsförmåga, jämfört med gruppen som fått sedvanlig vård. Vid ettårsuppföljningen ansåg endast 14 personer (29 %) av hemrehabiliteringsgruppen och fem (9 %) i gruppen som fått sedvanlig vård att de hade återhämtat sig helt jämfört med före frakturen.

I intervjuerna framkom att frakturen medfört stora förändringar i individernas liv, både i det korta och långa perspektivet. En dominerande erfarenhet var att olyckshändelsen hade begränsat förmågan att leva som innan. Intervjupersonerna erfor att de hade svårare att röra sig obehindrat och klara sig självständigt i det dagliga livet, vilket också medfört att de blivit mer isolerade. De hade också blivit mer försiktiga och rädda och för en del medförde händelsen att de upplevde att döden kom närmare och att de inte vågade planera framtiden. Olyckshändelsen hade begränsat deras dagliga liv och många av de negativa konsekvenserna kvarstod, eller hade fördjupats, ett år efter utskrivningen.

Både hälso- och sjukvård och socialtjänst kan dra lärdom av studiernas resultat. Efter en höftfraktur är det viktigt att skapa fungerande vårdkedjor med fortsatt möjlighet till rehabilitering omedelbart efter hemgång och, för dem som behöver, även i ett längre tidsperspektiv. Det är också sannolikt att hemrehabiliteringsprogrammet, som startade direkt vid inskrivning på sjukhuset och som innebar att patienten aktivt deltog i målsättning och utskrivningsplanering, har haft betydelse för hur snabbt patienterna kunnat återgå till sina dagliga aktiviteter i hemmet efter utskrivning. Eftersom en höftfraktur slår undan fötterna på den som drabbas finns stort behov av att få hjälp och stöd att behålla hopp om tillfrisknande och att själv bli aktiv i sin rehabilitering. Hälso- och sjukvårdspersonal bör alltså, i samverkan med andra vård- och omsorgsgivare, aktivt arbeta för att involvera patienterna och deras anhöriga i vård och rehabilitering och då inte enbart fokusera på de medicinska och rörelsemässiga behoven. Kunskaperna om patienternas erfarenheter och de psykologiska reaktionerna som kan följa på en sådan skada bör ligga som grund för hur man bemöter och stödjer patienten genom hennes återhämtningsprocess.

Det återstår att utforska hur hälso- och sjukvårdsresurserna ska användas på ett så optimalt sätt som möjligt för att skapa välfungerande och ekonomiskt försvarbara rehabiliteringsprogram. Dessa program bör innehålla samverkan och samarbete mellan olika vård- och omsorgsgivare och sträva efter att undvika att patienterna ”faller mellan stolarna”.

Original papers

This thesis is based on the following papers, which will be referred to in the text by their Roman numerals:

I. Zidén L, Frändin K, Kreuter M. Home rehabilitation after hip fracture. A randomized controlled study on balance confidence, physical function and everyday activities one month after discharge. Accepted for publication 2008 in Clinical Rehabilitation.

II. Zidén L, Wenestam CG, Hansson Scherman M. A life-breaking event: early experiences of the consequences of a hip fracture for elderly people. Clin Rehabil 2008;22:801-11.

III. Zidén L, Kreuter M, Frändin K. Long-term effects of home rehabilitation after hip fracture on functioning, balance confidence, and health-related quality of life in elderly persons. Manuscript submitted.

IV. Zidén L, Hansson Scherman M, Wenestam CG. The crack remains – elderly people's experiences of a hip fracture one year after the injury. Manuscript submitted.

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Abbreviations

HR	Home rehabilitation
CC	Conventional care
HRQoL	Health-related quality of life
ADL	Activities of daily living
FIM	Functional Independence Measure
IAM	Instrumental Activity Measure
FAI	Frenchay Activity Index
FES(S)	Falls Efficacy Scale (Swedish version)
TUG	Timed-Up-and-Go
STS	Sit-To-Stand
SF-36	Short-Form 36
CES-D	Center for Epidemiological Studies of Depression

Introduction

Hip fracture is currently one of the most serious health care problems facing ageing populations. Not only is the injury accompanied by severe pain, and difficulty to stand or walk on the fractured leg, but also by a risk of poor healing. Considerable disability and a decreased capacity for managing activities of daily living (ADL) independently may also prevail, despite advances in surgical techniques, nursing care and rehabilitation. Furthermore, the traumatic injury can bring feelings of uncertainty and fear which can lead to social isolation. A better understanding of how treatment of this injury can maximally restore functioning, and help the patients overcome fear and regain their previous abilities and activities, is a major challenge for health care.

In today's cost-cutting environment, caution must be taken to prevent short-term cost-saving measures from compromising long-term outcome for elderly people with hip fractures. Previous research has mainly dealt with the causalities and acute treatment of hip fracture, but the diversity of the recovery process and the voice of the individual have been less comprehensively described. Generally, physiotherapy after hip fracture has been regarded as a routine matter dealing mainly with training of mobility and leg muscle strength, basic daily activities such as transfers to and from bed or chair, and ambulation. However, in addition to this, the patient's own experiences and psychological reactions, such as anxiety and fear, and the pedagogical aspects of meeting people who are traumatized after an acute injury, are also essential to consider for physiotherapists. The long-term effects of physiotherapy interventions have not been sufficiently evaluated, which have resulted in dubieties as to which is the best method. Furthermore, the continuously reported devastating and lasting negative impact on patients' functioning and daily lives elucidate the deficiencies of today's routine physiotherapy treatment.

The focus of the present thesis is to enthrone the influences of a home rehabilitation programme on the patients' daily life as well as their own experiences of going through a hip fracture and the subsequent recovery process.

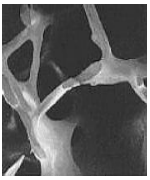
In the following section the state of current knowledge within the field is presented. This is followed by a section in which theoretical and methodological concepts with relevance to the aims of the thesis are presented.

In the following Background section, when referring to an individual or a patient "she" will be used in order to facilitate the reading. "Recovery" refers to recapturing the level of functioning and well-being prior to the injury and "rehabilitation" refers to WHO's definition (1): "Rehabilitation of people with disabilities is a process aimed at enabling them to reach and maintain their optimal physical, sensory, intellectual, psychological and social functional levels. Rehabilitation provides disabled people with the tools they need to attain independence and self-determination."

Background

Risk factors for hip fracture

Advanced age and frailty are recognized risk factors for hip fracture (2-5). Additionally, decreased bone-mass density has been found to be strongly related to hip fracture (6, 7), but also other clinical risk factors such as falls and fear of falling (8-10), lack of physical activity (11-14), living in an institution (15), impaired cognitive function (4), and impaired health (5), have been reported as predictors of long-term risk of hip fracture. In this section three selected factors; osteoporosis, falls and fear of falling, and lack of physical activity, will be highlighted.



Osteoporosis

Osteoporosis is defined as a condition of skeletal fragility characterized by reduced bone mass, with increased risk of fractures as a consequence (16). Throughout the world, osteoporosis is second, after cardiovascular disease, as the leading health care problem and it confines patients to a more immobile life than chronic obstructive pulmonary disease, myocardial infarction, or cancer (17). One in three women and one in eight men will develop osteoporosis in their lifetime, and the problem is growing as the number of older people increases. The most common osteoporosis fracture is vertebral fracture, followed by hip fracture. Among women over 50 years, approximately 40 % will experience a hip fracture, vertebral or wrist fracture during the remainder of their lives (17). It has been calculated that osteoporotic fractures in Europe cause more disability adjusted life years lost, i.e. the sum of the years of disabled life in survivors and the life-years lost due to premature mortality, than common cancers with the exception of lung cancer (18). In table 1 the estimated worldwide prevalence of fractures is shown.

Table 1. Estimated number of fractures, given in thousands, worldwide in men and women in the year 2000 (F/M female-to-male ratio). From Johnell and Kanis (18).

Site of fracture	Men	Women	Total	Percentage	F/M
Hip	490	1,137	1,677	18.2	2.3
Forearm	332	1,328	1,660	18.5	4.0
Spine	554	862	1,416	15.8	1.6
Humerus	178	528	706	7.9	3.0
Other sites	1,909	1,641	3,550	39.6	0.9

Hip fractures have become an international barometer of osteoporosis, as they are associated with low bone mineral density, cause extensive health care costs, and involve more disability than any other type of osteoporotic fracture (19). Furthermore, hip fractures are treated in hospital and are therefore easier to record and compare between different countries than for instance vertebral fractures (19). Although osteoporosis is a worldwide problem, the highest incidence of fractures is currently in Northern Europe (18). However, also in Asia the incidence is rising, as in the People's Republic of China, where hip fracture rates have been amongst the lowest in the world. Hip fracture rates in for instance Beijing were found to have increased by 34 % for women and 33 % for men between 1988 and 1992 (20).

Given the expected increase of the elderly population it is anticipated that the overall incidence of hip fractures will continue to rise by 1–3 % per year in most areas of the world for both men and women (19). The incidence rates of hip fracture increase exponentially with age in both men and women. Furthermore, the increase in falls is age-related with a higher incidence of falls in higher ages. Added to the development of the population and the relation to age, osteoporosis and falls, this explains at least 80 % of all hip fractures (19).

In Sweden, approximately 18,000 people sustain hip fracture every year and about 70 % of the patients are female (21). As it strikes late in the development of osteoporosis the mean age of the patients in Sweden is as high as 83 years; 84 years for women and 81 years for men. There are two principal categories of hip fracture, cervical (femoral neck) and trochanteric (including sub-trochanteric). The surgical treatment pattern has changed over the last ten years, especially concerning the dislocated, cervical fractures, of which in 1998 12 % were given hip replacement, compared to 71 % in 2004 (21).

The Swedish national quality register of hip fractures (SAHFE) reported that in 2004 64 % of the patients were admitted to hospital from their own homes, 57 % took out-door walks, 44 % used frame and 43 % walked without walking aids before the fracture. A quarter of the patients were discharged from hospital directly to their own homes. At the four month follow-up 30 % took out-door walks. Total mortality the first four months was in 2004 16 % (21).

Lack of physical activity

A low level of physical activity has been found to be associated with an increased risk of hip fracture (11-14). Coupland and co-authors (12) found that subjects who did not weight-bear regularly, or perform muscle loading activities such as climbing stairs and gardening, were all more than twice as likely to sustain a hip fracture when compared with subjects who were more physically active. This increase in risk remained after adjusting for body mass index, smoking, alcohol consumption, and dependence in daily activities (12). Additionally, Hoidrup and co-authors in a study on 1211 men and women reported that moderate levels of physical activity seemed to protect against hip fracture and that decline in physical activity over time was an important risk factor for hip fracture (13). Women who were active three or more hours per week during recent years had half the risk of sustaining a hip fracture as sedentary women, while physical activities during earlier years showed no association with the risk of hip fracture, as was shown in a study by Fahramand and co-authors (14). Low physical activity levels, particularly load-bearing activities, may thus have a strong bearing on the increase in hip fracture rates reported by developing countries, as well as industrial countries (22).

Falls and fear of falling

For older adults living in the community fear of falling is common, (9, 16, 23-27). Previous studies have estimated that between 25 % and 65 % of community-dwelling elderly people in general are afraid of falling (24, 25, 28, 29) and between 29 % and 92 % in those who have fallen (26, 30). Fear of falling has been shown to reduce physical (31-33) as well as social (25, 34, 35) activities, potentially leading to a decline in physical functioning (9), loss of confidence, dependency, social isolation (36, 37) and a decrease in quality of life (28, 32, 38). Kressig and co-authors (39) found that among 270 elderly women transitioning to frailty, activity-related fear of falling was present in almost half of the sample. In another study on 1064 community-living elderly people those who reported restricted activity were more physically frail than those who reported fear of falling alone (40). It has been suggested that fear of falling could act as a psychological barrier to hinder participation in recreational activity (28).

The correlation between falls and fear of falling has been clearly shown (26, 41), but it is unclear which comes first. Tinetti and co-authors showed that after an injurious fall the fear of falling tended to increase (10). In a population-based prospective study on 2,212 older adults, reported falls at baseline was an independent predictor for the onset of fear of falling after 20 months, and fear of falling at baseline independently predicted becoming a faller (41). It could therefore be suggested that individuals who either develop fear of falling or experience repeated falls are at risk of developing the other, with a resulting spiralling risk of falls, fear of falling, and functional decline (41).

Consequences of a hip fracture

The physical consequences of falling have been well documented. Although most falls do not result in severe injury, five per cent of falls result in a fracture (42), of which hip fracture is the most serious. There is an increased risk of dying after hip fracture, up to 20–30 % of patients, particularly men and those older than 75 years die during the first year after their fracture (43, 44). Part of this excess mortality is due to co-morbidity (7). As people who suffer a hip fracture have more other diseases compared with the general population, it has been estimated that maybe 25 % of deaths following hip fractures are due to the hip fracture itself (44).

The majority of patients sustaining a hip fracture do not regain their pre-fracture functional level (45, 46). Cooper (45) reported that one year after fracturing a hip 40 % of the patients were still unable to walk independently. Sixty per cent had difficulty with at least one essential activity of daily living, and as many as 80 % were restricted in other activities, such as driving or grocery shopping (45). Magaziner and co-authors (46) concluded that hip fracture caused an excess walking disability within two years after the fracture of 25 % more than in a group of matched non-fractured elderly people. In a case-control study by Norton and co-authors (47) on 570 surviving patients with hip fracture and 750 controls, the patients with hip fracture were 4.2 times more likely than controls to be community immobile and spent significantly less hours per day on their feet two years after their hospital stay.

Moreover, hip fracture increases the risk of being permanently institutionalized. This was described in a case-control study, in which the progress of 106 elderly females was followed two years after their hospital stay (48). The authors reported that patients with hip fracture were more likely to have multiple falls and a further hip or pelvic fracture, used more health care and home services and that 27 % of patients with hip fracture had entered a nursing home for the first time, compared with 9 % of the non-fractured controls (48).

Also the psychological reactions after a hip fracture, such as anxiety (49) and fear of new falls (23, 50), can be extensive. Furthermore, depressed mood is common after a hip fracture (51) and its negative impact on recovery has been described by several authors (52-55). The results of a recent study in which degree of depression, perceived hopelessness, illness, stress and pain was measured in 103 elderly patients with hip fractures indicated that post-injury beliefs and hopelessness influenced levels of depression and anxiety in the acute phase after a hip fracture (49). Lenze and co-authors (54) in one study showed that depression and cognitive impairment were predictive of negative outcomes in elderly patients' rehabilitation from hip fracture. In another study the same authors found that the greatest risk for onset of depression after hip fracture was immediately after the fracture and that patients with clinical evidence of apathy were at higher risk of developing depression (56). Results from another study showed that people suffering hip fracture who had few depressive symptoms were three times more likely to achieve independence in walking and nine times more likely to return to their prior level of functioning than those who were depressed (53). Similarly, patients with high positive affect showed better performance-based functioning after hip fracture (57).

Furthermore, the consequences of sustaining a hip fracture have been reported to extensively impact health-related quality of life (HRQoL) (58-60). This was described by Salkeld (61) who in a study of 194 women over 75 years showed that loss of ability to live independently after a hip fracture had considerable negative effects on perceived quality of life. Hallberg and co-authors (62) found that vertebral and hip fractures had a considerably greater and more prolonged impact on HRQoL than other osteoporosis fractures, and that for hip fracture the HRQoL was below normal even two years after the fracture. Randell and co-authors (58) conclude that measures of HRQoL should be included when evaluating the consequences of hip fracture.

It could thus be summarized that previous research highlights the extensive negative consequences of a hip fracture for the individual.

The patient's perspective

In contrast to research on functional recovery and the effects of different rehabilitation programmes after hip fracture, studies on the patients' own experiences are few (63-66). Borkan and co-authors (66) found that falls and fall injuries forced elderly patients with hip fractures to accept the limitations of ageing. In a paper describing two qualitative studies, Furstenberg (65) conducted ethnographic interviews with nine community-dwelling elderly who had not experienced hip fracture and 11 hospitalized patients with hip fracture. She reported that the non-fractured elderly foresaw permanent disability and social death were they to sustain a hip fracture, while those active in recovery after hip fracture altered their expectations positively or negatively based upon their recovery experience and cues or support from health care professionals (65). Furthermore, Archibald (63), who interviewed patients after being discharged to their own homes after hip fracture surgery, reported that the patients felt disabled and housebound.

Being admitted to hospital due to an acute injury is a distressing event for the individual. Today's health care strives to minimize hospital stay, which may negatively affect the post-discharge situation for the elderly patients if the discharge plans and routines are deficient. In a study, in which 14 elderly women were interviewed 6-8 weeks following hospitalization, the authors concluded that health care often fails to reflect the complexity of the patients' situation after discharge by focusing primarily on basic physical and medical needs rather than on those important to the patients (67). Furthermore, patients may not be able to anticipate their needs at home while still in hospital (68) and hospital professionals and patients often disagree as to what will become post-hospitalization needs (69).

Recovery after hip fracture

Different factors, such as pre-fracture cognitive and mood disorders (42, 57, 70-72), low level of physical activity and impaired functional ability (73), poor self-rated health (72), presence of diseases (72), lack of social support (74), post-surgical pain (72) all seem to negatively influence recovery after hip fracture. Some studies have suggested that old age could predict lower degree of recovery (75, 76), while other studies have shown that independence and physical functioning before the fracture were found to be more important than age per se for functional recovery (77-79). Ceder (80) reported that living together with someone and an ability to visit friends before the fracture meant a greater chance of returning home after a hip fracture. In contrast to this, Koval (81) in an earlier study found that independence in instrumental activities before the fracture predicted failure to recover. Also psychological characters such as self-efficacy (82), i.e. people's beliefs about their capabilities, have been stated as important factors in the recovery process.

Results from a study, in which two parallel randomized, controlled trials were undertaken aiming to prevent and treat depression after hip fracture, showed that falls efficacy and cognitive function were more important than pain and depression to predict functional recovery (83). Furthermore, Whitehead and co-authors (84), based on the results of a study on 78 elderly people with hip fracture, suggested that rehabilitation programmes should include a variety of outcome measures, including self-efficacy, and that more research was needed within this area. Nevertheless relatively few intervention studies have focused on the self-efficacy aspect.

A model of different factors influencing recovery after hip fracture, arranged according to the International Classification of Functioning, Disability and Health (ICF) model (see next chapter) is shown in figure 1.

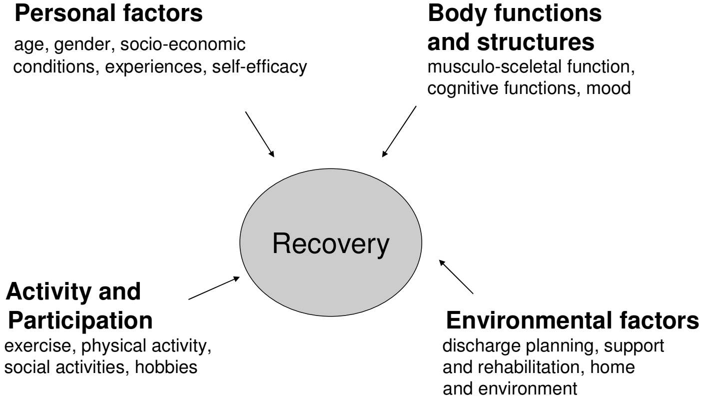


Figure 1. Factors influencing recovery after hip fracture, organized according to the International Classification of Functioning and Health (ICF) within the four components Personal Factors, Body Functions and Structures, Environmental Factors and Activity/Participation (85, 86) (see next section).

Major part of the recovery in self-care and basic transfers occurs within the first six months after hip fracture (87-89), while stair climbing and instrumental activities improvement proceed for at least one year after surgery (88). This was also reported by Magaziner and co-authors (46) who found that recovery in gait and balance was concentrated to the first six months, while social functioning appeared to increase up to two years post-fracture. Additionally, for perceived HRQoL the majority of recovery seems to take place by six months as was reported by Peterson and co-authors (90). The patients had attained over 90 % of their one year value by six months, measured by SF-36, except for the domain of physical role, which improved more slowly.

Rehabilitation after hip fracture

Physiotherapy

There are many different models of rehabilitation programmes for people with hip fractures available. One is intensive physiotherapy exercise, which has been shown to improve functional recovery after hip fracture (91-95). Hauer and co-authors (96) found that patients who had participated in 12 weeks intensive progressive resistance and functional training had significantly more increased strength, functional performance and balance than those who had received placebo activities, such as memory games or massage. However, the difference between the groups had largely disappeared three months after cessation of training (96). In another study, patients who had participated in an intensive hip fracture training programme at a specialized rehabilitation ward had significantly shorter length of stay in hospital (mean 24 days compared to 41), significantly more patients discharged directly to their own homes (32 % compared to 10 %) and significantly more patients who were independent in ADL at discharge (69 % compared to 39 %) than the control group (93). Additionally, Sherrington and co-authors (97) reported that a home-based weight-bearing programme for patients with hip fracture improved balance and functional ability to a greater extent than a non-weight-bearing programme. The authors showed that quadriceps muscle strength was significantly associated with improved physical performance (97). However, the studies have had relatively short follow-up time and few studies used post-discharge directed programmes.

Multi-disciplinary programmes

Multi-disciplinary efforts, using skilled medical, nursing and rehabilitation treatment, have been stated to be a superior model to maximize rehabilitation potential (42, 98). In an intervention study a group of patients with hip fracture who were randomized to extended multi-professional rehabilitation, including active prevention of post-operative complications, early mobilization and four month follow-up to detect complicating disorders and to determine further rehabilitation needs was compared with conventional post-operative routines four and 12 months after surgery (98). The results showed that despite shorter hospitalization significantly more patients in the intervention group than controls had regained independence in personal ADLs at both follow-up occasions (98). However, other intervention studies have failed to achieve functional recovery in a longer perspective (99-101). However, a recent review on randomized trials in which multidisciplinary rehabilitation was compared with conventional orthopaedic care in older people who had sustained a hip fracture showed that there was substantial support for multidisciplinary programmes (102).

Home rehabilitation

In Sweden there is a large variation in access to rehabilitation at home for elderly people. Many municipalities arrange home rehabilitation for community-dwelling elderly, for instance after an acute hospital stay, based on their need for rehabilitation at home (103). This presupposes that the patients cannot transport themselves to the primary health care unit. Furthermore, in many cases the prioritization for home rehabilitation is rigorous and the routines for referral between different care-givers deficient, which limits the accessibility for the patients. After extensive national health care re-organizations ambiguity and demarcation problems between different health and social care organizations have been reported (103).

A systematic review on home-based care and rehabilitation, made in 1999 by the Swedish Council of Technology Assessment in Health Care (SBU) (104) reported that hospital stay can be reduced by home-based care and rehabilitation, but that patient outcomes were similar in alternative types of rehabilitation and that costs were comparable.

Home rehabilitation (HR) is frequently offered to patients with stroke (105-108). Studies have shown that patients who, after stroke, had participated in a HR programme had significantly fewer hospital days than those who had received hospital-based rehabilitation (108, 109). Furthermore, one study showed short-term benefit in relation to social participation and HRQoL (107), while participants in another study on HR after stroke reported poorer mental health SF-36 scores than those with conventional rehabilitation (108).

Frail and mobility-impaired elderly adults may benefit from rehabilitation at home (110-113). In a study by Sanford and co-authors (111) participants who had received a multi-factorial, home-based occupational and physiotherapy intervention had improved their confidence in performing activities (task self-efficacy) more than those who had received conventional care (CC). Furthermore, one study described that elderly with a history of falls in the previous 12 months could reduce their falls by 31 % after having participated in a programme aimed at improving falls self-efficacy, encouraging behavioural change and reducing falls (113). In a recent study, Gitlin and co-authors (110) reported that community dwelling adults over 70 years who participated in a physiotherapy and occupational therapy intervention at home, including ADL and confidence in performing daily tasks, had less difficulty with instrumental ADL activities, greater self-efficacy, fewer home hazards and greater use of adaptive strategies than the controls, and that this was sustained for 12 months (110). Another recent study on community-dwelling elderly showed that an intervention including four one-weekly occupational and physiotherapist sessions targeting mobility and transfers resulted in a significantly higher over-all self-efficacy than those who had received CC (111).

In Sweden home rehabilitation after hip fracture was already practiced in the early 1980's (114, 115). During recent years home-based rehabilitation for different diagnoses has gained increasing interest from different health care providers. One reason for this may be the dramatically shortened hospital stay during the last decade.

There are many different models of home rehabilitation, one being home-based physiotherapy alone. In a study patients with hip fracture who had received eight sessions of home-based physiotherapy sessions, including exercises for muscle strengthening, range of motion, balance and functional training, were compared with patients who were instructed to practice the exercise programme given before discharge (89). The study showed that the intervention group tended to regain their physical functioning and health-related quality of life (HRQoL) faster than controls the first three months post-discharge, while there was no difference at six months. One limitation, however, with the study was the large amount of drop-outs, leaving few participants to follow-up (89). In another study by Crotty and co-authors (116) on a programme with accelerated discharge after hip fracture and multi-professional home visits, no difference in perceived HRQoL could be seen four months after the fracture. On the other hand, the patients who had received home-based physiotherapy had higher ability to perform daily activities and scored higher on the Falls Efficacy Scale at a four month follow-up, compared with conventional care (116). When the same authors later made a 12 month follow-up on the same participants, they saw a significant decline in the physical score of the SF-36 for both groups, but only the caregivers of patients allocated to receive home-based therapy reported a significant reduction in burden (117).

Few studies on home rehabilitation after hip fracture have followed the patients for more than six months. Kuisma (118) reported that home-based physiotherapy significantly improved ambulation scores for community and household ambulation one year after hip fracture surgery, compared with the control group. In contrast to this, Tinetti and co-authors (119) found no differences between the intervention and control group regarding ADL, social activity levels, mobility, balance or lower extremity strength six months after discharge for hip fracture. On the contrary, there was a trend towards a higher proportion of control group participants reporting complete independence in home management ADL at six months compared with the intervention group (120).

Reports on home rehabilitation after hip fracture thus imply that it often brings positive effects for the patients, although there is a great spectrum of results as well as of intervention models. Furthermore, the long-term effects of home rehabilitation have been sparsely studied.

What remains to explore?

Previous research has repeatedly enthroned that the long-lasting problems and limitations for the patients are substantial and most intervention programmes have shown limited effects in a more long-term perspective. Furthermore, constant pressure on hospital beds, deficiencies in discharge routines and lacking co-operation between hospital and communities have contributed to sustaining problems for the patients. The literature review has revealed that many questions still remain on how to best support elderly people after a hip fracture through the recovery process and how to overcome fear of falling in order to avoid physical and social limitations even in a longer perspective.

During recent years several countries have worked out ambitious policy statements, standards and guidelines. The recommendations are based on best available evidence. Different countries, or regions within a country, show great disparities concerning financing and organizing care and rehabilitation of elderly, which makes it difficult to compare and generalize. Furthermore, the voice of the patients has not been sufficiently heard. Research on patients' experiences of the consequences and rehabilitation needs after a hip fracture is scarce. It is also important to gain deeper knowledge of how to individualize rehabilitation after hip fracture in order to meet the patients' actual needs and help them best regain the abilities and activities they need and desire.

Aims

The overall aims of this thesis were in a short- and long-term perspective

1. to compare a multi-professional home rehabilitation (HR) programme with conventional care (CC)
2. to explore and describe the patients' experiences of a hip fracture and the recovery process after the injury.

The hypothesis was that people who had participated in a bridging, hospital-based HR programme would have more confidence in their own ability to manage daily activities and hence be more physically and socially active early in the rehabilitation process than people who had participated in conventional care, which included little or no rehabilitation after discharge from hospital. Furthermore, that the individuals who participated in HR would be able to resume their pre-fracture daily activities earlier in the rehabilitation process, and possibly be able to keep them over time, than those who had received CC.

The specific aims of the included studies were:

Study I

To study if a HR programme for elderly patients with acute hip fracture could lead to improved balance confidence, independence and level of daily activity and physical functioning, compared to CC one month after discharge.

Study II

To capture the perceptions of a group of elderly people, who recently had sustained a hip fracture, and to describe their experiences of the consequences of the hip fracture in the early phase of the recovery process.

Study III

To investigate long-term effects of a HR programme in elderly people with hip fracture regarding independence in daily activities, balance confidence, frequency of daily activities, physical functioning, health-related quality of life and perceived recovery, compared with CC.

Study IV

To explore elderly people’s experienced consequences of a hip fracture, and their conceptions of what influences recovery, one year after discharge from hospital.

Theoretical and methodological viewpoints

The topics studied in this thesis, recovery and rehabilitation after hip fracture, are multidimensional and require different theoretical keystones, as well as research methods, in order to cover various aspects. With this background it became valuable to seek a theoretical base inspired by medical, philosophical, psychological as well as educational areas of knowledge. As the basic medical standpoints have been described in the section above, this section will include a description of the areas which form the theoretical base for this thesis.

Life paradigm

A practicing physiotherapist often comes close to the patient’s body and feelings. Awareness about what happens in such an encounter is essential for developing a good relation between the therapist and the patient. The physiotherapist’s ambition could be to guide the patient to be aware of her own resources and her repertoire of action, i.e. what she is capable of doing, in order to be able to act according to her own intentions and goals instead of focusing on deficiencies and disabilities (121).

Within the area of rehabilitation Törnebohm (122) has developed specific theories about life-world and life paradigm. According to his theories a person’s life-world contains everything that mean something to her, such as activities, significant others and cultural phenomena. Within a person’s life-world herself, her body and her life paradigm are also included. A person’s life paradigm comprises her view on her life and life ideals, i.e. what makes life worth living, her view on the world, her conceptions and knowledge, her view on her body, her skill and abilities and her areas of interest, i.e. what drives her actions. As a person’s life paradigm is dynamic it contains everything she has experienced during life. Törnebohm emphasizes the urge for health care professionals to explore the patient’s life paradigms in order to be able to meet her different needs from her own perspective and not only from health care’s point of view (123).

It could thus be suggested that physiotherapists, and other health care professionals, have much to gain by exploring the patient’s life paradigm.

Self-efficacy

Self-efficacy, i.e. an individual's belief about their ability to coordinate skills and abilities in changing and challenging situations, can have important implications for successful rehabilitation outcomes. Evidence suggests that self-efficacy is an important aspect of rehabilitation in terms of the patient's propensity to engage rehabilitation programmes (111). High degree of perceived self-efficacy has been linked to positive outcomes, including better recovery from trauma or injury (82) and longer duration of recovery in older persons with newly acquired disabilities (124). Furthermore, higher self-efficacy scores were found to be one of the few factors associated with ADL recovery in a sample of the oldest old (125).

Bandura (126), who developed and described the concept self-efficacy, has suggested that outcomes that people anticipate depend largely on their judgement of how well they will be able to perform in given situations (126). Self-efficacy is closely related to the concepts coping, i.e. activity aimed at overcoming adversity to return to an active life (127), and locus of control, i.e. where individuals conceptually place responsibility, choice, and control over events in their lives (128). It is known from experiments with children learning mathematics that those who regarded themselves as efficacious were more successful in solving mathematical problems than were children who doubted their abilities. This suggests that people who doubt their capabilities in particular areas of activity may give up on difficult tasks in those domains and instead focus on their personal deficiencies (126, 129). Bandura describes how this may lead to lost faith in one's capabilities, which makes it easy to become a victim of stress and depression. In contrast to this, he states, people who have strong beliefs in their capabilities approach difficult tasks as challenges to be mastered, rather than threats to be avoided. Those individuals remain task-focused, tend to set themselves challenging goals, attribute failure to insufficient effort more than own incapability and recover quickly their sense of efficacy after failure or set-backs, which in turn lowers vulnerability to depression (126). If individuals do not believe in their potential for successful action, they are less likely to attempt adaptive strategies. According to Bandura, self-efficacy also affects the level of stress and depression experienced in threatening or difficult situations (126). Self-efficacy is increasingly being recognized as an essential component of well-being (126). In a study in 243 frail elderly people, psychosocial factors such as self-efficacy had a strong influence on the HRQoL (130).

Falls efficacy

The concept fall self-efficacy, often called falls efficacy, has been developed using the framework of self-efficacy (126). Measuring falls efficacy can be focused either on the aspect of fear of falling or on the aspect of balance confidence, i.e. perceived confidence in task performance without falling. In the intervention studies (I + III) we were primarily interested in exploring the confidence aspect of falls efficacy.

Falls efficacy has been reported to be associated with functional ability and individuals with low estimated self-efficacy tend to reduce their physical and social activities (23, 25, 29, 131-133). For improvement of falls efficacy, or balance confidence, among the elderly, different types of interventions, for instance Tai Chi (134), short-term physical exercise (135), home-based exercise and hip protector (136) have been tested. In one single case study (137) four out of five women with perceived unsteadiness improved their balance and increased their degree of balance confidence after having participated in a 6-week programme including out-door walking and balance training. Tinetti and co-authors (25) reported that falls efficacy proved to be a potent independent correlate of ADL as well as physical and social functioning and suggest that clinical rehabilitation programmes should attempt simultaneously to improve physical skills and confidence. Some studies have shown that, among older adults with a fear of falling, confidence is an important factor in relation to the performance of functional activities (35, 37, 38, 138). Higher levels of self-efficacy have been found to be protective against functional decline in basic ADL and social activities (25), whereas individuals with low perceived self-efficacy tended to avoid certain activities (10, 139-142). Fortinsky and co-authors (82) showed that patients with higher self-efficacy scores had a greater likelihood of locomotion recovery after hip fracture.

Clearly, level of self-efficacy and fear of falling are linked with well-being and quality of life of older adults (38, 130, 143). Moderate fear of falling has been associated with a decrease in life satisfaction, a depressed mood and increased frailty, and severe fear was further associated with a decrease in mobility and in social activities (10, 24, 36, 140).

Health related quality of life

The term health-related quality of life (HRQoL) refers to those aspects of quality of life that directly relate to an individuals health status. HRQoL measurement thus refers to the evaluation of the patient's subjective perception of his or her health, i.e. the impact of disease and treatment on perceived health status, influenced by his or her experiences and expectations (144-146). There is no universally accepted definition of HRQoL and different conceptual frameworks guide the operationalization of HRQoL domains and instruments. A widely used definition of HRQoL is the extent to which health impacts an individual's ability to function and her perceived well-being in physical, mental, and social domains of life (147). The functioning part of HRQoL includes basic activities such as self-care and paid or unpaid labour. It also includes the extent to which a person is able to interact with family or friends. The well-being part of HRQoL is more subjective than the functioning part as it deals with the respondent's perceptions. Well-being items include whether the person feels happy, sad, depressed, or anxious, whether they are in severe pain or have no pain and whether they are energetic or not. Comprehensive measures of HRQoL include items measuring the physical, mental, and social domains of life (144, 146).

Situated learning

One of the underlying ideas of the home rehabilitation studied in this thesis is that of placing rehabilitation at home rather than at a clinic. This idea is based on the theory of situated learning, which concerns learning which takes place in the same context in which it is applied. An underlying presumption is that learning as it normally occurs is a function of the activity, context and culture in which it occurs, i.e., it is situated (148). Situated learning has its roots in the works of Vygotsky (149) concerning social learning and in Dewey's theories on learning-by-doing (150). According to Anderson and co-authors (151) situated learning has four major premises which guide the educational activities: (a) learning is grounded in the actions of everyday situations; (b) knowledge is acquired situationally and transfers only to similar situations; (c) learning is the result of a social process encompassing ways of thinking, perceiving, problem solving, and interacting in addition to declarative and procedural knowledge; and (d) learning is not separated from the world of action but exists in robust, complex, social environments made up of actors, actions, and situations (151). According to the theories of situated learning, it is supposed that as learners acquire additional skills, less support will be needed. Instructors change their roles from content transmitters to facilitators of learning by encouraging progress, building learning environments, encouraging reflection, and helping learners become more aware of contextual cues to aid understanding (152).

From this perspective it seems preferable to reside in the patient's ordinary environment at home, rather than at a hospital ward or rehabilitation center, when training daily activities and functional abilities after an injury like a hip fracture.

International Classification of Functioning, Disability and Health (ICF)

The overall aim of the ICF is to provide a unified and standard language and framework for the description of health and health-related states (85). The domains included in ICF can be seen as health domains and health-related domains. They are described from the perspective of the body, the individual and society. Functioning is an umbrella term including all body functions, activities and participation and disability serves as an umbrella term for impairments, activity limitations or participation restrictions. ICF also lists environmental factors which may interact with all these areas (85).

ICF has two parts, each with two components; functioning and disability with the components (a) body functions and structures and (b) activities and participation, and contextual factors with the components (a) environmental factors and (b) personal factors. Each component may be expressed in two ways. On the one hand, they can be used to indicate problems, e.g. impairment, activity limitation or participation restriction summarized under disability) and on the other hand they can indicate non-problematic, neutral aspects of health, summarized under functioning.

Body structures are anatomical parts such as organs, limbs and their components and impairment in body structures are problems in body function or structure, for instance a significant deviation or loss of function. Activity is the execution of a task or action by an individual and activity limitations are difficulties the individual may have in executing activities. Participation is involvement in a life situation and participation restrictions are problems an individual may experience in involvement in life situations.
Environmental factors make up the physical, social and attitudinal environment in which people live and conduct their lives, for instance technology, natural environment, support from other people, attitudes and services or policies. Finally, personal factors are the particular background factors for an individual's life and living, which are not part of a health condition or health states. Examples of such factors are gender, race, lifestyle, past and current experience, coping styles or individual psychological assets, which may play a role in disability at any level. Personal factors are not classified in ICF, although they may have an impact on the outcome of various interventions (85). As ICF is seen as a research tool to measure outcomes, health-related quality of life could be regarded as a global concept of the ICF, measuring different aspects of health (85).

In this thesis the ICF has been used to structurize the different outcome measures.

Methods

Design

The research questions leading to the included studies were complex and required multiple methodological approaches. Therefore, a randomized, controlled non-blinded design was used for study I and III and interviews according to the phenomenographic method were used for study II and IV. An overview of the research design is given in table 2.

Table 2. Research design overview.

Study	**I, III, quantitative**	**II, IV, qualitative**
Design	Consecutive, randomized controlled	Explorative, descriptive
Data collection	Assessments and self-reported measures during hospital stay and one, six and 12 months after discharge	Semi-structured interviews one and 12 months after discharge
Setting	Acute hospital + participants' homes	Participants' homes
Participants	102 people, 48 in the HR group and 54 in the CC group	18 people from study I
Analysis	Descriptive statistics, parametric and non-parametric statistical analysis	Phenomenographic method

Settings

At the time of planning and commencement of our studies patients with hip fractures were admitted to all three hospitals belonging to the Sahlgrenska University Hospital in Göteborg: the Sahlgrenska hospital, the Östra hospital and the Mölndal hospital. We chose to use only the Sahlgrenska hospital for our studies of the following reasons:

- The Sahlgrenska hospital was the largest of the three with approximately 600 hip fracture surgeries, 50 % of all hip fracture surgery in the area, every year. Surgical and care routines differed between the three hospitals.
- The only hospital-based HR programme available for patients with hip fracture at the time was located at one of the geriatric wards at the Sahlgrenska hospital.
- A majority of the patients with hip fracture who were admitted to the Sahlgrenska hospital lived in the community districts in the central and western parts of the city and the HR programme was directed to six of those districts.
- A calculation showed that it would be possible to include the number of patients we needed to reach statistical power (approximately 90 patients) during 12-14 months at the Sahlgrenska hospital.
- Furthermore, we considered that it would be clinically possible to be in control of all steps of the study if the studies were concentrated to one hospital.

When considering all these factors we came to the conclusion of recruiting all participants to our studies at the Sahlgrenska hospital. However, due to a re-organization orthopaedic care in Göteborg, all hip fracture surgery in the area of Göteborg was moved to Mölndal hospital by the end of the inclusion period. As a consequence of this the last 23 participants included were recruited from geriatric wards at Mölndal hospital.

Participants

Study I and III

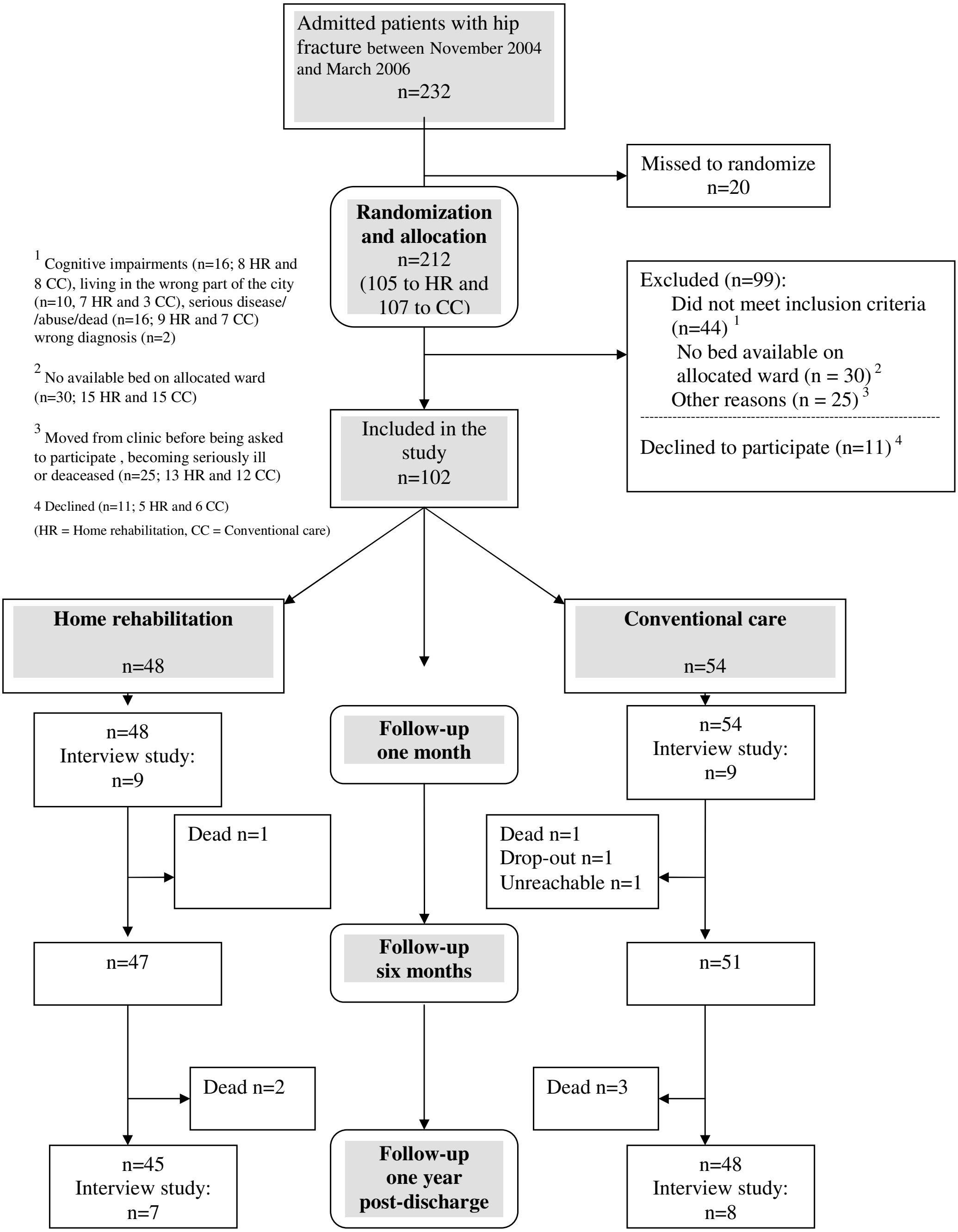
Randomization: At Sahlgrenska University hospital in Gothenburg, patients with hip fracture as a routine were referred directly from the emergency unit to either of two different geriatric wards, one with HR and one with CC. The study randomization therefore occurred before the patients were transferred to the respective ward and before they were informed and asked about participation in the study.

When a patient with acute hip fracture came to the emergency unit, the responsible nurse checked the basic inclusion criteria: 65 years or older, community-dwelling from one of six selected central-western community districts in Göteborg with diagnosis acute hip fracture (cervical, trochanterical or subtrochanteric). If the patient fulfilled these basic criteria, the nurse contacted the responsible geriatric doctor in order to get an approval that the patient was suitable for geriatric rehabilitation. After a positive response from the geriatrician, the nurse phoned a nurse at one of the geriatric wards, who drew a sealed envelope, stating which group and hence which of the two geriatric wards the patient was selected for. If there was no bed available on the randomized ward, the patient was excluded from the study. Within the first three hospital days the investigator checked each patient concerning the detailed inclusion and exclusion criteria before informing about the study. Patients who had documented dementia, for instance Alzheimer's disease, a diagnosed severe illness with expected survival of less than one year, severe drug or alcohol abuse, or who could not communicate or understand the Swedish language, were excluded. Patients who showed cognitive problems or acute confusion were tested using the Mini-Mental State Examination (MMSE) (153). Those who reached scores of less than 23 on the MMSE were excluded from the study.

Between November 2004 and February 2006 a total of 212 people were consecutively randomized at the emergency unit; 105 to the HR ward and 107 to the CC ward (figure 2). A total of 99 patients were excluded, 30 due to a lack of beds at the ward to which they had been randomized, HR or CC, 44 as they did not meet all inclusion criteria (cognitive impairment n=16, living in the wrong part of the city n=10, earlier serious disease/abuse/dead n=16) and finally 25 patients who became acutely ill or were moved to another hospital. The excluded patients were evenly distributed between the HR and the CC group.

Of the remaining 113 people, who were given verbal and written information and invited to participate in the study, 11 declined. Thus, 102 persons finally signed a written consent to participate in the study, 48 who had been randomized to the HR ward and 54 to the CC ward (figure 2). No socio-demographic differences were found between those who were excluded and those who participated in the study (154) .

The flowchart of the study participants is described in figure 2 and the initial descriptive characteristics of the participants in table 3.



[1] Cognitive impairments (n=16; 8 HR and 8 CC), living in the wrong part of the city (n=10, 7 HR and 3 CC), serious disease/ /abuse/dead (n=16; 9 HR and 7 CC) wrong diagnosis (n=2)

[2] No available bed on allocated ward (n=30; 15 HR and 15 CC)

[3] Moved from clinic before being asked to participate , becoming seriously ill or deaceased (n=25; 13 HR and 12 CC)

4 Declined (n=11; 5 HR and 6 CC)

(HR = Home rehabilitation, CC = Conventional care)

Figure 2. Flow-chart of the randomization and follow-up occasions

Table 3. Initial descriptive characteristics of the participants in the home rehabilitation and conventional care groups, arranged by gender. N (%) is given, except for age.

	Home rehabilitation group			Conventional care group		
	All n = 48	**Women n = 29**	**Men n = 19**	**All n = 54**	**Women n = 42**	**Men n = 12**
Age mean (sd)	81.2 (5.9)	82.5 (5.8)	79.2 (5.6)	82.5 (7.6)	82.5 (7.7)	82.3 (7.2)
median (min-max)	81.0 (70.0-94.0)	83.0 (70.0-94.0)	79.0 (71.0-93.0)	83.5 (65.0-99.0)	83.5 (65.0-99.0)	84.0 (69.0-93.0)
Social home service	11 (22.9)	5 (17.2)	6 (31.6)	20 (37.0)	15 (35.7)	5 (41.7)
Informal help	27 (56.3)	18 (62.1)	9 (47.4)	38 (70.4)	29 (69.0)	9 (75.0)
Living alone	26 (54.2)	20 (69.0)	6 (31.6)	39 (72.2)	33 (78.6)	6 (50.0)
Walking aids indoor	7 (14.6)	4 (13.8)	3 (15.8)	14 (25.9)	11 (26.2)	3 (25.0)
Walking aids out-door	13 (27.1)	8 (27.6)	5 (26.3)	23 (42.6)	20 (47.6)	3 (25.0)
Taking out-door walks	46 (95.8)	27 (93.1)	19 (100.0)	50 (92.6)	40 (95.2)	10 (83.3)
Alone	38 (79.2)	22 (75.9)	16 (84.2)	42 (77.8)	33 (78.6)	9 (75.0)
With company	8 (16.7)	5 (17.2)	3 (15.8)	8 (14.8)	7 (16.7)	1 (8.3)
Daily	31 (64.6)	17 (58.6)	14 (73.7)	25 (46.3)	20 (47.6)	5 (41.7)
≥ once a week	12 (25.0)	9 (31.0)	3 (15.8)	17 (31.5)	13 (31.0)	4 (33.3)
< once a week	3 (6.3)	1 (3.4)	2 (10.5)	8 (14.8)	7 (16.7)	1 (8.3)
Never	2 (4.2)	2 (6.9)	0 (0.0)	4 (7.4)	2 (4.8)	2 (16.7)
Type of fracture:						
Cervical	26 (54.2)	14 (48.3)	12 (63.2)	28 (51.9)	22 (52.4)	6 (50.0)
Trochanteric	17 (35.4)	12 (41.4)	5 (26.3)	21 (38.9)	16 (38.1)	5 (41.7)
Subtrochanteric	5 (10.4)	3 (10.3)	2 (10.5)	5 (9.3)	4 (9.5)	1 (8.3)
Other diagnoses: No	2 (4.2)	2 (6.9)	0 (0.0)	2 (3.7)	2 (4.8)	0 (0.0)
1-3	43 (89.6)	27 (93.1)	16 (84.2)	47 (87.0)	38 (90.5)	9 (75.0)
>3	3 (6.3)	0 (0.0)	3 (15.8)	5 (9.3)	2 (4.8)	3 (25.0)

There were no statistically significant differences between the two groups at prefracture baseline (table 4).

Table 4. Comparison of the pre-fracture measures between the home rehabilitation group and the conventional care group. Median (min-max) values. FIM = Functional Independence Measure, IAM = Instrumental Activity Measure.

Measurement	Home rehabilitation group n = 48	Conventional care group n = 54	p-value
Independence in daily activities (FIM, IAM)			
FIM total score	90.0 (64-91)	88.0 (52-91)	0.272
Self-care	42.0 (32-42)	41.5 (26-42)	0.472
Sphincter control	14.0 (9.0-14.0)	14.0 (7.0-14.0)	0.756
Mobility	21.0 (15.0-21.0)	21.0 (15.0-21.0)	0.573
Locomotion	14.0 (2.0-14.0)	13.0 (2.0-14.0)	0.053
IAM total score	44.5 (10-56)	39.0 (8, 56)	0.27
Out-door activities	24.0 (4.0-28.0)	19.5 (4.0-28.0)	0.107
Domestic activities	24.0 (4.0-28.0)	21.5 (4.0-28.0)	0.621
Frequency of daily activities			
FAI total score	28.0 (0.0-37.0)	24.5 (0.0-40.0)	0.388
Domestic activities	12.5 (0.0-15.0)	12.0 (0.0-15.0)	0.607
Out-door activities	11.0 (0.0-18.0)	9.0 (0.0-17.0)	0.180
Leisure and work	3.5 (0.0-8.0)	3.0 (0.0-9.0)	0.847

P-values are calculated with Mann-Whitney's U-test .

Conventional care

The 54 people in the CC group received standard care and rehabilitation and were discharged to their own home with no further organized rehabilitation or to short-term nursing home with varying access to rehabilitation. A common routine for patients with hip fracture at the geriatric clinic was early mobilisation and all personnel were involved in the everyday rehabilitation. The CC also comprised participation in the standard rehabilitation programme including daily individual exercise of personal ADL, transfers, walking, stair walking and physiotherapy group training sessions. The physiotherapist and occupational therapist made a home visit to the patient in connection with discharge when deemed as necessary, for example if the patient needed technical aids or home adaptations in order to manage safely in daily activities. All rehabilitation measures were adapted to the patients' individual medical and functional status and personal goals.

Home rehabilitation programme

Beyond what the CC patients received the patients at the HR ward followed a specially designed programme, consisting of two parts; one started immediately when the patient had been admitted to the HR ward and the second part after discharge. The programme included an early goal-setting meeting, in which the patient, a nurse, an assistant nurse and a physiotherapist or an occupational therapist participated, within the first days after admission. At this meeting the patient's short-term and long-term goals for the rehabilitation, described in as much detail as possible, were established, and the patient received a brochure describing the HR programme and their own decided goals in writing. The patients' next-of-kin were involved in the whole rehabilitation process, if the patient so desired. The aim of the early start of the programme was to relieve the patients' and their relatives' possible anxiety about going home instead of staying longer in hospital or being transferred to a short-term nursing home.

The HR programme included multi-professional actions aimed at mobilizing the patient's motivation and self-efficacy. Each HR intervention was individually designed and involved support for a rapid return home, encouraging cues and practice of daily activities with gradually rising complexity. Daily group sessions, including walking, stair walking, balance and muscle strength exercises, as well as regular assessment and training of personal care and transfers were included for all patients. Carefully prepared and supported discharge (155, 156), as well as close cooperation with the patient's relatives and social home services, were essential ingredients of the in-hospital part of the programme.

The second part of the programme consisted of a brief intervention period of a three weeks maximum including home visits made mainly by physiotherapists and occupational therapists. To ensure continuity the same therapists were involved in both parts of the programme. In some cases, when needed, nurses or assistant nurses made visits. The 48 persons in the HR group received a median of 4.5 home visits, (physiotherapist median 3, min 0 - max 7 visits; occupational therapist median 1.5, min 0 – max 8 visits; and 11 patients were visited by a nurse). The hospital geriatrician was also medically responsible for the patients' care during the second part of the HR period after discharge.

The focus of the physiotherapy intervention within the programme was to encourage self-efficacy and physical activity with special attention to stair climbing and out-door ambulation and self training was another key ingredient. The aim was to try to make every person who had been able to walk out-doors pre-fracture to resume walking out-doors within the rehabilitation period.

Study II and IV

Eighteen of the participants in the intervention study were recruited to the first interview study (II), sixteen women and two men. The aim was to include individuals with different backgrounds (gender, age, living conditions such as living alone or together with someone, in an apartment or villa, with or without elevator, living in different community districts,

previously healthy or with several medical diagnoses) in order to gain a variation of experiences. Two of the participants died between one month and one year follow-up and one person developed serious cognitive difficulties
with hallucinations, which prevented an interview at one year. Subsequently, 15 persons participated in the one year follow-up interview study.

Table 5 gives an overview of the participants in the interview studies (II and IV).

Table 5. Socio-demographic and clinical characteristics of the participants in the interview studies I and IV.

Sex	Age	Type of fracture	Number of diagnoses	Marital status	Reported posts-discharge rehabilitation
M	77	Trochanteric	1-3	Married	HR
M	81	Sub-trochanteric	1-3	Widower	HR
F	73	Cervical	1-3	Widow	HR
F	93	Trochanteric	1-3	Widow	HR
F	79	Cervical	1-3	Married	HR
F	81	Cervical	0	Widow	HR
F	83	Cervical	1-3	Widow	HR
F	81	Trochanteric	1-3	Widow	No
F	66	Sub-trochanteric	1-3	Married	No
F	91	Cervical	0	Widow	No
F	75	Cervical	1-3	Widow	No
F	93	Cervical	1-3	Widow	No
F	74	Cervical	1-3	Married	No
F	78	Cervical	1-3	Widow	No
F	77	Cervical	1-3	Married	Out-clinic physiotherapy
F	99	Trochanteric	1-3	Widow	Short-term nursing home
F	86	Cervical	1-3	Widow	HR
F	83	Cervical	1-3	Widow	No

HR = home rehabilitation

Measures (intervention studies I + III)

The outcome measures have been structured according to the International Classification of Functioning, Disability and Health (ICF)(85).

ICF – Personal Factors

Balance confidence
The Swedish version of the FES(S) (157, 158) was used to measure balance confidence. Initially, the FES was developed by Tinetti and co-authors (119) and consisted of 10 items with a 10-degree scale (1-10), where 1 indicated 'very confident, no fear of falling' and 10 'not confident at all, very afraid of falling'. The Swedish version has been modified into an 11-degree scale with 13 items (get in and out of bed, get in and off the toilet, personal grooming, get in and out of a chair, get dressed and undressed, take a bath or shower, go up and down stairs, walk around neighbourhood, reach into cupboards/closets, housecleaning, prepare simple meals, answer the phone, simple shopping), of which the first three have been added to the original scale. The FES has been used to measure either experienced degree of balance uncertainty, i.e. fear of falling, or experienced balance confidence, i.e. estimated confidence in keeping balance during performed activities. In this thesis we chose to focus on the confidence aspect of falls efficacy, i.e. the maximal score corresponding to maximal confidence. Subsequently, the reversed answering alternatives (0 = not confident at all and 10 = totally confident) were used in this thesis. The scale comprises three parts, six items measuring self-care, six items measuring instrumental ADL, two of them out-door, and the third part measuring stairclimbing. The maximum score is 130, with 60 points for basic ADL, 60 points for instrumental ADL and 10 points for stair climbing.

The FES has been found to be sensitive to change in fears following clinical interventions, for instance tai chi (134), hip protectors (136) or different group interventions such as exercise or education (159, 160). The FES has been found to have a reliability and validity of an acceptable standard for community dwelling elderly people (161) and it has been reported to be sensitive to change in fear of falling following clinical interventions (134, 162).

Perceived recovery
The participants reported perceived degree of recovery was part of the specially designed questionnaire (see below). The participants answered yes or no to the question "Do you consider yourself fully recovered, compared to before the hip fracture?"

ICF – Activity and Participation

Dependence and frequency of daily activities
Degree of independence in personal daily activities (PADL) was assessed using the Functional Independent Measure (FIM) motor scale (163). The FIM motor is a 13-item instrument that uses a 7-point grading scale per item (0 = totally dependent and 7 = totally

independent). The maximum score is 91 points, with 42 points assessing self-care, 21 points assessing mobility, 14 points assessing sphincter control and 14 points for locomotion. Validity and reliability have been tested and demonstrated acceptable to high reliability across a wide variety of settings, assessors and patients (164-166).

Degree of independence in instrumental daily activity (IADL) performance was assessed using the Instrumental Activity Measure (IAM), which is a scale developed from the FIM scale (167). The IAM assesses the degree of independence in eight advanced activities (walking 300 m, cooking a simple meal/dinner, using common transportation, simple shopping, major shopping, cleaning and washing). The maximum score is 56 points, with 28 points assessing domestic activities and 28 points assessing out-door activities. Good reliability has been reported in patients with stroke (168) and also inter-rater agreement has been found to be good (169).

For some analyses we dichotomized the FIM/IAM items and sub-scales into two levels: independence was defined as a score of 6, i.e. the individual used a device or was unable to do the activity in a safe or timely manner, or a score of 7, i.e. totally independent. Dependent was defined as a score of 1 to 5.

The frequency of social and complex daily activities, including leisure activities, was measured using the Frenchay's Activity Index (FAI), developed by Holbrook and Skilbeck (170). The activities demand a certain amount of initiative and the instrument can be broken down into three subscales: domestic chores, leisure/work and out-door activities. The FAI consists of 15 items, each scored 0-3 (0 = never, and 3 indicates the most frequent value), which can be divided into 3 domains, each containing 5 items: domestic, out-door and leisure/work, with a total maximum score of 45. The FAI has been found to have good construct validity (171), particularly in middle-aged and old people and to be reliable in a general (172, 173) and in stroke (174) populations.

Basic physical performance

The Timed Up and Go (TUG) test was used to measure ability to perform basic everyday movement. The TUG measures the total time for standing up from a standard chair, walking 3 m, turning 180^{o}, returning and sitting down. The TUG has good inter- and intra-rater reliability and is a reliable and valid measure of functional mobility (175). According to recommendations by Podsiadlo and Richardson, the TUG was performed twice in each test session, one trial and one timed performance, with a brief seated rest in between. The participant was informed to walk at a comfortable speed. The TUG is a predictor for walking ability and activity level after hip fracture (176) and a meta-analysis showed that mean value for healthy people aged 80 years of older was 11.3 (10.0-12.7) seconds (177). The TUG has also been tested as a measure of identifying elderly people who are at risk of falling (178, 179).

Ability to rise from a chair was measured by The Sit-to Stand test (STS) (180, 181). The best out of three trials, performed as quickly as possible in seconds was recorded. As the measurements were made in the participants' homes ordinary chairs (approximately 45 cm), preferably with armrests, and ordinary walking aids were used, if needed. The STS had was found reliable and valid when investigating lower extremity function (182) and limitations in mobility of elderly people (183).

ICF – Body Functions and Structures

Mood

The participants' mood was measured by the Centre for Epidemiological Studies Depression Scale (CES-D) (184), Swedish version. The CES-D is a short self-report screening instrument to measure depressive symptomatology. Particular behaviours or feelings are described, and participants indicate how often they behaved or felt that way during the past week. Possible answers are "rarely or none", "some or a little", "occasionally or a moderate amount of time" and "most or all of the time". The scale consists of 20 items. Each item has a score of 0-3, and the maximum score is 60, with higher scores indicating more symptoms. (185). People with scores ≥16 were classified as depressed. The instrument has been found to be valid and reliable (186, 187).

Health-related Quality of Life

Health-related Quality of Life (HRQoL) was measured by the Short Form-36 Health Survey (SF-36), which is a generic instrument measuring self-reported physical and psychological aspects of health (188). SF-36 includes eight domains: Physical functioning (PF; ten items), Role functioning-physical (RP; four items), Bodily pain (BP; two items), General health (GH; five items), Vitality (VT; four items), Social functioning (SF; two items), Role functioning-emotional (RE; three items), and Mental health (MH; five items). The total score in each domain is 100, which indicates a higher degree of perceived health. The Swedish version has been found reliable and valid by Persson and co-authors (189) and Sullivan and co-authors (190).

Within the ICF, quality of life has been regarded as an overall concept, incorporated in all levels of the ICF (191). In this thesis the different domains of the SF-36 could be associated with the different ICF components as follows: ICF Activity and Participation: Physical functioning, Role functioning – physical, Role functioning – Emotional and Social functioning; ICF Personal Factors: Vitality; ICF Body Functions and Structures: Mental health and Bodily pain. General health is considered as an overall concept.

Participant characteristics, baseline and follow-up data

All the pre-fracture baseline data was registered during the initial contact with the included patients at the ward using specially designed study questionnaires. The first covers social and living conditions, the use of walking aids and out-door walking habits, i.e. frequency of out-door walks with or without company, level of social home service/informal help and transportation habits before the fracture. Data concerning the fracture and other medical conditions was collected from medical records. At discharge from hospital, the second questionnaire, covering length of hospital stay, discharge facility and plans for continued rehabilitation, was used. The third questionnaire, covering living conditions, length of stay at post-discharge hospital or short-term nursing-home care, number of physiotherapy or HR visits, level of social home service/informal help and walking aids and habits, falls and perceived recovery, was used at the follow-up visits.

Some parts of the background and follow-up questionnaires, such as received help from social home service or relatives, could be regarded as belonging to the ICF component Environmental factors.

Phenomenography (interview studies II and IV)

The qualitative research tradition is heterogeneous and includes a wide range of approaches and methods. In contrast to other qualitative research methods, phenomenography was developed within the domain of human learning within the University of Gothenburg in the early 1970's. Its aim is to define the different ways in which people experience, interpret, understand, perceive or conceptualize a phenomenon, or certain aspects of reality. According to Marton (192) there are a limited number of qualitatively different ways in which different people experience a certain phenomenon. A basic assumption in phenomenography is that what people think, understand or remember about a particular phenomenon may vary in a qualitatively meaningful way. Another assumption is that human beings in relationship with the surrounding world create meaning. Phenomenography involves identifying the conceptions, or experiences, and looking for their underlying meaning and the relationship between them. Marton (192) describes this as follows:

> We are able to point not only to conceptions making up its constituents but also to relations between certain conceptions of one aspect of the world and certain conceptions of another aspect. What we have in mind is certainly not merely a listing of one conception after another. Some aspects are certainly more basic than others and different (and more or less fundamental) layers of the perceived world can be revealed. (p190)

In general, the research process of the phenomenographic method agrees with most of the qualitative methods. In a phenomenographic study, the empirical outcome includes verbal descriptions of cognitive processing, resulting in a body of descriptions of the particular topic investigated (the phenomenon), which constitutes the outcome space (193). The outcome space defines the qualitative variation of the individuals' conceptions of the phenomenon or the topic. The outcome space is the data ground for further analysis. The outcome space represents the various meanings a particular phenomenon has among a certain group of persons, which creates a second order description of the phenomenon. The second order perspective is central in phenomenography and it contrasts with the first order perspective, which focuses on investigating how things really are, that is "the true nature" of the world around us, while the second order perspective describes how a phenomenon is understood, perceived or experienced (192).

From a phenomenographic perspective it is important to gain knowledge of peoples' different experiences of a particular phenomenon and to use such knowledge in learning situations in school and in health and medical care (194-197). Phenomenography is descriptive, empirical and content-oriented (192, 198, 199). The research interest in phenomenography is to describe the world as people see it (198). Each unique conception, or experience, is reported, even if it is held by only one or two individuals participating in a study (200).

Data collection

Study I and III

During the patient inclusion period, most of the data collection was carried out by one of the authors (LZ), assisted by clinical physiotherapists at the wards. All data collection at the follow-up occasions, as well as interview transcripts and data input, were carried out by the same author.

Within one or two days after arrival at respective ward, either HR or CC ward, all included patients were interviewed by a physiotherapist. Back-ground data was recorded and medical data was collected from medical records.

To ensure optimal standardization of the discharge measurements of the TUG and the FES(S) the physiotherapists who were involved agreed on the procedures as well as co-practiced the measuring.

Before the follow-up the participants were contacted by telephone in order to appoint a time for the visit in their own homes. The questionnaires were presented in a predetermined order and filled out in cooperation with the respondents. The results of the different test sessions were recorded in separate documents and the investigator had no access to previous data.

Study II and IV

In the qualitative study, 18 of the participants in the two groups, nine from each, were included. According to the phenomenographic tradition the participants were chosen strategically to achieve a variation of experiences. Thus an as purposeful a selection as possible was made of individuals with different backgrounds such as marital status, living conditions, age, pre-fracture functional status and participation in rehabilitation programmes.

The common method of data collection in phenomenography is the semi-structured interview (201). Before the interviews, areas of interest within the chosen phenomenon were discussed and served as a starting point point for the interviews. The respondents were interviewed and tape recorded in their own home and each interview lasted 30-35 minutes. The interviews started with a few minutes of small talk and information about the procedure and were conducted in a conversational manner that allowed the interviewees to speak freely and express their own experiences of the phenomenon under investigation. As an introduction, the subject was asked to describe what had happened when he or she had fractured their hip (study I) or talk about their present situation compared to before the fracture (study II). Follow-up questions and prompts were used, such as 'Tell me more about it', 'What does this mean to you?' and 'Can you clarify?' The ambition was to let the subjects concretize their experiences, for instance by describing in as great detail as possible their ordinary daily activities before and after the fracture.

In table 6 the time schedule and the total outcome measurements are presented.

Table 6. Procedure of all data collection.

Measurements	Pre-fracture[1]	Dis-charge	One month	Six months	12 months
Falls Efficacy (FES(S))	-	X	X	X	X
Degree of independence (FIM, IAM)	X	X	X	X	X
Frequency of daily activities (FAI)	X	X	X	X	X
Living conditions	X	X	X	X	X
Walking habits	X	X	X	X	X
Falls	-	-	-	X	X
Perceived recovery	-	-	X	X	X
Help at home, walking aids	X	X	X	X	X
Health-related quality of life (SF-36)	-	-	X	X	X
Mood (CES-D)	-	-	X	X	X
Basic physical mobility	-	X	X	X	X
(TUG, STS)	-	-	X	X	X
Semi-structured interview	-	-	X	-	X

[1] information was retrospectively collected at hospital

FES(S) = The Falls Efficacy Scale, Swedish version, FIM = The Functional Independence Measure
IAM = The Instrumental Activity Measure, FAI = The Frenchay Activity Index
SF-36 = The Short-Form-36, CES-D = The Center for Epidemiological Studies Depression Scale
TUG = The Timed-Up-and-Go test, STS = The Sit-To-Stand test

Data analysis

Statistical methods (study I and III)
Based on clinical assumptions and the results of previous studies (116, 136, 202, 203), assuming a power of 80% and α of 0.05, and a difference between groups of 10 points in FIM with SD=15, a total sample size of n=78 was estimated. With an approximated drop-out rate of 20%, a total sample size of n=92 was necessary. For statistical analysis SPSS 13.0 was used. For comparison between the two groups Fisher's Exact test was used for dichotomous variables, Chi-square test for non-ordered categorical variables and Mantel-Haenszel chi-square test for ordered categorical variables. For tests of changes over time, the Wilcoxon's signed rank test was used for continuous variables for comparisons within the groups and Mann-Whitney U-test for comparisons between the groups. All tests were two-tailed and conducted at 5 % significance level.

Qualitative analysis (study II and III)
In the qualitative studies, the analysis was performed according to the phenomenographic method, described by Dahlgren and Fallsberg (204). They described the following six steps of the analysis process: familiarization, condensation, comparison, articulation, labelling, and contrasting.

All interviews were transcribed before the start of the analysis process. The analysis was based on the phenomenographic method (192, 198, 199) described by Dahlgren and Fallsberg(204). The sequence of the steps of the analysis was the following: all the interviews were first read thoroughly and repeatedly to obtain a total concurrent overview, a sort of familiarization. The second step, condensation, is a selection procedure, based on relevant criteria. Statements that dealt with the consequences of the hip fracture were extracted from all interviews to achieve a concentrated and representative version of entire dialogues. The quotes thus selected made up a pool that formed the basis for the subsequent steps in the analysis. The third step, comparison, was to contrast the extracted quotes with each other in order to uncover sources of variation or agreement. In the grouping step, similar quotes were grouped together and the essence of the similarity within each group of quotes was described. The next, articulating, was an attempt to describe the essence of the similarity within each group. The labelling step gave the categories names that corresponded to the essence of their meaning and the last step, contrasting, compared categories with each other to arrive at a definitive description of the unique character of each category. The conceptions found and described make up the complete meaning variation in the data material and constitute the 'outcome space'. All statements, or part of statements, dealing with the phenomenon under study were included in the analysis (193). In the final step the various descriptions dealt with in the categories were defined and named, summarizing the common significant meaning in each category.

Through the entire process there was a constant interplay between the various steps of the analysis. The ambition was to ensure that the categories did not overlap and that there was empirical support for each category. The grouping and articulating steps were revised several times before the analysis was judged to be satisfactory, as bringing the quotes together develops the meaning of the category and, at the same time, the developing meaning of the category determines which of the quotes should be included and which should not. This procedure has been described as "a tedious, time-consuming interactive procedure with repeated changes in which quotes are brought together in the exact meaning of each group of quotes. There is, however, a decreasing rate of change, and eventually the system stabilizes itself"(205). The whole sequence of steps in the analysis was made separately by the authors before joint discussions leading finally to consensus.

A computer programme, Open Code (version 2.1 2001, developed at Umeå University, Sweden), was used to facilitate the sorting of the interviews and the quotations.

Ethical considerations

Ethical considerations of this thesis followed the ethical principles of research in respect of autonomy, beneficence, non-malfeasance and the principle of justice (206). The respondents were informed verbally and received written information before being asked to participate and were able to withdraw at any time during the study. The information also included the author's (LZ) contact information. All data was coded and the code list and all data material were kept locked separately.

The risk that dependence would influence the patients was minimized by the fact that the author (LZ) was not involved in the rehabilitation. However, an ethical dilemma during the follow-up visits could be to discover problems and not being able to treat them. To minimize these possible negative aspects the investigator informed each participant where he or she could turn for professional treatment and support.

The study was approved by the Research Ethical Board at the University of Gothenburg in September 2004.

Results

The results of the original papers are presented in two sections, the first containing the summarized results of the early phase of the recovery (studies I and II), and the second section the results from the latter phase of the recovery (III and IV), ending with an overview of the entire recovery process from discharge to one year follow-up. Three tables (7 a-c) and six figures (figures 3-8) illustrate the summarized findings and readers are referred to the separate original papers for further illustrations of the separate results.

Seven persons (HR 3, CC 4) had died between discharge and one year follow up. During the whole study period, from admission for hip fracture until one year after discharge, the median total institutional care consumption for the HR participants was 42 days (18 – 227 days) and for the CC participants 43 days (19 - 368 days, NS). Forty-two persons in each group, HR (93%) and CC (88%, NS), lived in their own homes one year after discharge. One person in the HR group and four persons in the CC group had moved to permanent sheltered livings during the year after hospital discharge.

The early phase of recovery *(study I and II)*

The HR participants increased their independence and activity level faster than those who had received CC. At the one month follow-up the HR participants were significantly more independent (table 7a, page 50) and reported significantly better confidence in performing daily activities (table 7b) compared with the CC group. They also took out-door walks more frequently and performed the Timed-Up-and-Go and Sit-To-Stand tests significantly faster than the controls (paper I). One month after discharge the HR group also performed domestic and out-door activities significantly more often than the CC group (table 7c).

When comparing recovery over time, i.e. pre-fracture scores with follow-up scores, the HR participants reported significantly greater recovery in self-care, transfers and locomotion and domestic activities at one month follow-up than the CC group (table 7a). Furthermore, the improvement in balance confidence on domains stairs and instrumental daily activities, when compared with discharge, was also significantly higher for the HR group than for the CC group (table 7b).

In the interviews performed at the one month follow-up participants described their experienced consequences of the fracture. What started as an accident, a broken leg was experienced as having caused extensive and dramatic changes concerning their relation to their bodies and to themselves, to others and to their whole life situation.

Within these changed relations the following eight categories were identified:

In relation to your body and to yourself**:**
1) You are limited to move and have lost confidence in your body
2) You become humble and grateful
3) You respect yourself and your own needs

In relation to others:
4) You become more dependent on others
5) You gain more human contact and are treated in a friendly way by others

In relation to the life situation:
6) You are secluded and trapped at home
7) You are old, closer to death and have lost your zest for life
8) You take one day at a time and are uncertain about the future.

Within the first category (you are limited to move and have lost confidence in your body) expressions of fear of falling again and what a new fall might lead to were given. Two quotes from the interviews to illustrate this:

> *I've become very careful… when I move I'm very careful about not tripping on rugs. There are things I can't do now…. Everyday things which were easy before... that something would happen"*
>
> *I feel insecure. Really, That I could fall. I'm scared to death of that.*

Within the sixth category (you are secluded and trapped at home) the interviewees expressed that life had become restricted and that their daily routines had changed radically, including reduced level of activity. One quote from the interviews:

> *I think it'll get better if I just get out and exercise! I feel LOCKED UP! I feel like somebody has shut me in somehow.*

The categories most highly represented among the subjects were the two dealing with limitations in movement and being dependent on others.

The latter phase of recovery *(study III and IV)*

Between six and 12 months after discharge, the functional recovery rate of both the HR and the CC group slowed down and the overall recovery of the two groups became more similar. However, when comparing one year and pre-fracture, the HR participants had improved their degree of independence to a significantly higher degree than the CC participants in self-care and transfers and locomotion, while there was no significant difference between the groups in domestic and out-door activity recovery (table 7a). The proportion of people who had regained their independence, i.e. scored 6 or 7 on the FIM and IAM scale, at all follow-up occasions was significantly higher in the HR group than in the CC group in all domains except domestic activities (figure 3).

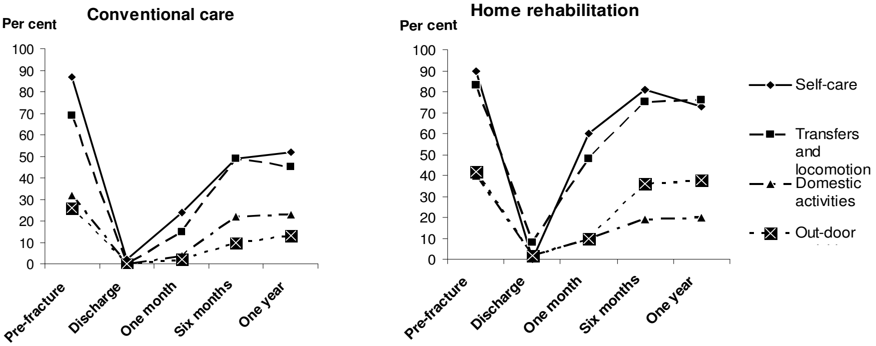


Figure 3. Proportion of participants being independent with or without technical aids in self-care (one month $p<0.001$, six months $p=0.006$, one year $p=0.053$), transfers and locomotion (one month $p<0.001$, six months $p=0.013$, one year $p=0.003$), domestic (one month, six months and one year NS), and out-door activities (one month NS, six months $p=0.003$, one year $p=0.007$). P values within ( ) indicate comparison between home rehabilitation and conventional care group at each follow-up. Chi-2 test.

One year after discharge 40 people (85 %) in the HR and 36 people (75 %, NS) in the CC group were back to pre-fracture out-door walking ability. There was no significant differences between the HR and CC group regaining pre-fracture frequency of either out-door or domestic activities at the six months and one year follow-up, as measured by the FAI (table 7c).

Between discharge and one year, 20 persons (44%) in the HR group and 21 persons (43%, NS) in the CC group had fallen once or more. Four of the falls (HR 2, CC 2) resulted in a new fracture.

When comparing balance confidence at six months and one year with discharge measures the HR group showed significantly greater improvement in confidence on stairs at one year, and in instrumental activities at both six months and one year than the controls, while there was no difference in confidence in self-care domain of the FES(S) (table 7b). The proportion of people who reported total balance confidence (i.e. 10 on the FES(S)) was significantly higher in all 13 activities of the FES(S) among the HR than among the CC participants at all follow-up occasions. Four of the activities are shown in figure 4.

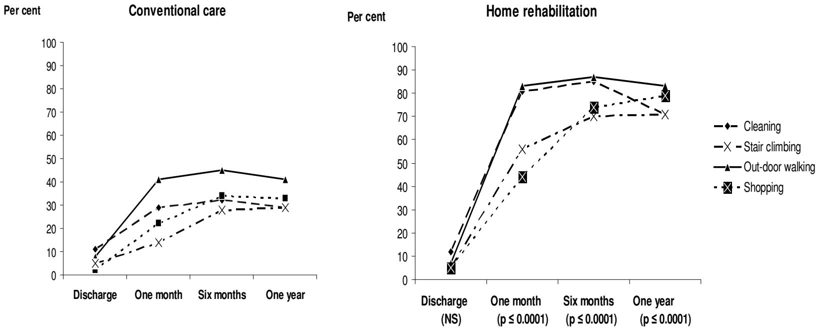


Figure 4. Proportion (per cent) of participants in the two groups, conventional care and home rehabilitation, reporting totally confident in performing the activities cleaning, stair climbing, out-door walking and shopping at discharge and one month, six months and one year after discharge. Chi-2 test.

The HR group reported a higher degree of physical functioning (PF) of the SF-36 at all follow-up occasions and significantly less bodily pain six months and one year post discharge than the CC group. The proportion of participants whose response was 'not limited at all' on the PF item climbing one flight of stairs at one year and walking several blocks at six months was also significantly higher in the HR than in the CC group.

There was no significant difference between the two groups in the proportion of individuals who could be considered depressed, i.e. having a score of 16 or more on the CES-D, at either follow-up (one month HR 20 % CC 35 %, six months HR 17 % CC 22 %, one year HR 24 % CC 24 %). However, at one month the CC participants had reported lower mood than the HR participants (HR median 7.5, min 0- max 27, CC median 12.0, min 0-max 40, p=0.045) (not reported).

Fourteen persons (29 %) in the HR group and five persons (9 %, p=0.019) in the CC group considered themselves fully recovered one year after discharge.

Data from all follow-up occasions, which took place one month (study I), six months and one year (study II) after discharge from hospital, concerning independence in and frequency of daily activities, and balance confidence is shown in tables 7 a-c.

Table 7a. Independence in daily activities. Comparisons between the groups pre-fracture, one, six and 12 months after discharge, and change compared to pre-fracture values, in degree of independence. FIM=Functional Independence Measure, IAM=Instrumental Activity Measure, HR=Home rehabilitation, CC=Conventional care.

		HR	**CC**	**p value**	**Maximal score**	**HR**	**CC**	**p value**
		Median values (min, max)				**Median (min-max) change pre-fracture – follow-up**		
Pre-fracture	FIM total score	90.0 (64, 91)	88.0 (52, 91)	NS	91*			
	Self-care	42.0 (32, 42)	41.5 (26. 42)	NS	42			
	Transfers and locomotion	35.0 (18, 35)	33.0 (19, 35)	NS	35			
	IAM total score	44.5 (10-56)	39.0 (8, 56)	NS	56			
	Domestic	24.0 (4, 28)	21.5 (4, 28)	NS	28			
	Out-door	24.0 (4, 28)	19.5 (4, 28)	NS	28			
Discharge	FIM total score	74.0 (45, 84)	71.0 (35, 80)	**0.009**				
	Self-care	36.0 (24, 40)	24.0 (8, 29)	**0.007**				
	Transfers and locomotion	30.0 (16, 33)	25.0 (5, 35)	**0.021**				
	IAM total score	8.0 (8, 56)	8.0 (8, 11)	NS				
	Domestic	4.0 (4, 28)	4.0 (4, 4)	NS				
	Out-door	4.0 (4, 28)	4.0 (4, 7)	NS				
One month	FIM total score	82.0 (61, 88)	73.0 (13, 89)	**<0.0001**		-6 (-22, 9)	-3.5 (-70, 1)	**<0.0001**
	Self-care	40.0 (29, 42)	41.5 (26, 42)	**<0.0001**		-2.0 (-13, 7)	-5.0 (-32, 0)	**<0.0001**
	Transfers and locomotion	30.0 (16, 33)	25 (5, 35)	**<0.0001**		-4.0 (-14, 9)	-8 (-26, 3)	**<0.0001**
	IAM total score	26.5 (8, 52)	16.0 (8, 49)	**0.003**		5.0 (-19, 30)	1.0 (-20, 22)	**<0.0001**
	Domestic	15.5 (4, 28)	11.5 (4, 26)	**0.0292**		2.5 (-23, 6)	-7.0 (-22, 0)	**0.0098**
	Out-door	9.0 (4, 25)	4.0 (4, 24)	**0.0014**		-11.0 (-24, 12)	-12.5 (-24, 0)	NS
Six months	FIM total score	85.0 (61, 90)	79.0 (13, 90)	**<0.0001**		-4.0 (-12-8)	-7.0(-64-0)	**<0.0001**
	Self-care	40.0 (33-42)	37.0 (6, 42)	**<0.0001**		-2.0 (-15-5)	-3.5 (-29-1)	**0.001**
	Transfers and locomotion	31.0 (15, 34)	30.0 (5, 35)	**0.001**		-3.0 (-9-9)	-4.0 (-19-5)	**0.008**
	IAM total score	41.0 (8, 56)	26.0 (8, 56)	**0.004**		-3.0 (-38-12)	-8.0 (-48-11)	**0.010**
	Domestic	20.0 (4, 28)	17.0 (4, 28)	**0.039**		-0.0 (-21-12)	-3.0 (-24-4)	**0.004**
	Out-door	21.0 (4, 28)	10.0 (4, 28)	**0.001**		-2.0 (-20-13)	-4.0 (-24-7)	NS
One year	FIM total score	85.0 (46, 91)	80.0 (29, 91)	**0.001**		-3.0 (-34-5)	-7.5 (-51-6)	**0.001**
	Self-care	40.0 (23, 42)	38.0 (12, 42)	**0.002**		-2.0 (-15-5)	-5.4 (-29-1)	**0.001**
	Transfers and locomotion	32.0 (11, 35)	29.0 (9, 35)	**0.001**		-2.0 (-24-9)	-4.0 (-20-5)	**0.012**
	IAM total score	40.0 (8, 56)	34.0 (8, 56)	NS		-6.5 (-48-18)	-9.0 (-34-11)	**0.053**
	Domestic	19.0 (4, 28)	17.0 (4, 28)	NS		-1.0 (-24-11)	-2.0 (-24-17)	NS
	Out-door	21.0 (4, 28)	15.0 (4, 28)	**0.012**		-2.0 (-24-18)	-4.5 (-20-7)	NS

*domain of sphincter control omitted

Table 7b. Balance confidence. Comparisons between groups, and change to follow-up compared to discharge values. FES (S) = Falls Efficacy Scale, Swedish version. HR=Home rehabilitation, CC=Conventional care.

	HR	**CC**	**p value**	**Maximal score**	**HR**	**CC**	**p value**
	Follow-up data Median values (min, max)				**Median (min-max) change discharge - follow-up**		
Discharge (n)	42	39					
FES(S) total score	88.0 (35, 130)	75.0 (8, 124)	NS	130			
Self-care	50.0 (28, 60)	43.0 (8, 60)	NS	60			
Stairs	6.0 (0, 10)	5.0 (0, 10)	NS	10			
Instrumental	36.0 (0, 60)	28.0 (0, 60)	NS	60			
One month (n)	47	51					
FES(S) total score	121 (85, 130)	90.0 (8, 130)	**<0.0001**		30.5 (- 1, 75)	7.0 (-25. 64)	**0.0004**
Self-care	58.0 (42, 60)	52.0 (8, 60)	**<0.0001**		7.5 (-14, 26)	6.0 (-17, 23)	NS
Stairs	10.0 (3, 10)	5.0 (0, 10)	**<0.0001**		3.0 (-5, 10)	0.0 (-6, 10)	**0.0018**
Instrumental	54.0 (20, 60)	32.0 (0, 60)	**<0.0001**		18.5 (-6, 50)	2.5 (-19-31)	**<0.0001**
Six months (n)	46	44					
FES(S) total score	128 (20, 160)	105 (7, 130)	**<0.001**		36 (-2, 87)	26 (-87, 75)	NS
Self-care	60 (49, 60)	56 (7, 60)	**<0.001**		8.9 (-7, 32)	9.0 (-38, 41)	NS
Stairs	10 (0, 10)	8 (0, 10)	**0.001**		3.0 (-9, 10)	2.5 (-8, 10)	NS
Instrumental	60 (20, 60)	42 (0, 60)	**<0.001**		22.0 (-2, 60)	13.0 (-41, 43)	**0.024**
One year (n)	42	48					
FES(S) total score	128 (61, 130)	102 (13, 130)	**<0.001**		37.9 (-26, 87)	22.0 (-35, 72)	**0.023**
Self-care	60 (30, 60)	54 (13, 60)	**<0.001**		9.0 (-26, 27)	9.5 (-14, 25)	NS
Stairs	10 (2, 10)	8 (0, 10)	**<0.001**		3.5 (-5, 10)	1.5 (-10, 10)	**0.008**
Instrumental	60 (10, 60)	46.5 (0, 60)	**<0.001**		22.0 (-3, 60)	11.0 (-35, 41)	**0.013**

Table 7c. Frequency of activities. Comparisons between the groups pre-fracture, one, six and 12 months after discharge, and change compared to pre-fracture values, in frequency of daily activities. FAI = Frenchay Activity Index, HR = home rehabilitation, CC = conventional care.

		HR	**CC**	**p value**	**Maximal score**	**HR**	**CC**	**p value**
		Follow-up data Median values (min-max)				**Median (min-max) change pre-fracture - follow-up**		
Pre-fracture	FAI total score	28.0 (0-37)	24.5 (5-40)	NS	45			
	Domestic	12.5 (0, 15)	12.0 (0, 15)	NS	15			
	Out-door	11.0 (0, 18)	9.0 (0, 17)	NS	15			
	Leisure/work	3.5 (0, 8)	3.0 (0, 9)	NS	15			
One month	FAI total score	18.0 (0-35)	16.0 (0-32)	**0.0012**				
	Domestic	9.0 (0, 15)	8.0 (0, 15)	**0.0119**		-1.0 (-15, 4)	-4.0 (-15, 1)	**0.0009**
	Out-door	5.5(0, 15)	1.0 (0, 14)	**0.0007**		-4.0 (-17, 6)	-6.0 (-13, 5)	**0.0541**
	Leisure/work	3.0 (0, 7)	3.0 (0, 7)	NS		0.0 (-4, 6)	-1.0 (-5, 3)	**0.0272**
Six months	FAI total score	26.0 (0-41)	19.0 (0-39)	**0.013**		-1.0 (-20-13)	-1.0 (-24-20)	**0.033**
	Domestic	12.0 (0-15)	11.0 (0-15)	NS		0.0 (-13-7)	0.0 (-15-6)	NS
	Out-door	9.0 (0-14)	4.5 (0-15)	**0.001**		-2.0 (-6-8)	-3.5 (-12-6)	NS
	Leisure/work	6.0 (0-14)	5.0 (0-12)	NS		3.0 (-6-8)	1.0 (-5-6)	**0.010**
One year	FAI total score	27.0 (0-40)	20.0 (0-42)	**0.028**		-3.0 (-30-8)	-3.0 (-25-7)	NS
	Domestic	12.0 (0-15)	10.0 (0-15)	NS		0.0 (-15-6)	-1.0 (-15-5)	NS
	Out-door	9.0 (0-15)	4.5 (0-15)	**0.003**		-3.0 (-12-9)	-4.0 (-11-4)	NS
	Leisure/work	7.0 (0-11)	6.0 (0-13)	NS		3.0 (-3-8)	2.0 (-5-6)	**0.037**

Table 7a, b and c: Mann-Whitney U-test for comparisons between the two groups at each follow-up occasion and between the two groups' differences between baseline and follow-up.

Results from the FES(S) showed that the proportion of participants reaching maximal score, i.e. 130, was significantly larger in the HR group at all follow-up occasions, as is shown in figure 6 (not reported).

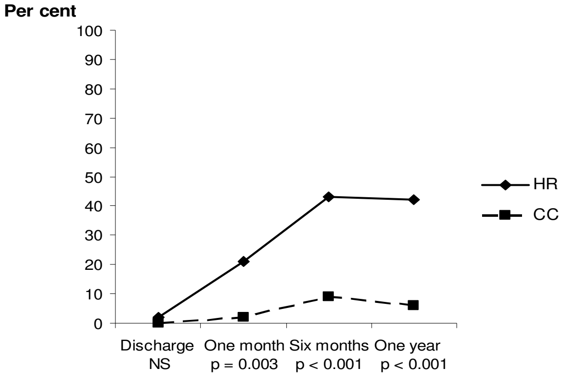


Figure 6. Proportions (per cent) of participants reporting full score (130) of the FES(S). Chi-2 test.

Before the fracture more than 90 % of the participants of both the HR and CC group took out-door walks, and 25-30 % walked once a week or more. The proportions of participants taking out-door walks before and at all follow-up occasions are shown in figure 7.

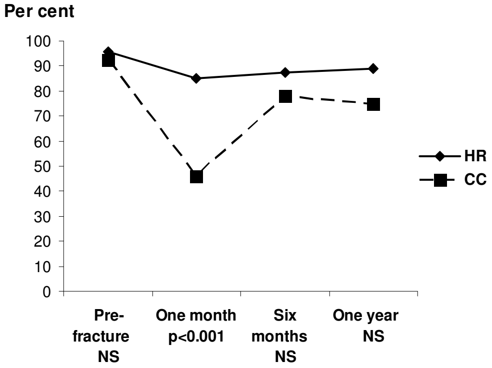


Figure 7. Proportion of participants taking out-door walks. Chi-2 test.

Of those who did walk out-doors before the fracture, six persons (13 %) in the HR group, compared to 25 persons (46 %, $p<0.0001$) in the CC group did not leave their homes one month after discharge, while the corresponding proportions at one year was five persons (11 %) of the HR group and nine persons (19 %, NS) of the CC group.

In the interviews from the latter phase of the recovery process (one year after discharge) a majority of the participants gave expressions of remaining insecurity and restricted life. All 15 interviewees described that they experienced remaining insecurity or restricted mobility. On the other hand, a few of them also said that the fracture had made them better than they were before the fracture, or even saved their life.

The analysis of the one year interview data resulted in an outcome space of six main categories and two sub-categories within the two focused areas experienced consequences of a hip fracture one year after discharge and conceptions of what influences hip fracture recovery. The categories were arranged within respective area as follows:

Experienced consequences of a hip fracture one year after discharge
1. Isolated life with more restricted activity and fewer social contacts
    1.a. More insecure and afraid
    1.b. More limited ability to move
2. Disappointed and sad that identity and life have changed
3. Satisfied with the situation or feeling even better than before the fracture

Conceptions of what influences hip fracture recovery
4. Own mind and actions influence recovery
5. Treatment and actions from others influences recovery
6. You cannot influence recovery

One quote from the first category may serve as an illustration of the patients' expressions:

> *I'm more housebound. So I've become more of a recluse, I suppose…..It's my social life that suffers.*

The category most highly represented among the subjects was category 1 (isolated life with more restricted activity and fewer social contacts) with sub-categories (more insecure and afraid and more limited ability to move).

Figure 5 shows a visualization of the relation between the categories concerning experienced consequences of the fracture. As can be seen in the figure experiences of insecurity and limited mobility had led to a more isolated life, including restricted activity and fewer social contacts than before the fracture. This had led to different psychological reactions. The subjects described that they were either disappointed or that they had come to terms with the situation, as they experienced it at the time of the interview. Two of the interviewees expressed that they felt even better compared with the situation before the fracture.

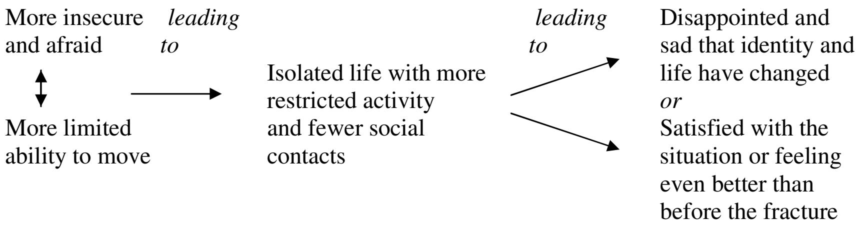


Figure 5. Relations between the categories within experienced consequences of a hip fracture one year after discharge.

One part of the results from the one year interviews was the presentation of the different conceptions of what influences recovery after hip fracture. The descriptive categories within the field were: own mind and actions influence recovery, treatment and actions of others influence recovery, and you cannot influence recovery. The category most highly represented among the subjects was category 4 (own mind and actions influence recovery).

In both interview studies expressions of more limited mobility, which resulted in restricted activity and social contacts, were given by the participants. However, for a majority of interviewees the experienced consequences of the hip fracture had shifted from an early focus on bodily experiences to latter perceived consequences for the identity and life shown by expressions of disappointment over the entire situation. A summary of the categories from study II and IV is given in figure 8.

Early experiences	**Late experiences**
Isolated life with more restricted activity and social contacts:	
More dependent	More limited to move
Limited ability to move and lost confidence in your body	Disappointed and sad that life and identity have changed
Trapped at home	
Insecure and afraid:	
Uncertain about the future	More insecure and afraid
Closer to death	
Life is the same or even better than before the fracture:	
Respect yourself	Satisfied with the situation or even better than before
Gain more human contact	
Become humble and grateful	
	Own actions and mood influence the recovery
	Other's treatment influence/you cannot influence the recovery

Figure 8. Early and late experiences and conceptions of the recovery after hip fracture.

Discussion

General discussion of the findings

This thesis enlightens several aspects of the rehabilitation of elderly people with hip fracture. The results underline that the consequences of a hip fracture are substantial, multi-dimensional and long-lasting. This was accentuated by the fact that only a minority of the participants reported that they were fully recovered one year after discharge, compared to before the fracture. Furthermore, the interview studies showed that a hip fracture seemed not only to break the bone but also to cause social and existential cracks which remained, or became deeper during the year after the injury.

Home rehabilitation versus conventional care

The results from the intervention studies could be seen as support for the HR programme. Although the differences between the two groups were largest in the early phase of recovery, measured after the HR programme was finished one month after discharge, the programme also seemed to have more long-lasting impact than were expected. Of those who were independent before the fracture a larger portion of HR than CC participants regained their independence and activity level after discharge and to a larger degree maintained it over time, although not within all measured areas. The HR programme's focus on encouraging self-efficacy and exercising everyday activities, including out-door walking, might have contributed to this. Furthermore, the HR programme's clear focus on the patients' motivation and personal goals as well as self-efficacy and learning by doing in the home environment, in which self training was one key ingredient, might be part of the positive effects of the intervention. The importance of self-efficacy on rehabilitation outcome has also been described by Fortinsky and co-authors (82) who found a positive association between rehabilitation therapy self-efficacy and likelihood of locomotion recovery. It is also reasonable to believe that the home environment stimulates the individual's activity and mobility level more than an institutional environment, as suggested in the theories of situated learning (148, 151).

Another reason for the more accentuated recovery for the HR group might be the bridging function of the HR programme, which presumably contributed to a smooth and secure discharge for patients as well as their relatives. A rehabilitation process generally passes through different phases. In the first acute phase, after admission to hospital, the patients are largely at the mercy of the health care personnel. Gradually they may be more active and take on responsibility for their situation and planning of the future. There are several studies dealing with the importance of the patients being engaged in their discharge planning (67, 207, 208). In one of them (67) patients reported that hospital discharge routines failed to reflect the complexity of the post-hospitalization situation by focusing primarily on very basic physical and medically related needs rather than on the actual needs of the elderly patients. In our studies a HR programme, including early involvement of patients and relatives in the supported discharge, followed by rehabilitation visits at home, was tested. One of the aims of the supported discharge was to reduce the patients' and relatives' uneasiness about going home instead of staying in hospital or being transferred to a short-term nursing home. Supported discharge is a model which has been used mainly for patients with stroke in order to shorten the duration of hospital care and to reach a higher level of independence in daily activities (155, 209). Studies on supported discharge after stroke have shown positive results for the patients' well-being and recovery (156, 209). It is however conceivable that structured discharge routines, which include patient and relative involvement, are of value for all elderly patients.

Previous studies have underlined the importance of well organized discharge from acute hospital (67, 210). Although it was not an aim of this thesis, a global goal for the geriatric clinic was to shorten hospital stay through HR. However, we could not show any significantly more reduced hospital stay for the HR group than for the CC group. On the other hand, the HR group consumed considerably fewer days in short-term nursing homes the first month after discharge. The total sum for stay at nursing home was 266 days for the nine patients in the CC group compared to 76 days for the three patients of the HR group who needed short-term care after discharge (study I). A more thorough examination of the health care consumption the year following discharge is planned.

Optimally, discharge planning for elderly patients with hip fracture should involve an assessment of their resources and limitations during hospitalization, plans for continuity of their health care after discharge and services that enhance their recovery, both physical and emotional. The planning should also comprise education of the patient and other care givers including their families (211). Moreover, poor planning often results in a discrepancy between the needs anticipated and planned for in hospital and the person's actual needs once he or she returns home (67). Hunt and Stein (210) proposed that health care professionals, instead of advising elderly patients to change or limit their activities or rearrange their living environments in order to decrease the risk of falling, they should encourage elders to promote an active and engaged life style. Advising them to limit their activities may have the negative effect of increasing their fear of falling and unnecessarily diminishing their quality of life. The results from our studies show that the patients need continued support also after discharge in order to better regain previous activity level.

One important part of a HR programme is to involve not only the patients, but also their relatives. In our studies we did not specifically ask the patients' relatives about their experiences. This was however done by Crotty and co-authors (117) who compared a group of elderly patients with hip fracture who were discharged to their homes within 48 hours after randomization receiving multi-professional HR with a patients who received conventional in-hospital rehabilitation. They found similar outcomes on ADL, TUG and HRQoL for the two groups, while caregiver burden at 12 months was significantly less for the HR group compared to the controls (117). One remaining interesting research area is to explore both the patients' and their relatives' experiences of rehabilitation at home.

In this thesis it is not shown which components of the HR programme are the most beneficial for each patient. Some patients could perhaps manage their rehabilitation more or less on their own with one or two home visits and a telephone number to call when they need further advice, while others probably need more regular contact and visits from health care professionals. It is also conceivable that some patients could be discharged to their own home at an earlier stage of their rehabilitation, thereby decreasing their hospital stay. This calls for further studies.

Patients' experiences and conceptions

Early in the recovery process participants in the interview studies hesitated to talk about the future and felt uncertain of their future recovery. Some participants expressed that they felt insecure of how much they could move and what the injured leg could withstand. In line with these findings Carrese and co-authors (212) found that ill elderly were not willing to talk about or plan for the uncertain near future events, related to their chronic and serious illness, but were more willing to talk about and plan for events more distant in time, including their own death. Later in the recovery process the participants in our studies expressed frustration and disappointment that life had changed, and that it would probably never be the same as before the fracture. These findings support previous studies showing that substantial physical restrictions (59, 87), dependency in daily activities (213), social limitations (214) and depression (56, 215) are common after a hip fracture, especially during the first months after the injury. Depression has been found to predict poor functional outcome after hip fracture (54, 55, 57), and anxiety and a feeling of hopelessness are shown to be associated with a risk of developing depression after hip fracture (49, 216). Thus, in a medical perspective, the experiences reported in this study, such as being inactive, hesitating to plan for the future or having lost a zest for life could be seen as signs of depression. Taking this into account, it is possible that the subjects in our study may have suffered from depression or low mood by the time of the interviews, and perhaps also prior to the injury, which might have influenced the experiences they described.

The interviewees' conceptions of the latter phase of recovery , reported in study IV, for instance that own mood and actions and other people's treatment and actions influence recovery, could be associated with psychological concepts such as self-efficacy (126), locus of control (217), perceived health control, (218), or coping (127). It has previously been reported that low self-efficacy, i.e. perceived ability to carry out an action, is associated with depression, anxiety and helplessness (219, 220) as well as being strongly connected with activity limitations (33). Locus of control, on the other hand, measures generalized expectancy beliefs with respect to health along three dimensions; internal, i.e. a belief that health is the results of one's own actions; external - powerful others, i.e. an individual's belief that health is a result of powerful others such as health care professionals, and external – chance or fate, i.e. the extent to which individuals believe their health is due to chance or fate (221). In a study of 112 older women with hip fracture Shaw and co-authors (222), found that internal locus of control was significantly related to less physical disability one month after the fracture. Furthermore, it is a common view that people who believe that they have control over their own health are more likely to engage in health-promoting activities and to comply with treatments than those with low perceived control. Bruggeman and co-authors (49), reported that feelings of hopelessness could mediate depression after hip fracture and that personal control beliefs were associated with anxiety and depression, i.e. those who believe they have little control over their injury are at risk of hopelessness and depressive symptoms (49). Taken together, this gives indications for multi-professional screening for signs of depressive mood, as well as to organize appropriate interventions early in the rehabilitation process after hip fracture.

Results from the interview studies in this thesis showed that a hip fracture could be experienced as a distinct manifestation of being old, including a variety of negative attributes. This may be seen as a reflection of society's attitudes towards the elderly, who, in contrast to young people, are often given the attributes of worthlessness and a strain on society (223). The one month interviews also indicated that the fracture came as a final blow, comparable to a serious disease that could lead to permanent disability or death. The participants' experiences of feeling old included a feeling of embarrassment, for instance of not being able to stand on one's own two feet. In accordance with these findings another study reported that the interviewees viewed falling as a sign of ageing, diminishing competence and dependence (66). Growing old is in itself a time when many important and stressful changes take place, such as retirement, illness or disability, and separations, all of which place demands and stress on the individual. Previous research indicates a relationship between aspects of subjective ageing and health and changes in health are the most frequently cited reasons for beginning to feel older (224). Furthermore, society generally holds a stereotypical view of old people and ageing which is often called ageism (223). Attitudes such as progressive physical and mental decline, social isolation, asexual behaviour, lack of creativity and economic and familial burden, Tornstam (225) suggested, stem from deep value patterns characterized by valuing economic productivity and independence. Older people are frequently labelled as a dependent burden, a social problem connected with the concept of dependency and how to prevent it (223). Assumptions and attitudes against ageing have also become part of the health care system. A healthy old age could be seen as a reward for a life of self-control and "correct-living" and frailty and dependency consequently as a consequence of unsuccessful ageing. According to researchers around the world the "age of dependency" is expected to put pressure on the community, who fear the ageing of the population and worry about whether we can afford the costs of an increasing older population (223). Therefore, investments in treatment, care and rehabilitation after hip fracture might contribute to a more healthy elderly population and thus also be of economical value. In this thesis no health-economical calculation of the HR programme in comparison to CC, has been performed, but would certainly be of significant value.

One interesting question, emerging from the results from the interview studies, is if the patients' recovery could be influenced by their own expectations. Furstenberg (226) in an interview study on 11 patients with hip fracture found that they had different ways of describing expectations of the injuries and over future accidents. One was to describe the accident as a consequence of their behaviour and how they could avoid future falls, implying a sense of control. On the other hand, those who saw the accident as unavoidable and outwith their control also showed signs of helplessness to control future events. These different ways of perceiving control also seemed to influence the patient's rehabilitation (226). One way of supporting patients after a hip fracture, proposed by the author, could be to encourage them to put their painful experiences into words, which might relieve their anxiety. This could work as cognitive processing of the traumatic event and help the patients discover a cause for the accident, which may bring a sense of controllability (226). It has also been suggested that intervention after hip fracture should be focused on self-efficacy, as greater falls self-efficacy in being able to perform tasks without falling was associated with better functioning (131). In accordance, one of the basic ideas of the HR programme studied in this thesis was to encourage self efficacy in daily activities.

Predicting and preventing falls and fractures

Considering the extensive evidence of the negative consequences of a hip fracture for the individual as well as for the society primary and secondary prevention efforts should be made on all levels of health care and social service. One move could be to try to reduce the risk of falling and the negative effects of falls. It is thus essential to identify those at higher risk of falls also after discharge. Studies of fall risk have examined both intrinsic factors, such as psychological or cognitive impairment, muscle weakness, balance disorders, as well as extrinsic factors such as lighting, deficient assistive devices and slippery surfaces that contribute to falls (227). Pease and co-authors (228) showed that 12 % of patients with a hip fracture had a second hip fracture with a significant further impact on mobility and social independence. In another study Stewart and co-authors (229) followed 394 patients with hip fracture for 52 weeks and saw that poor mobility was a significant risk factor for a new fall. It is therefore important to find valid, reliable and usable tests to select those patients who are at greater risk of falling. The TUG test has been reported to be a usable tool to identify those at risk of falling (178, 179, 230). One recent study showed that the TUG performed at discharge with a cut-off point of 24 seconds significantly predicted falls during a 6-month follow-period after hip fracture (178), while others have reported that a TUG score of more than 13 or 14 seconds was able to discriminate people who fell from people who did not fall in the preceding six months (228, 229). In contrast to this, a recent study showed that the TUG was not recommended as a test of fall risk in an ambulatory elderly population (231). Also the STS has been found reliable as a test to investigate limitations in mobility among community-dwelling elderly people (183) and an increase in the time to rise was associated with an increase in ADL independence (232). Our own clinical experience from the follow-up visits was that both the TUG and the STS were easy to use in a homes environment. They could therefore be recommended to be used for instance at discharge from hospital or in home and primary health care as screening tests to identify patients who might need further follow-up and rehabilitation. Replication of earlier studies could reveal which are the best cut-off points for prediction of falls or functional decline.

It also seems important to identify interaction of multiple factors for falls. This was shown by Tinetti and co-authors (10), who reported that the percentage of people falling increased from 27 % for those who had no or one risk factor, to 78 % for those with four or more fall risk factors. This underlines that individuals who sustained a fall, or even more important those who have had multiple falls or a fracture, should undergo a comprehensive evaluation for underlying causes (233). It is not entirely clear which is the most appropriate treatment for those found to be at higher risk of falling (234). Shumway-Cook and co-authors (235) reported that a community-based multifactorial intervention programme, consisting of group exercise, fall prevention education and falls risk assessments improved balance, mobility and leg strength more a programme with written information only, although the incidence of falls did not significantly differed between the two programmes. Results from the studies in this thesis show that home rehabilitation could be a gainful model for community-dwelling people with hip fracture.

Interviewees in our studies described that they felt more limited and trapped at home. Lack of physical activity is a known risk factor for osteoporosis and hip fracture. There is also evidence that physical activity is one important factor for independence, perceived good quality of health and mood in the ageing population (236-238). This was supported by a recent randomized study on 412 elderly adults who were randomized to either physical activity or successful aging education, Rejeski and co-authors (238) found that those who had participated in physical activity group had more favourable increase in self-efficacy and satisfaction with physical functioning than those who had participated in education. As fear of falling, especially after an injury, has been shown to lead to restricted activity in elderly people (239), efforts should be made to help patients overcome their fears and continue with activities even after a hip fracture. In the intervention studies in this thesis a considerably larger proportion of HR participants reported maximum score on the FES(S) than the CC participants. The HR programme, focusing on supported discharge, self efficacy and out-door activities, could have contributed to the increase in balance confidence. However, it has not been clarified who gains most from the HR programme and how many home visits are optimal for each individual. As discussed by Tinetti (120), too many HR visits could lead to the patients becoming unnecessarily dependent on personal support. In our studies, the intervention consisted of a mean of 4.9 home visits (mean 2.4 visits made by physiotherapist and 1.6 visits by occupational therapists, every fourth patient received a visit by a nurse or an assistant nurse), which was relatively few.

The participants in our studies belonged to a frail part of the elderly population and can therefore not be regarded as representative for community-dwelling elderly people in general. Furthermore, it could not be excluded that their perceived HRQoL, mood or physical functioning was below average for their age-group before the fracture.

Methodological considerations

Statistical considerations

Most of the scales used in the thesis are based on ordinal scales that produce data which might not have a normal distribution and therefore we predominantly used non-parametric statistical methods to analyse the data. The various sensitivities of the scales, as well as ceiling effects, may have affected comparisons. A small improvement in a scale does not necessarily represent a clinically relevant improvement. One might argue that an improvement in a rough scale is more clinically relevant than an improvement in a more sensitive scale, because it requires a larger change in functioning. On the other hand even small improvements are sometimes valuable, from the patient's perspective. A use of different measures illuminating different aspects of complex situations, as well as different research methods, is therefore valuable.

Validity

The internal validity, i.e. the extent to which the independent variables may be considered to account for the results, changes or group differences, rather than other factors or influences (threats to internal validity) has been thoroughly considered (240). Such threats to the internal validity could be changes in measuring instruments or selection bias. In the intervention studies (I, III) the same measurements and measurement procedure, for instance order of measurements, were used during the whole study period, in order to minimize the risk. Furthermore, the participants were included consecutively as they were admitted to the emergency unit. A weakness was that the randomization had to take place before the patients were asked if they were willing to participate. The reason for this was hospital routines with direct, around-the-clock transfer of the patients from the emergency unit to either the HR ward or the CC ward. The emergency nurses checked the basic inclusion criteria, such as community-dwelling within the inclusion area, age and principal diagnosis, but in some cases the hip fracture was not medically confirmed and the patients' cognitive status not assessed before they were transferred to the geriatric wards. One consequence of these clinical routines was that a considerable number of patients were excluded after randomization (n=74) as they did not meet all the inclusion criteria or due to lack of beds either at the HR or at the CC ward. There was however no other possible way to conduct the randomization procedure and we therefore had to scrutinize the randomization routines in order to avoid selection bias. It is possible that we would have received a more even proportion of men and women in the two groups by using stratification.

Another way to secure internal validity is to control the intervention, and measurements, as carefully as possible (240). In the intervention studies repeated meetings with the multi-professional team were arranged in order to catch problems, to discuss and repeat the goals and content of the HR programme and to secure similar procedures for assessments when the patients were discharged.

External validity refers to the extent to which the results can be generalized beyond the sample, settings and circumstances in which the study was conducted (240). Threats to external validity could be sample characteristics, stimulus characteristics and settings, reactivity of assessment and timing of measurements. There were some baseline differences between the HR and the CC group, for instance concerning gender, living conditions and pre-fracture activity level, although they were not statistically significant. Nevertheless it cannot be excluded that these baseline differences may have affected our results.

Another possible threat to the external validity is the influence of the subjects' awareness that they are participating in an investigation, which may lead to changes in how they respond. In the present studies all participants were aware that they participated in a research study, which might have affected their answers, for instance they could be eager to please the investigator or be reluctant to criticize their care and treatment.

There is also the question of timing. An external validity question that could be raised is whether the same results would have been obtained had measurements been taken at another time, say, several months later, for example two months instead of immediately after an intervention. In the present studies we have carried out follow-up measures on three occasions, immediately after the intervention, and six months and one year after discharge, and we can only give an opinion on these points of time.

Another limitation is the relatively small number of participants in the intervention studies. This was particularly noticeable when evaluating change over time for the Timed-Up-and-Go and the Falls Efficacy Scale because of the rather extensive internal missing values at discharge, especially for the CC group, which may have limited the comparison for these two tests. A positive factor for the study, though, was that there were few drop-outs and missing values throughout the study period. Furthermore, the number of participants exceeded the number required in the power analysis. Additionally, even though the statistical significance was set at $p < 0.005$, many of the calculations showed significance at $p < 0.001$, which reduced the possibility of a Type I error, i.e. the risk of getting an incorrect statistically significant difference between groups. A post-hoc test, i.e. Bonferroni, could have been added to the analyses in order to reduce the risk of getting a Type I error. On the other hand, such a test carries the risk of the corrections being too large, thus increasing the risk of a Type 2 error, i.e. the risk of getting an incorrect statistically non-significant difference between groups.

Reliability and validity of chosen measurements

Reliability and validity of the FES(S) have been found to be of acceptable standard, as well as to show adequate responsiveness, according to a review by Jörstad and co-authors (241) The scale involves ceiling effects for individuals with high physical functioning, which suggests that use of fall efficacy assessment with major demands on balance performance may be preferable in follow-up after the sub acute phase (242). In our study ten of the patients in the HR group and one patient in the CC group reached the maximum score of 130 at the one month follow-up. In order to meet this problem, different modified versions of the FES(S) have been developed, for example the international version (FES-I), to which more difficult and social activities have been added (243). The FES-I measures how concerned the respondent is of falling while performing 16 daily activities and is consequently focused on fear rather than confidence, while we were more interested in the confidence aspect. When planning the study we also considered using the Activity Balance Confidence scale, but as the scale comprised too many complex activities and has been shown to have a greater responsiveness for persons with a higher degree of functioning(244) than our participants, we chose the FES(S). However, it is possible that a modified FES with some additional instrumental activities added might have been more appropriate to use.

The FIM is a well documented and widely used instrument. The supplementary IAM has not been tested as thoroughly as the FIM, and mainly on patients with stroke or other neurological diagnoses. Possibly we should have used an additional instrument to measure instrumental ADL independence in order to make reliability tests on our population.

The FAI, which measures frequency of different complex daily activities, has also been widely used over the world and in different populations. Its focus on activities, which could be considered as traditionally "female", at least in an ageing population, could contribute to underestimation of traditionally "male" activities and hence put the participating men in a more inactive role than they actually were. However, we found no instrument which was more gender neutral.

The SF-36 was chosen for measuring HRQoL as it is widely used in research. It has been suggested that the SF-36 has a well-demonstrated validity compared to other scales, although the validity for older respondents has been questioned (245, 246). It was our experience that face-to-face interviews were an appropriate approach to use the SF-36 on this population of frail elderly people.

The STS and TUG tests were predominantly performed in the participants' own homes, and different constructions and height of chairs could affect the performance of the tests. In order to meet this problem we used the same chair on the different occasions. In addition to this, the participants themselves were allowed to choose which, if any, walking aid they preferred to use. This might have influenced the results, as for instance walking safely with a wheeler could be quicker than walking with two crutches. Concerning the STS we had no baseline measurement, as we decided to include the test when the study had already started, and could therefore not compare discharge measures with follow-ups. Additionally, the missing data on the TUG at discharge are substantial, which weakens the possible conclusions of the comparisons.

Trustworthiness and credibility of the qualitative data

When discussing validity questions in qualitative studies, one often refers to research that it plausible, credible, trustworthy, and therefore defensible (247). Lincoln and Guba (248) suggested that the criteria credibility, dependability, i.e. the consistency of observing the same findings under similar circumstances, confirmability, i.e. the degree to which the results could be confirmed by others, and transferability, i.e. the degree to which the results of qualitative research can be generalized or transferred to other contexts or settings, could be used as criteria for scientific rigour. They compared credibility with internal validity, confirmability with objectivity, and transferability with generalisability (248). Some authors also recommend triangulation, i.e. “cross-checking” information and conclusions through the use of multiple data sources or research methods to study a phenomenon, or to use multiple investigators in collecting and interpreting the data. In this thesis triangulation was not used.

To determine whether a published qualitative research article is trustworthy or not is a complex task, particularly as there is no agreed set of criteria to apply. Some definitions of trustworthiness tend to relate back to a quantitative evaluation of quality (247). However, it has become a common practice for qualitative researchers to avoid using quantitative terminology when describing measures to evaluate the quality of their research, as the philosophical assumptions of quantitative and qualitative research could be seen as incompatible (249). In the light of this, trustworthiness refers to the extent to which the findings could be seen as an authentic reflection of the experiences of the phenomenon under investigation (250). In our opinion, the results from the included interview studies in this thesis, even when comparing with results from other studies, could be regarded as authentic reflections of different experiences of sustaining a hip fracture.

One strategy to establish trustworthiness, which was also used in this thesis, is to try to obtain transparency, for instance by clearly describing methods, sampling, data collection, data analysis and results. This should involve a clearly defined research question, ground for choice of method, detail of sample and transparent descriptions of the pathway from data to conclusions including exact quotes from the interviews (251).

Transferability is also a term used within the area of the quality of research. From a qualitative perspective transferability is primarily the responsibility of the reader. The researcher can enhance transferability by detailing the research methods, contexts and assumptions underlying the study (248).

In the two qualitative studies included in this thesis we have considered the question of trustworthiness by describing the aim and research questions, choice of method, sampling, data collection, analysis and by presenting results illustrated by quotes collected from the interviews in order to meet the criteria of transparency. The results could thus be used by clinicians to recognize similar situations and problems in the rehabilitation of patients with this injury. Furthermore, all interviews were analyzed by two people separately before discussing and comparing the findings.

It is not possible for us to exclude the possibility that there may be other ways of experiencing a hip fracture than were reported in this thesis. Nevertheless, the variation of conceptions which emerged from the interviews created an outcome space covering qualitatively different aspects of the studied phenomenon. The findings may also serve as ground for development of new instruments.

Combining qualitative and quantitative methods

Although qualitative and quantitative research methods have different underlying theoretical assumptions it seems fruitful to combine qualitative and quantitative data to illustrate complementary aspects of chosen phenomena and to better understand the complexity of many health care topics (252). Furthermore, in order to understand the individual consequences of a serious injury like hip fracture, and which rehabilitation measures to offer, a broad range of knowledge and understanding need to be brought together. Unfortunately qualitative and quantitative researchers often use different assumptions about the world and ways of learning about it. These assumptions may be seen contradictious and researchers are often taught to master only one type of method, either qualitative or quantitative (253). Combining quantitative and qualitative methods is complex, as these methods belong to traditionally different paradigms with fundamentally different philosophical framework (254). However, physiotherapy, as other health care professions, is based on a diversity of knowledge, which implies the need for research methods which reflect the complexity of human responses to various health care situations. Therefore, qualitative and quantitative methods provide different, but non-competing knowledge with equal importance and weight. In this thesis, based on the diversity of the research questions, both qualitative and quantitative methods have been used. It is our opinion that this combination was of value and contributed with rich descriptions of the patients' situation after a hip fracture. The knowledge gained through the research is intended to be used in communication with other clinicians and may thus serve as a means to develop education and clinical practice.

ICF

ICF is a classification system and not an assessment instrument. Measure instruments can be assigned to ICF by coding of individual items and formation of so called core sets (255). Different limitations and problems with ICF have been debated, one being the insufficiently developed area personal factors. One question which has been discussed is if psychological functions could be regarded as a part of body function, or rather as personal factors. According to the present model, most psychological functions should be coded under body function. Furthermore, it has been discussed that it is difficult to distinguish between the activity and participation components and that they should possibly be divided into two components (255, 256).

The ICF can serve as a connecting framework between interventions and outcome measures, facilitating the selection of the most appropriate outcome measure for the aim of the intervention (257). In this way, different interventions could be easier compared with respect to the interventions administered and the results obtained. In this thesis the use of ICF was limited to structure of the outcome measures. It could have been valuable to link item for item to the ICF codes in order to help future decisions about what outcomes should be measured, how to measure them and what components rehabilitation programmes should include.

What is worth knowing?

According to Törnebohm researchers should try to produce valuable knowledge for the practitioners (123). One essential question to put, according to Törnebohm, is: "What do the actors in the field need to know in order to be able to perform better in their profession?" He also concluded that clinical oriented research should concern what could be done to help a person in a life crisis, for example being admitted to acute hospital after an acute injury. Törnebohm exemplified this with the suggestion that the therapist builds two paradigms (a coherent system of thoughts and theories); one about the patient as the person he or she was before, as he or she is at present, and as what he is at present or what she might become after the treatment and one about the treatment of the patient. He also suggests that the patient needs to build a paradigm about his or her active participation in the treatment, and that the success of the treatment depends on the qualities and linkage of these paradigms (123). The present studies could be seen as an attempt to explore this field of knowledge. One of the aims with the studies was to gain knowledge of how the patients experience a serious injury like a hip fracture, which could be seen as exploring part of the patient's life paradigm. Another long-term goal was to present new, interesting and essential knowledge which could contribute to improvement of treatment and programmes within geriatric rehabilitation, applicable for all health care personnel and for physiotherapists in particular.

Ethical aspects

The interviews and data collection were carried out in the participants' homes, unless a different venue was requested, and at a time that best suited the respondents. This meant entering a private sphere which has to involve certain considerations. Furthermore, some of the topics might be regarded by the respondent as private and it was therefore of prime importance to observe the respondent's integrity. However, we got no indications that the study visits should have harmfully affected the participants in any way. On the contrary, there were participants who said that the follow-up visits made them feel safe and that they appreciated having someone to ask about their injury and who they should turn if they needed help.

The fact that the participants in the study may not be the same as those who may benefit from the results of the research could also be seen as a dilemma. Hopefully, though, the knowledge gained in these studies will contribute to improvement of the rehabilitation and, thus, the situation for patients with hip fracture in general.

Conclusions and clinical implications

The higher degree of recovery among the participants of the HR that was found one month, six months and one year after discharge implies that the programme had more long-term impact on independence and functioning than was expected from previous research within the field. Although this was most apparent in the early phase of the recovery some of the effects were also more prevailing. Possible reasons were the programme's early start and its focus on self-efficacy and exercising daily activities in the home environment, as well as a high degree of continuity and cooperation among the involved health care professionals. Another contributing factor may be the bridging function of the HR programme, which presumably contributed to a smooth and secure discharge for the patient as well as for their relatives.

The results accentuate research reporting that the negative consequences of a hip fracture are substantial and long-lasting. It can be argued that a hip fracture not only involves a broken bone, but also has a profound psychological and social impact for the individuals. As a hip fractures strikes mostly elderly people who may have experienced earlier losses and growing disabilities, it could add to the risk of permanently losing important life values.

The results from the present studies could contribute to deepen health care professionals' understanding of the personal consequences of sustaining a hip fracture. One key component in hip fracture programmes is to let the patients' formulated needs lead the care and rehabilitation instead of the other way around. Furthermore, considering the remaining long-lasting negative consequences of the injury it is our opinion that programmes supporting patients' self-reliance and hope of recuperation should be given priority.

A remaining challenge for health care is also to determine the composition and duration of hospital stay and of rehabilitation that ensures optimal functional recovery most efficiently in older people who sustain a hip fracture. Arranging health care and rehabilitation chains in order to link together different health care organizations should be given priority. It is important for all professionals who meet the patients to consider the patients' experiences and the psychological dimensions, and not primarily focus on the physical injury and disability. Intervention programmes that acknowledge elderly people's fear of falling while, at the same time, encouraging a lifestyle that includes physical exercise, social activity and connectedness, and a capable sense of self reliance could help people regain a high quality of life during the recovery process. An interesting future research area for physiotherapists is to further investigate how important the patient's trust in her or his own recourses and abilities is for the rehabilitation outcomes. Furthermore, in more close detail explore what outcomes are the most appropriate in the rehabilitation of elderly people with hip fracture. Taking the results from this thesis as a starting-point, self-assessment of self-efficacy, such as falls or task efficacy, could be one valuable part in the outcome evaluation. To use body and movement as key components in rehabilitation, as physiotherapists do, is a powerful way to reach the patient's reactions and experiences. The physiotherapist can use this to guide the patients to overcome fear and insecurity caused by the injury and to feel that they are able to move and thus be able to realize actions of their own choice.

English summary

Hip fracture is one of the most serious consequences of falling and is, besides stroke, the most common reason for acute hospital stay and rehabilitation among elderly people. Only a minority of the patients regain the physical and social activities they had before the fracture. Many of the elderly experience an increased mobility which makes it more difficult to get out of their homes and there is an increased risk for depressed mood and inactivity. Within health care, substantial measures have been made in order to identify 70effective rehabilitation models for this group of patients. One of the models that have gained growing interest during recent years is home rehabilitation. However, research on home rehabilitation is inconclusive. Furthermore, there is a lack of knowledge of how the patients themselves experience the recovery and how the injury has affected lives of the individuals.

The overall aim of this thesis was to compare a geriatric a home rehabilitation programme with conventional care and to follow the patients' recovery during one year after discharge from hospital, and to capture the patients' own experiences and conceptions of the consequences of the injury and the recovery process. Therefore, alongside measuring the patients' confidence in performing daily activities without falling, their degree of independence and frequency of daily activity, their ability to perform basic functional activities, and their perceived health-related quality of life, degree of recovery and mood, we have also interviewed some of the patients about their experiences of the consequences of the injury, its impact on their daily lives, as well as their conceptions of the recovery process.

In the thesis, results from two studies, in which the patients were randomized to participate in either a home rehabilitation programme (48 persons) or to receive conventional care (54 persons), are presented. The home rehabilitation programme, which started immediately after admission to hospital, was focused on encouraging the participants' confidence in performing daily activities, such as taking out-door walks and exercising daily activity soon after discharge. The participants in the home rehabilitation programme received approximately five visits from physiotherapists and occupational therapists and occasional visits from a nurse. All 102 participants were followed-up in their own homes one month, six months and one year after discharge, during which all measurements and interviews were performed. On these occasions measures were made and the participants filled in self-report questionnaires. Furthermore, the participants performed two simple functional mobility tests.

In the interview studies 18 of the participants of the home rehabilitation study were interviewed about their experienced consequences of the fracture and their conceptions about what had influences recovery after a hip fracture.

The majority of the recovery for all participants took place during the first six months after discharge. One month after discharge those who had participated in home rehabilitation reported higher increase in balance confidence, as well as higher degree of recovery in independence and frequency of daily activities, as well as in basic physical mobility, than those who had received conventional care.

One year after discharge some of the differences between the two groups of patients were diminished, but those who had received home rehabilitation still had a higher degree of recovery of independence in personal care and walking as well as in balance confidence and self-rated physical performance, compared to the group who had received conventional care. At the one year follow-up only 14 (29 %) of the home rehabilitation group and five (9 %) of the conventional care group considered themselves fully recovered, compared to before the fracture.

The interview studies one month and one year after discharge revealed that the injury had meant major changes in the interviewees' life, both in a short- and long-term perspective. One dominating experience was that the fracture had limited the ability to live as before. The interviewees expressed that they had more difficulties to move and to manage independently in daily life, which had also made them more isolated. They also reported that they had become more afraid and insecure, and for some the injury had meant that they felt death had come closer and that they did not dare plan for the future. The injury had limited their daily lives and many of the negative consequences remained, or had even deepened, one year after discharge.

Different professionals within social and health care for elderly people have something to learn from the results of the studies. An essential part of care and rehabilitation after a hip fracture is to create health care chains including continued possibilities for rehabilitation in the sub-acute phase after discharge and, for those who need, also in a longer perspective. It is also perceivable that the home rehabilitation programme, which started directly after admission to the acute clinic and included active participation of patients and their relatives in the goal setting and discharge planning, has had importance for how soon the patients could regain daily activities in their own homes after discharge. As a hip fracture literally strikes your feet, the patients need extensive help and support to maintain hope for recovery and to be active in their own rehabilitation. Subsequently, health care professionals, together with other caregivers, should work actively to involve the patients and their relatives in care and rehabilitation and not mainly focus on the medical and physical needs. Knowledge of the psychological reactions that may follow a hip fracture should create the basis for how to meet and support the patient through her recovery process.

How to use health care resources in the most optimal way and how to create a well-functioning and economically defensible rehabilitation models remains to explore in forthcoming studies. Such models should include cooperation between different health care providers and prevent the risking patients “falling between chairs”.

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