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ORIGINAL ARTICLE

## Fall scenarios In causing older women's hip fractures

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### Abstract

**Objective.** Falls and fall-related injuries among older women constitute a major public health problem with huge costs for the society and personal suffering. The aim of this study was to describe and illustrate how a number of circumstances, conceptualized as a scenario, that were related to the individual, the environment, and the ongoing occupation contributed to a fall that led to a hip fracture among women. The sample included 48 women over 55 years old. **Methods.** Interviews were conducted during home visits and the analysis provided a descriptive picture of circumstances in the shape of a scenario related to the risk of falling. A number of scenarios were developed based on the data and named to provide an understanding of the interplay between the individual, the environment, and the ongoing occupation at the time of the fall. **Results.** By applying the concept of a scenario, occupational therapists can increase the awareness of fall risks among older people, and are relevant also for interior designers, architects, and town planners to consider when designing the local environment as well as furniture and other objects.

**Key words:** occupational therapy, occupation, fall situation, fall risks, fall prevention, environment, accidental falls

### Introduction

The risk of falls increases with age (1–5) and injuries after a fall are also expected to increase in the future as the number of older people (over 65 years) increases (6). Falls are one of the most common causes of long-term pain and impaired activity patterns as well as death among older adults (7,8). In the Nordic countries there are more women who fall in old age compared with men, since women live longer (9). Falls among older women (i.e. over 65 years old) are a growing public health problem in Sweden and internationally and result in high costs for the society and in suffering for the individual. About one-third of persons living in their own private homes over the age of 65 are expected to experience another fall if they have fallen earlier (6,10,11).

Most falls take place in the home environment (2,12,13). The most dramatic consequence of a fall is a hip-fracture and around 18 000 persons per year break their hip after a fall (9). A hip fracture leads to participation restrictions and only 50% of older adults recover their previous abilities, which also has an impact on well-being (14–16). A previous study shows how one consequence of a hip fracture could be that of experiencing oneself as being old for the first time in life (17).

Despite the increasing number of older people who face the risk of falls and fall-related injuries, there are few studies of the fall situation, especially from an occupational perspective (18). However, it has previously been established how performing dual tasks (i.e. walking and talking) increases the risk of falling (19). This knowledge of how multi-tasking can increase the

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fall risk that leads to a hip fracture led us in this study to apply the idea of a scenario analysis of falls. The clear advantage of a scenario is that all the contributing circumstances in a fall can be identified and seen in relation to each other in a complex scene that also is unique in each case. This means that fall scenarios are located in a complex pattern of interaction between the capacity of the individual, the many facets in an environment and the situation, i.e. what the person is doing at the moment of the fall (3,13,20–22).

The aim of the study was to describe and illustrate in terms of scenarios how a number of circumstances related to the person, i.e. women who participated in the study, the environment, and the ongoing activity contributed to and created the scene for falls that led to a hip fracture. The overall goal was to provide new knowledge able to be applied, for example, on home-visits conducted by occupational therapists or conducted by other professionals to identify fall risk and prevent falls from happening in people's homes.

## Material and methods

This study is partly the result of a fall-prevention project – *Early systematic fall-prevention study* – that took place under the auspices of Stockholm County Council between the autumn of 2006 and the autumn of 2007 (23).

### Participants

Participants in the study were consecutively recruited: a total of 57 women, over 55 years old, who had experienced a hip fracture after a fall in one geographical area outside Stockholm, Sweden. The reason for including only women was to be able to analyze in more depth the scenarios when women fall and break their hips that are strongly related to participation in daily activities, and participation in daily activities is also a gender issue (2,9,24). The participants were recruited from primary care, a geriatric clinic, and an emergency clinic. The inclusion criteria stated that the women should be living at home. Women in nursing homes and women who were judged to be unable to communicate in Swedish or diagnosed with a dementia disease were not included in the study.

Nine women dropped out of the study due to illness at the time or on the grounds of lack of time. In total, 48 women participated in the final study. The mean age of the participants (Table I) was 81 years old (range 60–93 years old). The majority of the women were retired and 30 of them were living as singles while 18 were living with a partner. The interviews took place between one and 12 months after the hip fracture occurred. The majority of the

participants, 46 of the 48, reported that they had some type of medical condition and 19 participants reported that they had more than three different types of medical conditions. The most common problem was high blood pressure ( $n = 25$ ); other common conditions were diabetes, painful joints, post-stroke conditions, and high levels of cholesterol. In addition, 46 of the 48 participants were under drug treatment and 21 participants had more than four drugs prescribed.

### Data collection

All data were collected in interviews based on a structured interview guide developed for the purpose. The Person-Environment-Occupation model (PEO model) (25), which conceptualizes the risks of a fall into personal, environmental, and occupational aspects, served as a theoretical model for the development of the interview guide. A number of questions, open as well as structured, focused on the specific situation when the fall took place with the objective of providing information on the participant's behavior and occupation at the time of the fall, the person's physical and medical condition, together with descriptions of the environment and what they were doing when the fall took place. The interviews took place in the participants' homes and took, in

Table I. Demographics ( $n = 48$ ).

	<i>n</i> (48)
Age:	
Mean	81
Eange	60–93
>65	45
Civil status:	
Unmarried/separated	5
Married/partner	18
Widow	25
Housing:	
Private house/terraced house	11
Flat	37
Earlier fall-related injuries:	
Yes	26
No	22
Medical conditions/problems:	
Yes	46
No	2
Under drug treatment:	
Yes	39
No	9

most cases, about one and a half hours to complete. All the interviews were conducted by three experienced occupational therapists who worked as research assistants on the project. The home visit also included observations of the home environment and in some cases description of the place where the fall occurred. The study received ethical approval from the Stockholm Ethics Committee. Medical problems that were identified during the interviews were reported to the healthcare providers after permission was given by the participants.

#### *Analysis of data*

The interviews in which the participants described what they were doing, and where and how the fall occurred, were analyzed and provided the basis for the construction of scenarios for when falls took place. In the analysis the PEO model (25) served as a frame of reference that enabled a clear definition of what to include and analyze in each scenario. The first step in the analysis included categorization of each participant's ongoing occupation at the time of the fall, the environmental setting, and the person's condition at that moment. This was a back-and-forth process of comparing all data, described by Glaser & Strauss (26) as a constant comparative process. This mapping out resulted in categories that described scenarios of falls indoors and outside the home. The concept scenario originates from theatrical studies, where a scenario not only includes a number of events, but also a specific environment or a scene, in this study the home or the outdoor environment of the home. The scenario idea was applied to better describe the process and interplay described in the PEO model (25) between the individual, the environment, and the occupation. The concept of scenario, as conceptualized by Jarke et al. (27), relates to sets of events in a place that together with the place (or the environment) outline the scene for an event, in this case a fall. The concept is used in disciplines such as engineering and computer science. In the construction of the scenarios reported in this paper all available qualitative data as well as relevant quantitative data gathered through assessments of each participant were included and analyzed to make up and also to illustrate the scenarios. The goal was to map out and to learn about the variation in scenarios in the material.

The second step in the analysis included naming the scenarios. This step also included a back-and-forth process of going back to the data to search for alternative categories and additional names. This process continued until all of the scenarios were named and discussed by the researchers.

The scenarios outlined in this study were named: "*climbing and falling in flip-flop shoes*", "*coming home*

*after shopping*", "*watching TV for too long*", "*running to the telephone*", "*in a hurry being late*", "*walking the dogs early in the mornings*", "*painful walking backwards in the dark*". The scenarios represent one or more fall situations in the study. Each scenario that was grouped together was not totally identical, but very similar in terms of the condition of the person, the environment, and the ongoing occupation at the time of the fall. A choice was made to present what the authors believed were the most significant ones as good representations of all of the scenarios from an educational standpoint.

The analysis conducted, based on SPSS (28), provided descriptive frequencies of the sample with regard to the participants' physical and medical conditions, as well as the conditions of the environment in which the fall took place (Tables I and II).

## **Results**

### *Risk factors in the scenario: shoes and balance*

One of the common predictors of falls is balance and also the type of shoes the older person is wearing at the time of the fall (29). In this study we learnt that half of participants had good walking shoes on at the time of the fall, but a large number ( $n = 22$ ) had less suitable shoes of a "flip-flop" type, easy to get into, or in some cases just socks, or no shoes at all. Among the participants who fell inside their own private homes, only 13 of 36 had good walking shoes on at the time of the fall. However, one-third of the participants ( $n = 13$ ) reported that they had experienced poor balance (see Table II) and as many as 26 persons reported that they had experienced fall-related injuries in previous falls (see Table I) before the fall that caused the hip fracture.

The scenario when Cecilia fell and broke her hip illustrates when a fall takes place and the type of shoes and also poor balance become risks factors for falls in the specific scenario. We named the scenario; "*climbing and falling in flip-flop shoes*".

Table II. Characteristics of participants at the time of the fall ( $n = 48$ ).

Characteristics	Yes	No
Alone at time of fall	35	13
Impaired balance	13	35
In a hurry	13	35
Dizziness	10	38
Fear of falling	7	41
Being tired/fatigue	6	42
Used walking device	8	40
Slipped/stumbled	8	40

Cecilia was an 82-year-old woman who was cooking when the fall took place; she stepped up on a footstool she seldom used in order to reach a cupboard for some herbs for her cooking. She fell when she moved around on the footstool and lost her balance. She was not wearing good walking shoes at the time of the fall and there were no grab-bars or anything else to hold on to which contributed to the difficulty in keeping her balance.

The case of Cecilia demonstrates how several aspects in the environment (shoes, lack of grab-bars) as well as poor balance and movements that not are in the “habit body” (29) can result in a fall. In addition she climbed on a footstool she seldom used, which could imply that the object was not integrated in her body movements.

#### *Falls indoors – the home environment is the scene*

The majority of the falls in this study ( $n = 39$ ) took place during the day, which is in line with previous research (2,31–33). Just two of the 48 participants fell during the night. The women who fell in their own homes were a bit older (82 years) than the mean age (81 years) of the sample in the study, and most of the falls in this study that resulted in a hip fracture took place at home. More than half of the participants, 28 out of 48, fell at home during the day.

The most frequent places inside the private home in which falls occurred in this study were areas close to the front door of the home (Figure 1). In the Swedish context, the hallway would typically be the place where one keeps shoes and outdoor clothes, a place for transits in and out of the home. One case illustrates the scenario; we named it “*coming home after shopping*”, when someone is in or passing through the hallway and experiences a fall:

Britt, who was a 78-year-old woman, fell just after she had entered her home. Inside the door to her apartment she had put down her basket containing eggs and cream after shopping and had pulled a sweater over her head. Then she leant against the wall beside where she was standing and experienced herself sliding down it. In sliding and falling she broke her hip.

One explanation for why she slid and fell could be that she was exhausted from the shopping, and maybe she also had low blood pressure at the time.

It should be noted that when we identified situations by applying the scenario idea, we were also able to learn how a change in the environment could have helped: for example by providing a chair to sit down on, the chair might have inhibited the fall.

The living room was, in this study, a typically frequent locality for falls to take place, and was a more frequent place in the home environment than other places (see Figure 1). The falls occurred in the midst of transferring or during an ongoing occupation. Agnes’s case illustrates the scenario named; “*watching TV for too long*”, when she fell and broke her hip.

Agnes was an 83-year-old woman and was living with her husband. The night she fell she had been sitting in the sofa in the living room reading the newspaper and watching TV for quite some time. When she fell she had just risen from the sofa to go to bed; she fell when she moved and bent towards the TV to turn it off. She reported how this transition made her dizzy and as a result she stumbled and fell on the carpet in the living room.

In analyzing it became obvious how the risk of spending a long time watching TV or just sitting without moving, and then making quick transitions, can contribute to an increased risk of falling. Additional scenarios of increased risk relate to being tired

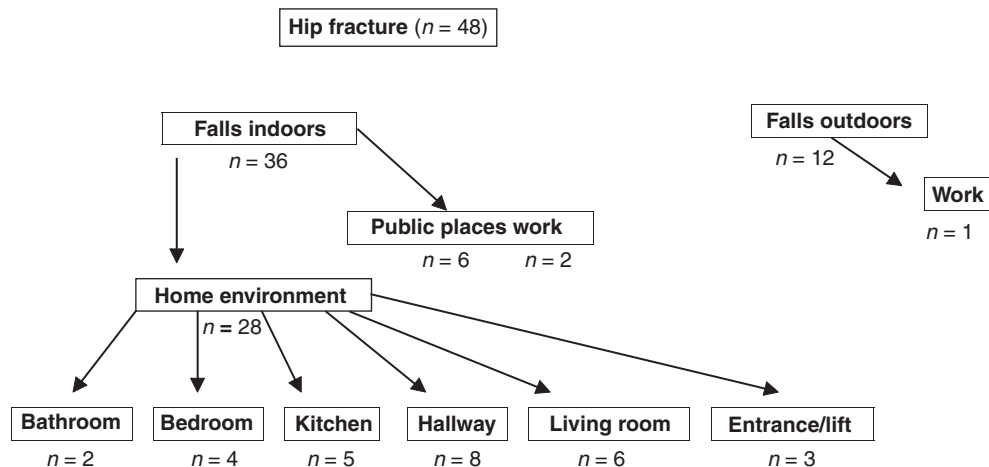


Figure 1. Places for falls that caused hip fracture 2006–2007 ( $n = 48$ ).

and maybe being dizzy (see Table II) and perhaps also experiencing a change in blood pressure. High blood pressure was a common medical problem among the participants in this study. Also participants who climbed ladders in order to reach for something could end up losing their balance.

There were also other scenarios in which a number of coincidences taken together could be contributory to the fall. In Ruth's case the telephone played an important role in the creation of the scenario we named "*running to the telephone*", in which the fall took place.

Ruth was an 86-year-old woman who fell in the hallway, close to the front door, which in a traditional Swedish home would be a typical place to keep the telephone. Ruth was in a hurry to get to the phone in time when she fell on a loose piece of plastic mat on the floor. The combination of being in hurry and slippery surfaces was probably both contributory to the fall and important in creating the scene for the fall to take place.

#### *Falls outside the home*

In this study 12 of 48 participants fell outdoors. These participants were in general younger than the women who fell in the home, which has also been noted in previous research (34). The mean age of those falling outdoors was 77 years of age and most of them were walking on the pavement or on the street when they fell. The women who fell outside the home reported both slippery surfaces and obstacles in their way as causes of the fall. Nevertheless, as in the previous cases of falls taking place inside the home, a number of aspects taken together created the scenario for when the fall we named "*in a hurry being late*", took place.

Anna was a 73-year-old woman who was walking in a hurry to an appointment with her dentist. She chose to walk in the street rather than on the pavement since the pavement had holes in it and this seemed to make it harder for her to walk quickly. The fall took place at the same time as two cars were approaching and she had to get back onto the pavement. This combination of being in a hurry and an unsafe surface, and maybe also other conditions related to the person such as balance, provided the scene for the fall.

The next scenario in the outdoor environment, which we named "*walking the dogs early in the mornings*", also provided a quite common scenario, when something that not is expected happens and as a result a fall took place.

In the case of Elisabeth, who was 65 years of age, she was walking her two quite large and strong dogs when she fell early in the morning. The fall happened after the dogs spotted another dog and both started to pull on theirleashes, and this was very unexpected for

Elisabeth. She fell backwards and explained afterwards that she was tired at the time and that her dogs saw the other dog before she had a chance to react.

A number of factors contributed to Elisabeth's fall and it was not just the dogs that caused the fall; her being sleepy early in the morning also played a role in the scenario that created the fall.

The next case also provides a scenario in which a number of aspects in the environment as well as personal characteristics all contributed to the fall. We named the case "*painful walking backwards in the dark*". In this next case adjustment made to pain in the knees played an important role;

Ingrid, an 82-year-old woman, was on her way to the local community laundry early in the morning – a five-minute walk. To get to the laundry she had to walk outside down some steep, unlighted steps. She was also walking backwards, in the dark, carrying her laundry because she experienced a lot of pain in her knees. In her description of the fall she stated that the last step was broken and she could not find her footing while walking backwards and this also contributed to the fall.

Here again there were several circumstances that taken together provided the setting for the fall: the pain, walking backwards, carrying the laundry, as well as poor lighting and a broken step.

#### *Environmental conditions and assistive technology in the fall scenario*

It is well known through previous research that conditions in the environment (for example, lighting, condition of surfaces, lack of handrails) have an impact on the risk of falling (21,35). The participants in this study also provided examples of several conditions in the environment that contributed to and caused falls: for example, the elevator door or the entrance door, which in some cases closed very quickly (automatic closing) and hit the person who fell and broke her hip. Slippery surfaces, and objects on the ground or on the floor are all conditions in the environment that have an impact on a fall and in this study we identified how several of these conditions were present at the same time. Indeed, the participants reported that it was objects on the ground or the floor, or differences in ground levels outdoors, or slippery surfaces that caused them to stumble and fall. The number of persons who used some kind of assistive technology to prevent a fall was 25 out of 48; 10 of these had three or more pieces of assistive technology. The most common assistive technology among the participants was a walker ( $n = 15$ ). However, at the time of the fall just eight of them were using their walker, which probably increased the risk

of falling (see Table II). The assistive devices that were actually used in the situation when the fall that caused the hip fracture occurred were: spikes, raised toilet seats, walkers, walking sticks, non-slip bath mats, shower stools. About half of the participants had received some type of modification of the home environment, for example removal of thresholds, installed hand rails, and modification of entrances.

## Discussion

This study shows that a number of circumstances and several factors in the environment, as well as the person in the ongoing occupation, or the situation, contributed and interacted to create a scenario which became the scene for the falls that led to a hip fracture. Occupational therapists need to base fall prevention on assessments of the person, of the environment, and of the daily activities that the individual person performs and this is very much needed according to Woodland & Hobson (36) and Cumming et al. (1).

There is evidence of good preventive effects based on multi-factorial and multidisciplinary inventions (24,35), even if most research focuses on studies of single contributing factors. This has resulted in fall prevention being recommended by a large number of researchers (21,35–37) and most frequently in three important areas: to increase physical health, for example balance and muscle strength; the investigation of fall risks in the home environment; and a review of the use of drugs among older adults. Furthermore, it has been stressed that all of the risk factors need to be given attention by healthcare workers, and this should include both conditions in the environment and person-related circumstances (1,38–40).

In this study we demonstrated how scenarios can be constructed and used for educational purposes in understanding the situation when a fall takes place. The creation of scenarios can be an educational tool based on story-telling introduced in occupational therapy by, for example, Mattingly (41). In making these descriptions and telling the stories of the participants in the study we also argue that it is possible to raise awareness of the risk of falls through the telling of stories about people who fell and what they were doing when they fell. As in most previous research the participants in this study had several medical conditions which could be seen to be risk factors (9,13,21,22,31,32) together with the environmental conditions surrounding the fall (21,26,32). However, by applying the concept of scenarios it was possible to throw some light on high risk in a certain context, for example running to the telephone, walking in a hurry outdoors to an appointment, walking the dog while

sleepy, spending several hours in front of the TV and then making a quick movement to stand up, getting exhausted from shopping and having no place to sit down and rest. This type of scenario in the contexts of fall prevention has not, to the best of our knowledge, been described before and provides some new tools in the prevention of older people's falls. These scenarios as well as scenarios created based on other studies of falls can be used by occupational therapists and other healthcare providers to increase the awareness of situations of high risk for falls among older people. It is therefore of great importance in the future to name the scenario, as we have done with a few scenes in this study. Naming the scenarios in order to be able to talk and discuss fall risks should not be underestimated and is essential when we wish to increase awareness of falls. This process of naming is derived from the tradition of interpretative understanding (42) that enables us to see and identify something as *being something*.

Nikolaus & Bach (43) did show how home visits to older adults with an increased risk of falling result in an increase in safety and a change in performance of daily living activities. Tinetti et al. (10) suggested that interventions that limit the risk of falls also contribute to the person's safety and their ability to participate in daily living activities.

The concept of scenarios provided a method in this study to illustrate the interplay between several factors that create the scene for a fall that causes a hip fracture. When a fall has taken place it is most often a sign of the need for a home visit to learn more about fall risks in the person's home (44–47). Clemson (48) suggested that working with clients to exert control could reduce environmental hazards.

There are some limits in the description of the scenarios that we would like to highlight. Most of the participants were prescribed some kind of drug, and in the development of the scenario for falls we did not include medication as part of the scenario for the fall to take place. To be prescribed some kind of drugs is most often the case for all older adults and there are also some drugs (i.e. psychopharmacological drugs and sleeping drugs) that are seen to be more related to falls than others (13), which could also be the case in the scenarios provided in this study.

To find in this study that the hallway and the living room were the places where falls most frequently took place was somewhat surprising since clinical experience points towards the bathroom and the bedroom as places with increased risk of falls occurring. These rooms are also the places that are the focus of occupational therapists' attention when assessing environmental fall risks. Both Cumming & Klineberg (47) and DeVito et al. (49) stated that the bedroom is the most frequent place for a fall and

Downton (33) stressed that falls occur in places where people are active and engaged. Maybe the awareness of the risk of falling is higher when it concerns bathrooms, building on the scenario idea. It is possible to view the increased risk of a fall in a room with a wet floor, and maybe people then behave differently in bathrooms since they are more aware of the risks in these rooms. This also points to making awareness of risks the main target in fall prevention, where the scenario idea could fit very well since it illuminates the risks inherent in complex situations.

Occupational therapists and healthcare providers can learn from this study in order to provide guidance to people faced with the risk of falling. The study highlighted how there is an increased fall risk when people sit in front of the TV for a long time. Knowledge about these risks can help prevent people from sitting too long on the TV sofa. It is also interesting to note that no one in this study had tripped over a threshold in their home. We do not know if this is a result of extensive home modifications (HM), but it is interesting to consider this finding in relation to the numbers of HMs made with the aim of removing this type of obstacle in order to increase safety in the home. Maybe the risk of falling is not as strongly related to the existence of thresholds as has earlier been assumed? This is also an example of a finding that needs to be further investigated in future research. Further investigation is also necessary by interior designers and architects, who also can learn from this study, for example how to build lifts and entrance doors that do not close too quickly, how to avoid slippery surfaces in environment, and the importance of designing apartment hallways with spaces for a seat (perhaps wall-mounted and folding).

Preventing falls in the home is an essential element of the areas in which occupational therapists can provide supportive interventions (50). Part of home intervention must be to make the client and the family more aware of the risks in the home environment. For this reason the pedagogic approaches used in home interventions need to be discussed and further developed in research and through implementation. Our hope is that this paper will be part of that development and that the idea of scenario analysis will be further refined and developed in new studies of how falls take place.

By applying an occupational perspective and the scenario concept occupational therapists can increase the awareness of fall risks among older people, and is also an important factor for interior designers, architects and town planners to consider when designing the local environment as well as furniture and other objects.

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## References

1. Cumming R, Thomas M, Szonyi G, Salked G, O'Neill E, Westbury C, et al. Home visits by an occupational therapist for assessment and modification of environmental hazards: A randomized trial of falls prevention. *J Am Geriatr Soc* 1999;4:1397–402.
2. Luukinen H, Koski K, Hiltunen L, Kivelä S-L. Incidence rate of falls: An aged population in Northern Finland. *J Clin Epidemiol* 1994;4:843–50.
3. Räddningsverket. Äldres skador i Sverige (Injuries in the elderly in Sweden). Karlstad, Sweden: Räddningsverket; 2003.
4. Socialstyrelsen. Vård och omsorg om äldre – lägesrapport 2003 (Care for the elderly – Progress report 2003). Stockholm: Socialstyrelsen; 2004.
5. Socialstyrelsen. Systematiskt arbete för äldres säkerhet: Om fall, trafikolyckor och bränder (Systematic efforts for senior safety: About falls, traffic accidents and fires). Stockholm: Socialstyrelsen; 2007.
6. Socialstyrelsen. Socialstyrelsens riktlinjer för vård och behandling av höftfraktur (The Swedish National Board of Health and Welfare guidelines for the care and treatment of hip fracture). Stockholm: Socialstyrelsen; 2003.
7. Kannus K, Sieväinen H, Palvanen S, Järvinen T, Parkkari J. Prevention of falls and consequent injuries in elderly people. *Lancet* 2005;366:1885–93.
8. Tinetti M, Doucette J, Claus E, Marttoli R. Risk factors for serious injury during falls by older persons in the community. *J Am Geriatr Soc* 1995;43:1214–21.
9. Albertsson D. Hip Fracture prevention by screening and intervention of elderly women in primary health care. Dissertation, Gothenburg University, Sahlgrenska Akademin; 2007.
10. Tinetti M, Baker D, McAvay G, Claus E, Garret P, Gottschalk M., et al. A multifactorial intervention to reduce the risk of falling among elderly people living in the community. *N Engl J Med* 1994;331:821–7.
11. Tinetti M. Preventing falls in elderly persons. *N Engl J Med* 2003;348:42–9.
12. Loord S, Menz H, Sherrington C. Home environment risk factors for falls in older people and the efficacy of home modifications. *Age Aging* 2006;35–55–9.
13. Räddningsverket. Skador bland äldre personer i Sverige (Swedish civil contingencies agency). Karlstad: Nationellt Centrum för lärande och Kunskapscentrum för äldres säkerhet; 2008. p 9.
14. Hagsten B. Arbetsterapeutisk träning efter höftfraktur: aktivitetsförmåga och hälsorelaterad livskvalitet (Occupational therapy training after hip fracture. Effects on abilities in daily life and health-related quality of life). Dissertation. Stockholm: Karolinska Institute; 2006.
15. Räddningsverket. Fallolyckor bland äldre: Samhällets direkta kostnader (Fall accidents among elderly: Societies' direct costs). Report no. 199-107/03. Karlstad: Räddningsverket; 2003.
16. Yardley L, Donovan-Hall M, Francis K, Todd C. Older people's views of advice about falls prevention: A qualitative study. *Health Ed Res Theo Pract* 2006;21:508–17.
17. Luborsky M, Borell L, Lysack C, Bark-Baker H, Martin M, Komanecky I. Perceived social consequences of hip fracture:



- A comparison of men and women in Sweden and the USA. *Gerontol* 2003;43:195–6.
18. Borell L. Occupational therapy for older adults: Investments for progress. *Br J Occup Ther* 2008;71:482–6.
  19. Lapointe L, Stierwalt J, Maitland C. Talking while walking: Cognitive loading and injurious falls in Parkinson's disease. *Inter J Spe-Lang Pat* 2010;12:455–9.
  20. Räddningsverket. Olyckor i siffror: En rapport om olyckutvecklingen i Sverige. (Accidents in numbers: a report on accident trends in Sweden). Report no. 199-160/07. Karlstad: Räddningsverket; 2007.
  21. Skeleton D, Todd C. What are the main risk factors for falls among older people and what are the most effective interventions to prevent these falls? Health Evidence Network Report. Copenhagen: WHO Regional Office for Europe; 2004. Available at: <http://www.euro.who.int/document/E82552.pdf> accessed (090116).
  22. Nevitt M, Cumming S, Kidd S, Black D. risk factors for recurrent nonsyncopal falls: A prospective study. *J Am Med Assoc* 1989;261:2663–8.
  23. Larsson T J, Hägvide M-L, Svanborg M, Borell L. Falls prevention through community intervention: A Swedish example. *Safe Sci* 2010;48:204–8.
  24. Socialstyrelsen. (Hospitalisation due to injuries and poisoning in Sweden). Official statistics of Sweden-Statistics-Health Care and Medical Services. Socialstyrelsen; 2009. Available at: <http://www.socialstyrelsen.se/Publicerat/2009>.
  25. Stewart D, Letts L, Law M, Cooper B, Strong S, Rigby P. The Person- Environment-Occupation Model. In Crepeau EB, Cohn ES, Boyt Schell BA, editors. Willard & Spackman's occupational therapy. Philadelphia: Lippincott Williams & Wilkins; 2003. p 227–33.
  26. Glaser BG, Strauss AL. The discovery of grounded theory: Strategies for qualitative research. Chicago: Aldine; 1967.
  27. Jarke M, Bui T, Carroll J. Scenario management: An interdisciplinary approach. *Commun ACM* 1999;42:47–9.
  28. Wahlgren L. SPSS. Statistical Package for Social Sciences: Step by step. Lund: Studentlitteratur; 2005.
  29. Menz H, Lord S, McIntosh. Slip resistance of casual footwear: Implications for falls in older adults. *Gerontol* 2001;47:145–9.
  30. Merleau-Ponty M. The phenomenology of perception. London: Routledge & Kegan Paul; 1962/1945.
  31. Close J, Lord S, Menz H, Sherrington C. What is the role of falls? *Best Practice Res Clin Rheum* 2005;19:913–15.
  32. Close J. Prevention of falls in older people. *Disabil Rehabil* 2005;27:1061–71.
  33. Downton JH. Falls in the elderly. London: Edward Arnold; 1993.
  34. Kelsey J, Berry S, Procter-Gray E, Quach L, Nguyen U, Li W, et al. Indoor and outdoor falls in older adults are different: The maintenance of balance, independent living, intellect, and zest in the Elderly of Boston Study. *J Am Geriatr Soc* 2010;2135–41.
  35. Gillespie LD, Gillespie W J, Robertson MC, Lamb S, Cumming RG, Rowe BH. Interventions for preventing falls in elderly people. *Cochrane Database of Systematic Reviews:Art. No CD000340*;DOI: 10.1002/14651858.CD000340.; 2008.
  36. Woodland J, Hobson S. An occupational therapy perspective on falls prevention among community-dwelling older adults. *Can J Occup Ther* 2003;70:174–82.
  37. Ganz D, Alkema G, Wu S. It takes a village to prevent falls: Reconceptualizing fall prevention and management for older adults. *Injury Prev* 2008;14:266–71.
  38. Norton R, Campbell J, Lee-Joe T, Robinson E, Butler M. Circumstances or falls resulting in hip fractures among older people. *J Am Geriatr Soc* 1997;45:1108–12.
  39. Salkeld G, Cumming RG, O'Neill E, Thomas M, Szonyi G, Westbury C. The cost effectiveness of a home hazard reduction program to reduce falls among older persons. *Aust N Z J Public Health* 2000;24:265–71.
  40. Thorngren K, Hommel A, Norrman P, Thorngren J, Wingstrand H. Epidemiology of femoral neck fractures. *Int J Case Inj* 2002;33:1–7.
  41. Mattingly C. Healing dramas and clinical plots. Cambridge: Cambridge University Press; 1998.
  42. Borell L. The activity life of persons with a dementia disease. Dissertation, Department of Geriatric Medicine. Sweden: Karolinska Institute; 1992.
  43. Nikolaus T, Bach M. Preventing falls in community-dwelling frail older people using a home intervention team (HIT): Results from the Randomized Falls-HIT Trial. *J Am Geriatr Soc* 2003;51:300–5.
  44. Stockholms läns landsting (SLL) Medicinskt programarbete; Regionalt Vårdprogram. Fallprevention (Medical program; Regional Fall Prevention). Stockholm: SLL; 2008. Available at: <http://www.viss.nu>.
  45. Sveriges Kommuner och Landsting (SKL). (Preventing falls and fall injuries in connection with care. National efforts to improve patient safety). Stockholm: SKL; 2008. Available at: <http://www.skl.se/patientsakerhet>.
  46. Walker Peterson E. Understanding the role of occupational therapy in fall prevention for community-dwelling older adults. *Occup Ther Pract* 2008;13:1–8.
  47. Cumming R, Klineberg R. Fall frequency and characteristics and the risk of hip fractures. *J Am Geriatr Soc* 1994; 42:774–8.
  48. Clemson L, Cusick A, Fozzard C. Managing risk and exerting control: Determining follow through with fall prevention. *Disabil Rehabil* 1999;13:531–41.
  49. De Vito C, Lambert D, Sattin R, Bacchelli S, Ros A, Rodriguez J. Fall injuries among the elderly: Community-based surveillance. *J Am Geriatr Soc* 1988;36:1029–35.
  50. Clemson L, Manor D, Fitzgerald MH. Behavioral factors contributing to older adults falling in public places. *OTJR, Occup Part Health* 2003;23:107–17.