Professional voices on risk and accidents in home care – a Swedish survey study

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Abstract

Purpose – The purpose of this study is to find out what knowledge and experience of occupational therapists, personal assistants and public health nurses/nurses in Sweden can contribute concerning the vulnerability of residents to injury in different residential care-settings.

Design/methodology/approach – This study is based on a online survey. A total of 832 individuals responded to the survey. The data was analysed from a mixed-method approach, using descriptive statistics, correlations and textual-analysis.

Findings –More than one in four representatives of these professions had witnessed accidents. The results show that bedrooms and bathrooms are the rooms in which accidents are most likely to occur in homes.

Research limitations/implications – One limitation of the study is that the impact of educational initiatives on the different professions was not investigated, so it is not possible to ascertain what effect this may have had on risk identification and accident prevention measures in residential care-settings.

Originality/value – To the best of the authors' knowledge, no prior study of these issues has been conducted. This study is deemed to have significant social benefit because of the steadily increasing need for care in residential settings. No other study has addressed the importance of the physical environment in this context. Collaborations involving researchers from various disciplines, professional organizations and public and private sector employers involved in personal assistance have contributed specific knowledge.

Keywords: injuries, risks, residential care-setting, home care, home healthcare, occupational therapists, personal assistants, nurses

Article Type: Research paper

Introduction

Injuries and risks at home and in residential care settings have been addressed in a number of ways from the perspective of the individual resident. For example, the UN Convention on the Rights of Persons with Disabilities, the World Health Organization (WHO) and the World Bank's World Development Report, as well as the UN's AGENDA 2030 (United Nations, 2006; WHO & The World Bank, 2011; UN, 2015; Regeringskansliet, 2018) all highlight the need for safe and secure living environment for all people, regardless age or disability.

In Sweden, society takes responsibility for both care and housing of the elderly (Table 1). As long ago as 1997, the national action plan on policy for the elderly declared: "insofar as possible, provide the opportunity to live at home in their original environment as long as they wish to do so." (Bill 1997/98:113). The policy also states that the elderly should receive assistance in the activities of daily living. This is also what most older people prefer (Nord & Abrahamsson, 2012, and for a number of years 95 per cent of Sweden's residents aged 65 and older have been living at home (Socialstyrelsen, 2016).

Table 1. Overview of health care and social services in Sweden for the elderly and people with disabilities in various age groups

Activity	Healthcare	Rehabilitation	Assistance in daily living	Services in municipalities
Participant	Public health nurses, nurses	Occupational therapists, physical therapists	Social workers, personal assistants, home help services staff	Home help services staff
Law/regulatory system	Health and Medical Services Act (SFS 1982:763).	Health and Medical Services Act (SFS 1982:763).	Social Services Act (SFS 2001:453), Act concerning Support and Service for Persons with Certain Functional Impairments (LSS) (SFS 1993:387)	Social Services Act (SFS 2001:453), Health and Medical Services Act (SFS 1982:763).
Target group	All citizens	All citizens	20–64 years old	65–84 years old, 85+

Study context

This article will focus on the experiences of the three professional groups concerning accidents and risks care recipients face in the home and residential care setting, therefore it is important to discuss the context of the study in relation to professions within health care and social services

Occupational therapists and public health nurses are two occupational groups that require post-secondary education (licensing requirements). Today, 12,100 people work in Sweden as occupational therapists and 111,000 people have nursing degrees, 30 per cent of whom work as public health nurses; most are employed by municipalities and visit residents at home (SCB, 2017). There is a shortage of public health nurses/nurses. In relation to the population at large, their number has declined; between 2001 and 2016 a total of 700 public health nurses completed training (Björkman, 2018). Earlier research indicates that occupational therapists in particular carry the heaviest burden of preventive work (Gillespie *et al.*, 2012), while also having high educational requirements (Schemm & Gitlin, 1998; Swann, 2006), especially when working with people who have cognitive disabilities, such as brain injuries and stroke (Lidström

Holmqvist, 2012). The job of the occupational therapist also entails risks related to the technical aids and home environment of residents (Darragh *et al.*, 2012). Prior research has addressed the duties of public health nurses in relation to stress (Pålsson *et al.* 1996; Rout 1999), the work environment and working conditions found in the homes of residents (Goodman et al., 2003), but large gaps in the daily life of the public health nurse remain to be explored.

Personal assistants are another occupational group of great importance for people with disabilities at home or in a residential environment. Personal assistants usually are not college educated, nor does the occupation require any formal training (Socialstyrelsen, 2007), but it has been deemed that training is a central issue, in part to strengthen occupational identity, in part to raise the quality of service in relation to legislation, ergonomics and ethical considerations (Socialstyrelsen, 2007:20). The importance of shedding light on questions of power and ethics in relation to the duties, role and function of personal assistants is highlighted as a central issue in prior research (Shakespeare *et al.*, 2017). In Sweden over 70,000 people work as personal assistants, but the job is complicated by having the home as a workplace and by the guidelines for exchanging information between assistants. The National Board of Health and Welfare points out that the home environment may entail cramped and limited space for certain duties, technical aids may be unavailable, and it may be difficult to solicit help from colleagues in emergency situations (Socialstyrelsen, 2007:40). Assistance users also decide who should have access to prior documentation concerning the work environment and risks, decisions regarding subsidies for personal assistants, and information about diseases, prognoses and medications (Dehlin, 1997, Arbetsmiljöverket, 2001; Socialstyrelsen, 2007).

The occupations in the present study can be viewed in relation to both level of education and time spent working with the residents, ranging from temporary visits to having the home as a permanent workplace. Such conditions lead to differences in how these professional groups experience the residents, but the home as the work environment remains the common denominator.

Literature review

In the review of previous research we have focused on both international and national studies from Sweden relevant for our study. Previous research of the home and residential care-setting for people with disabilities and the elderly has focused on security aspects and home modifications. Research has also brought attention to the experiences of residents and family members concerning implemented home modifications (Cumming *et al.*, 1999; Hawkins & Stewart, 2002; Petersson *et al.*, 2009; Kruse *et al.*, 2010; Aplin *et al.*, 2015; Norin *et al.*, 2017; Pettersson *et al.*, 2017; Thodelius & Lundälv, 2018). There is also need for additional research regarding living conditions at various institutions (Thodelius *et al.*, 2017b; Lundälv, 2018a; Lundälv, 2018b) and research has indicated a need for social support for people who have been injured (Lundälv, 2018c; Lundälv, 2018d). Previous studies have also focusing on for example the situations and health for elderly persons, building design for people with dementia and inclusive design of open space and safety for visually impaired persons (Leung et al., 2013; Fisher et al., 2018; Siu et al., 2019).

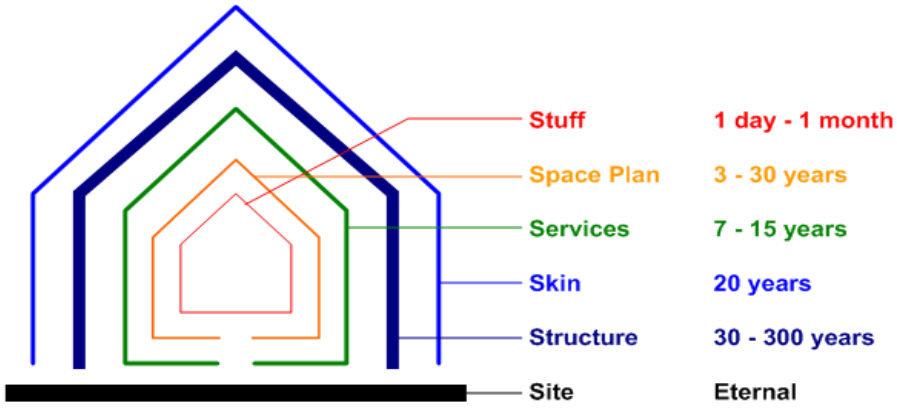
Feeling safe and secure at home is fundamental to older people who live in their own household. Residential design is extremely important, especially in the context of physical security, which is highly dependent on physical accessibility in the home. Especially important factors for accessibility in the home include the planning and design of toilet facilities, bathrooms and entryways (SOU 2015:85). Physical accessibility is good when new homes are planned in compliance with building legislation in Sweden (BFS, 2018). However, it is far from

satisfactory when it comes to existing housing. Among individuals aged 65 and older who live in multifamily housing, half lack access to elevators, which could make it difficult or even impossible for friends and family with disabilities to visit them (Kindberg *et al.*, 2017).

A home should be a place that provides quality of life, reinforces identity and helps people to organize their lives to achieve order and stability. The ability to be autonomous in daily living is probably the single factor that elderly individuals appreciate most and that promotes quality of life in a number of ways, including security (Lantz, 2007). But this may be a challenge when the home becomes a workplace, where the majority of care is provided within its confines. The availability of special housing (assisted living facilities), referred to in daily speech as "senior housing", has substantially declined in recent years. A new type of housing that can be viewed as occupying the space between special housing and regular residential apartments is "sheltered housing", which started to be built following the presentation from the central-government-appointed Senior Housing Delegation (SOU 2008:113). At this time, however, current needs for such housing far surpass the supply. In Sweden as a whole, it has declined in relation to the population aged 80 and older by a full 36.6 per cent (SWECO, 2016). Several challenges must be met in the future concerning the opportunities for the individual to arrange housing modifications, since residents fear losing their personal assistance should they apply for housing modification (Lundälv, 2018a).

Proposals for measures and improvements mentioned in various studies may address completely different levels of the physical environment, including furniture, loose furnishings and equipment of various types. Such concerns can often be rectified over time and proposals for measures from respondents in this study will be addressed in a future article. Changes in the structure of the building itself are more challenging. To understand this line of thinking, a simple diagram showing the different layers of a building can be used as an illustration (Brand, 1997). The layer that cannot be changed is the location of the building itself – the site. Next is the design of the building – the structure – which is difficult and therefore expensive to change. The next layer is the facade – the skin – which generally has no impact on the factors addressed in this study. How the various spaces relate to one another, the floor plan – the space plan – is also expensive to change after the fact. The floor plan plays a major role in how well the home functions, for which reason careful consideration must be given to well-thought-out solutions from the start. The infrastructure of the building – services – are relatively simple to change, especially electricity, phone lines and IT. The building layer with the shortest lifetime, which is simplest to change, is the interior with furnishings and equipment – "stuff". It comes down to ascertaining what measures are relatively easy to implement in existing buildings. However, proposed solutions involving changes to floor plans in existing buildings must generally be considered impossible to implement from a practical standpoint due to high costs. Guidelines concerning floor plans must instead be observed at the planning stage for new construction.

Health care and social services currently provided in private homes in Sweden mainly concern the two layers "space plan" and "stuff", as described in Brand's building layer model (Brand, 1997).



Stewart Brand's 6 S's from *How Buildings Learn*

Figure 1. Model of the different layers of the home, based on the model by Stewart Brand (1997)

A safe and secure home environment can be created through modifications, technical aids and support in daily living. However, little attention is paid to the knowledge about risks and injuries in the home and residential care setting accumulated by the professionals who provide care and support to the elderly or individuals with disabilities. Our literature review, based on both international and national research, clearly shows that there are knowledge gaps when it comes to what role and importance that knowledge and experience among different professions. There is also lack of knowledge about the different professions' experiences from a multidisciplinary perspectives. The following article will therefore highlight professional voices from three professions – occupational therapists, public health nurses/nurses and personal assistants.

Aim and research questions

The basic premise of the study is to reconcile two aspects of health care and social services: health care and social services as a social organization, and health care and social services as a site-related activity. The purpose is to study the knowledge and experience of three professional groups (occupational therapists, personal assistants and public health nurses/nurses) concerning the vulnerability of residents to injuries and risks in the home and residential care setting. The study is based on the following questions:

1. What are the experiences of individuals within these three professions regarding encounters with residents who have suffered from injuries and risks in the home and residential care setting?
2. In what rooms and during which activities do residents sustain injuries?

Methods

Since our aim was to highlight the experience of injury occurrence in the three different professional groups, occupational therapists, public health nurses/nurses and personal assistants, an online survey was conducted. A total of 832 individuals participated in the study, which was conducted between November 2017 and March 2018, and the sample included permanently employed, employed by the hour and retirees.

The survey was distributed by the two national professional associations – the Swedish Association of Occupational Therapists and the Association of Public Health Nurses, which each posted the surveys on their respective websites. To reach personal assistants, an e-mail message with a link to the survey was sent to all 290 municipalities and to the three

organizational bodies that provide personal assistance services in Sweden: municipal (43%), private companies (50%) and assistance cooperatives (6%) (Socialstyrelsen, 2015). On one hand, the survey study had nationwide coverage with respondents representing the various geographic areas of Sweden, on the other hand since it was distributed electronic it had some limitations regarding the sample. Firstly, the group of respondents can be described as a non-probability sampling or a convenience sample, since it based on a group of people that has the opportunity to answer, for which reason it is difficult to conduct an attrition rate analysis. Secondly, it is also difficult to know how many people visit the websites or whether the municipalities sent the email message to everyone within the professions, and therefore hard to estimate the risk for sampling error.

The online survey consisted of a questionnaire with 22 questions about injuries, risks, vulnerability and accident prevention measures in home and residential care settings. The questionnaire was structured into 12 multiple-choice questions and 10 open questions. The multiple-choice questions addressed background factors such as education, continuing education, number of years of occupational experience, age group of residents and experience/knowledge about injury events (place of occurrence and activities). The open questions in turn, was descriptive, there the respondents were asked to describe typical injury events in detail.

Since the survey continued both descriptive statistics on ordinal and nominal scales and textual narrative the analysis was based on a mixed method approach (Creswell, 2014). The mixed method approach seemed suitable, since it allows both mapping and explanation of the patterns, by combining both quantitative and qualitative analysis (e.g. applying convergent parallel mixed method). In line with Creswell (1994:267) this approach relates to compare and relate the quantitative data with the qualitative, and thereafter interpret the results to explain the findings, not only report them. The quantitative analysis to map the experience was conducted first, after which a qualitative analysis of the open questions was conducted. The numerical survey responses were analyzed using descriptive statistics (Nolan & Heinzen, 2014:3), after which a correlation between certain variables was conducted to examine covariance, strength and direction. The free texts were coded and analyzed based on content analysis (Krippendorff, 1980), where the analysis units were categorized according to three themes: 1. individual circumstances of the residents, 2. how the work was organized and 3. design of the physical environment.

The study was conducted in accordance with the research ethics principles of the Swedish Research Council (Vetenskapsrådet, 2017). All respondents in the online survey are anonymous. The study also complied with the ethical considerations discussed in the literature (Beauchamp & Childress, 2013).

Findings

As seen in Table 2 somewhat more occupational therapists (38.1%) participated in the study compared with personal assistants (30.5%) and public health nurses/nurses (31.3%). The vast of the professionals (48.6%) work exclusively with care recipients over the age of 65. Only one in four study respondents work with care recipients under the age of 65 (24.8%) and the remainder state that they routinely work with both age groups (26.6%). However, internal variation was noted among the various professionals in relation to the age group with which they worked; personal assistants worked to a greater extent with care recipients younger than age 65, compared with the other two professional groups.

Table 2. Descriptive statistics categorized by professional occupation. Absolute numbers and percentages (N=832)

Variable	**Occupational therapists**	**Personal assistants**	**Nurses**	**Total:**
Number of respondents:	317 (38.1%)	254 (30.5%)	261 (31.3%)	832
Years of work experience: Less than 1 year 1 to 5 years More than 5 years	 11 (3.4%) 65 (20.5%) 238 (75.0%)	 17 (6.7%) 36 (14.1%) 200 (78.7%)	 11 (4.2%) 26 (10.0%) 224 (85.8%)	 39 (4.7%) 127 (15.3) 662 (79.5%)
Continuing education over the past 36 months: Yes No No answer	 169 (53.3%) 137 (43.2%) 11 (3.5%)	 124 (48.8%) 126 (49.6%) 4 (1.5%)	 120 (46.0%) 140 (53.6%) 1 (0.4%)	 413 (49.6%) 403 (48.4%) 16 (1.9%)
Care recipient age group: Under age 65 Over age 65 years Both groups No answer	 25 (7.9%) 207 (65.3%) 84 (26.5%) 6 (1.9%)	 157 (61.8%) 44 (17.3%) 51 (20.0%) 9 (3.5%)	 24 (9.2%) 153 (58.6%) 86 (32.9%) 3 (1.1%)	 206 (24.7%) 404 (48.5%) 221 (26.5%) 18 (2.1%)
Witnessed or heard about accident: Yes No No answer	 142 (44.8%) 174 (54.9%) 1 (0.3%)	 64 (25.2%) 188 (74.0%) 2 (0.7%)	 221 (84.7%) 38 (14.5%) 2 (0.7%)	 427 (51.3%) 400 (48.1%) 5 (0.6%)
Witnessed or heard about accident in the past 18 months: 1–5 occasions 6–10 occasions More than 11 occasions	 96 (30.2%) 10 (3.1%) 19 (6.0%)	 46 (18.1) 2 (0.7%) 0	 90 (34.5%) 55 (21.0%) 74 (28.3%)	 232 (27.9%) 67 (8.0%) 93 (11.1%)

In general, respondents had more than five years of professional experience (79.5%), and half had witnessed one injury event in their professional life (Table 2). As expected, there is a weak positive correlation between years of work experience and witnessing accidents, with a peak on those whom worked 1-5 years (Table 3).-Even if this correlation is positive, it is still weak and therefore are the work experience is not the main factor explaining the respondents' experience of accidents. In addition, the age of care recipients is also weakly related to the number of incidents witnessed, with a weak positive correlation between working with the oldest age group and witnessing accidents (between .174 ** and .178**). The conclusion is that the weak positive correlations between work experience, care recipient age and witnessed accidents, indicate tendencies that seems to be of importance – but not explaining the experience of accidents entirely. Moreover, and interestingly is that level of continuing education does not appear to affect the outcome; furthermore, opportunities for continuing education appear to be evenly distributed among the various professions.

Table 3. Correlation between years of work experience, continuing education, care recipient age and number of accidents experienced (N=832)

	Less than 1 year	1–5 years	More than 5 years	Continuing education	Care recipients under age 65	Over age 65	Both age groups	Have not experienced or witnessed accidents	1–5 occasions	6–10 occasions	More than 11 occasions
Work experience less than 1 year	1										
1–5 years	-[1]	1									
More than 5 years	-[1]	-[1]	1								
Continuing education	.468**	.438**	.437**	1							
Care recipients under age 65	.485**	.444**	.447**	.260**	1						
Care recipients over age 65	.421**	.378**	.421**	.297**	-[1]	1					
Both age groups	.446**	.433**	.440**	.274**	-[1]	-[1]	1				
Have not experienced or witnessed accidents	.167**	.174**	.129**	.095**	.165**	.133**	.157**	1			
1–5 occasions	.161**	.179**	.137**	.098**	.125**	.178**	.158**	-[1]	1		
6–10 occasions	.170**	.175**	.148**	.107**	.130**	.174**	.177**	-[1]	-[1]	1	
More than 11 occasions	.166**	.177**	.148**	.105**	.117**	.179**	.166**	-[1]	-[1]	-1	1

Pearson's correlation coefficient ranges between -1 and +1 and indicates strength of correlation.
Significance levels: * = $p<0.05$, ** = $p<0.01$ and *** = $p<0.001$
[1] Correlation estimate not calculated since these are tautological.

Those with experience of accidents stated in the survey which factors they felt played a role in the accidents suffered by residents. As seen in Table 4, the design and interior furnishings of the home ranked third in general; 17.7 per cent of survey respondents felt this was an important factor. The two factors that ranked higher, disability and disease, are both related to the individual circumstances of the resident. The internal variation here, regarding factors can be understood by the differences in of the organization of everyday work between the professionals. A personal assistance, for example, work more closely to the recipient compared to an occupational therapist, and therefore they acknowledge different factors in the situations.

Table 4. Factors that played a role in accidents suffered by residents at home categorized by professional occupation. Absolute numbers and percentages (N=832)

Influencing factor	**Occupational therapists** 317 (38.1%)	**Personal assistants** 254 (30.5%)	**Nurses** 261 (31.3%)	**Total** 832
Disability	107 (33.7%)	31 (12.2%)	112 (42.9%)	250 (30.0%)
Disease	62 (19.6%)	22 (8.7%)	117 (44.8%)	201 (24.1%)
Design and interior furnishings of the home	56 (17.7%)	17 (6.7%)	72 (27.5%)	145 (17.4%)
Poor balance	34 (10.7%)	3 (1.1%)	24 (9.2%)	61 (7.3%)
Stress among residents	26 (8.2%)	26 (10.2%)	24 (9.2%)	76 (9.1%)
Lack of insight on part of residents	20 (6.3%)	-	15 (5.7%)	35 (4.2%)
Loose rugs	17 (5.3%)	-	26 (9.9%)	43 (5.1%)
Poor lighting	12 (3.8%)	-	12 (4.6%)	24 (2.8%)
Furniture	13 (4.1%)	2 (0.7%)	8 (3.0%)	23 (2.7%)
Narrow spaces	11 (3.4%)	10 (3.9%)	4 (1.5%)	25 (3.0%)
Inexperienced personnel	-	17 (6.7%)	4 (1.5%)	21 (2.5%)
Thresholds between rooms	11 (3.4%)	-	3 (1.1%)	14 (1.6%)
Assistive equipment	10 (3.1%)	9 (3.5%)	7 (2.7%)	26 (3.1%)
Under influence of medication	7 (2.2%)	2 (0.7%)	22 (8.4%)	31 (3.7%)
Age-related	3 (0.9%)	-	13 (4.9%)	16 (1.9%)
Stress among personnel	7 (2.2%)	8 (3.1%)	1 (0.4%)	16 (1.9%)
Slippery floors	6 (1.9%)	2 (0.7%)	5 (1.9%)	13 (1.5%)
Materials	-	5 (1.9%)	7 (2.7%)	13 (1.5%)

Moreover, in the survey there was also questions aimed at the specific professional related to their organization of work. For personal assistants, a greater number of detailed questions were asked about living spaces and incidents since this occupational group spent considerably more time with residents to provide assistance with the activities of daily living. The question of how spaces relate to each other was put to occupational therapists, since occupational therapists regularly spend more time visiting residents at home.

The result of this specific questions for occupational therapists and personal assistants are presented in Table 5. The results indicates that the room in which most accidents occurred,

was the bathroom/toilet facilities, which was the site named in about 35 per cent of the respondents. In addition many accidents (22%) also seemed too occurred in the bedroom (Table 5). The results also show differences between the professions. Personal assistants found that accidents were considerably more common in bathrooms/toilet facilities (42.9%). Regarding the spaces (bedroom + bathroom), 37.6 per cent of occupational therapists identified accidents there compared with only 19.3 per cent of personal assistants.

Note that the result in table 4 and 5 sum up the subjectively named factors that played a role in the accidents, and are not an objective or significant asserting of risk factors. Instead, the result shows the experience of accidents mechanism and place of occurrence from a professional perspective.

Table 5. How spaces where accidents occurred relate to each other according to occupational therapists and personal assistants. Absolute numbers and percentages (N=577)

Indoor space	Bedroom	Bathroom /toilet facilities	Hall	Living room	Kitchen	Bedroom + bathroom	Total number of responses	Total number of responses
Occupational therapists	56	78	3	3	16	94	250	317
(per cent)	22%	31%	1.2%	1.2%	6.4%	37.6%	78.8%	
Personal assistants	25	51	2	7	11	23	119	254
(per cent)	21%	42.9%	1.7%	5.9%	9.2%	19.3%	46.8%	
number of incidents per room	81	129	5	10	27	117	369	833
(per cent)	22%	34.9%	1.4%	2.7%	7.3%	31.7%	44.3%	
Outdoor spaces	Stairway	Entrance	Pavement	Garden	Differences in level	Uneven terrain	Total number of responses	Total number of
Occupational therapists	50	42	30	3	8	14	147	317
(percent)	34%	28.6%	20.4%	2%	5.5%	9.5%	46.4%	
Personal assistants	13	7	19	2	1	3	45	254
(percent)	28.9%	15.6%	42.2%	4.4%	2%	6.7%	17.7%	
number of incidents per space	63	49	49	5	9	17	192	833
(percent)	32.8%	25.5%	25.5%	2.6%	4.7%	8.8%	23%	

Meanwhile, both public health nurses/nurses and personal assistants were asked about various activities related to accidents because of the nature of their duties, thus how spaces relate to each other can also be considered in terms of the activity during which the accident occurred. In the 65-year and older age group, transfers/ambulation was the primary risk activity; the analysis showed a positive correlation between transfers/ambulation and accidents (estimate for public health nurses/nurses was .222** and for personal assistants .301**). However, in

this age group, any activity was a risk activity in relation to potential accidents, compared to the younger age group (under the age of 65). Also, more activities tend to be risky with age, for example hygiene and dressing. Moreover, there is also a difference in the estimates directions and strengths, there personal assistants had somewhat higher estimates in the correlation compared to the nurses (Tables 6 and 7). This might be due to the different work situations between the two professional groups, and also indicates that the survey captured minor accidents experienced by the personal assistance in everyday work.

Table 6: Correlation matrix: age of residents and activity at time of accident, based on responses from personal assistants (N=254)

	Hygiene	Dressing	Transfers/ambulation	Cooking	Sleep	Other
Under age 65	.076**	.072*	0.55	.100**		
Over age 65	.276**	.271**	.301**	.275**	.290**	.262**

Pearson's correlation coefficient ranges between -1 and +1 and indicates strength of correlation. Significance levels: * = p<0.05, ** =p< 0.01 and *** = p<0.001

Table 7: Correlation matrix: age of residents and activity at time of accident, based on responses from public health nurses (N=261)

	Hygiene	Dressing	Transfers/ambulation	Cooking	Other
Under age 65	-.077*	-.078*	-.091**	-.081*	-.072*
Over age 65	.201**	.198**	.222**	.198**	.187**

Pearson's correlation coefficient ranges between -1 and +1 and indicates strength of correlation. Significance levels: * =p< 0.05, ** = p<0.01 and *** = p<0.001

Experience of injuries and risks

As seen above, a majority of the respondents of all three groups have personal experience of accidents among individuals under their care. To enable a further understanding of which factors that are of importance to the occurrence of accidents, the open questions (free text in the survey) was analyzed qualitative. The response rate on these open questions was quite surprising, a total of 610 respondents wrote comments (237 public health nurses/nurses, 178 occupational therapists and 195 personal assistants). The analytic work considering risk factors are here presented as three themes: 1. individual circumstances of the residents, 2. how the work was organized and 3. design of the physical environment.

The first theme includes factors such as disabilities, current condition, use of assistive devices and especially medical conditions such as dementia. Several responses referred to dementia in particular; for example, one respondent states that lack of disease awareness and forgetfulness led to risk situations: "*the person lacks disease awareness. It is not uncommon with dementia that residents forget their walker"* (occupational therapist). Another notes that a good physical environment and access to technical aids are not always helpful when a resident suffers from dementia: "*Generally a major challenge to deal with patients who suffer from cognitive dysfunction with difficulties understanding information and instructions"* (public health nurse). Thus the biggest challenge is to achieve a functioning daily life, in which residents can be supported by personnel who understand the importance of the circumstances of the individual in relation to risk of injury.

Organization and daily routine of caregiving are also related to risk of injury; free text responses highlighted aspects of knowledge and experience as injury-reducing factors as an reoccurring theme. For example, risk of injury is deemed to relate to "*inadequate knowledge about technical aids, use of correct transfer technique to protect one's own body while maximizing the*

remaining ability of the patient" (occupational therapist), or "*untrained staff and carelessness."* Similarly, force of habit can affect events; in other words, "*you do things the way you've always done them"* (occupational therapist). But the time factor can also play a role, and injuries can occur when "*the person tries to carry out the activity alone while waiting for the caregiver/home help services"* (occupational therapist).

Shortcomings in the design and interior furnishing of the home are often described using specific examples relating to furnishings, material choices – especially flooring – and differences in levels was the third theme. The physical environment in itself also affects appropriate use of technical aids, as noted by one respondent: *"They have difficulty using technical aids because of the design of the home. Rugs, elevated thresholds and cables pose risks for tripping and slipping*" (occupational therapist). This demonstrates how, even when corrective measures have been taken to compensate for shortcomings in individual circumstances, the environment may pose an obstacle that thwarts any benefits.

What becomes apparent from the analysis of the free text responses is the importance of the interplay between factors; injuries do not generally result from any single factor, but rather from, as one respondent expressed it, "*stress, design of the home, disability with lack of insight"* (occupational therapist). And another shares a similar experience by pointing to the combination: "*Design of the environment, cognitive dysfunction and impaired balance combined with osteoporosis"* (occupational therapist). However, public health nurses/nurses entered the most comments in the free text section of the survey.

Discussion

Several countries are undergoing demographic shifts, including a substantial increase in the proportion of elderly people in society. People with dementia are often insecure and the design of their homes has largely been ignored as an area of research with regard to the consequences of dementia (van Hoof, 2010). While it is a fact that the proportion of elderly individuals in society is increasing, the substantial care needs of people with disabilities in different age groups are rarely discussed (Hjalmarsson & Österman, 2017). Moreover, the need for support interventions from society for people with various disabilities and for the elderly will also increase. In addition, staff in various professions are subjected to the changes, requirements and stresses that are associated with working as a personal assistant, occupational therapist, or public health nurse/nurse (Kåhlin *et al.*, 2018; Womack *et al.*, 2018). Nor will the costs and suffering that arise when accidents occur in the residential care-setting decline over time.

Our investigation shows that it is relatively common for occupational therapists, personal assistants and public health nurses/nurses to witnesses accidents among residents in the home and residential care- settings. In just the previous 18 months, more than one in four representatives of these professional groups had witnessed between one and five accidents. Despite their experiences in witnessing and hearing about risks and accidents in the residential settings, only half of the occupational therapists, personal assistants and nurses stated that they had completed any continuing education over the past three years. Public health nurses/nurses proved to have had the least continuing education on risk vulnerability and occurrence of injuries among residents.

When accidents occur at home and in the residential care-setting, affected individuals can use various coping strategies in their daily life and living situation (Lundälv, 2018d). The injured parties or those who have witnessed an accident may also talk about the incident with family, friends and others. But there are other examples when people actively choose to remain silent about the incident and view it as something that happened in the past; in other words, they want to get on with their lives. When the residential setting is not modified and accessible, people may also experience a sensation of being ignored or silenced, and feel as though no one has listened to their concerns about inadequacies, barriers and insecurity.

According to the respondents in the study most accidents occurred in the bathroom/toilet facilities, which was the site of about 35 per cent of accidents. Many accidents also seemed too occurred in the bedroom – 22 per cent. Nearly 32 per cent of respondents implicated the combination of bedrooms and bathrooms. That response may pertain to either one of these two rooms, or to transfer/ambulation between them. Several added that the injury occurred at night, specifically during night-time bathroom visits, which is common among the elderly.

In summary, this study shows that injuries occur in the layers that the Stewart Brand model refers to as “stuff” and “space plan” (1997). The more superficial the layer, the easier it is to rectify errors and inadequacies. Loose furnishings and furniture can easily be changed. Some built-in furnishings can also be changed.

Conclusions

The combination of the physical environment, social factors and the organization of the healthcare system is important for both risk of injury and accidents at home and in the residential care-setting. The study shows that most accidents occur in bathrooms/toilet facilities and in bedrooms, as well as in a combination of these two spaces, which means that proximity of bedroom and bathroom is important when planning new housing where the elderly can live in comfort and dignity.

An additional conclusion of this investigation is that the three professions studied have extensive knowledge and experience, which in the future could be used in injury and accident prevention initiatives at home and in residential care-settings.

The professionals' experiences are important for developing the injury prevention work to create safe and secure residential care-settings. Through their practical knowledge and experiences, not only the housing environments become safer but also their own working environment could be developed. We also believe that the professional´s experiences could be used in a multidisciplinary inclusive research together with various organizations. In this way, the research would be put into practice and could have a clear societal benefit.

This study has several limitations. One limitation is that the impact of educational initiatives on the various professions was not investigated. Similarly, there is no basis for a truly comparative study since the survey questions were specifically adapted to fit the different professions. Another limitation is that the study does not show the attrition rate since the survey was carried out online.

Two questions are deemed to be important for further research. This first question is how the experiences of these three professional groups can be used for active accident prevention at

home and in the residential care-setting. Such an approach could empower these groups and also contribute to implementation of more effective initiatives and corrective measures. The second question addresses what effect educational initiatives have on the ability of these professional groups to discover risk situations in homes. It would also be important to monitor how the various educational initiatives and professional voices are communicated to interested parties and to the public.

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